

I. Introduction

Qualcomm thanks the Sub-Committee on Standards (“SOS”) for the opportunity to comment on the National Institute of Standards and Technology (NIST) Request for Information regarding the Effectiveness of Federal Agency Participation in Standardization in Select Technology Sectors (RFI) for National Science and Technology Council’s (“NSTC”) Subcommittee on Standardization dated December 8, 2010. Qualcomm wholeheartedly supports the current U.S. government policy that (a) relies on private sector, innovation and standards development and (b) discourages barriers to trade that may harm dynamic competition and innovation. U.S. policy for standards development correctly relies on funding by and the prospects of returns to the private sector to respond effectively and efficiently to market needs with innovative solutions. Interoperability standards are critical for smart grid, healthcare IT, cyber security, and other emerging technologies identified in the RFI. Development of interoperability standards for these technologies should likewise be driven by the private sector via voluntary consensus-based standards setting organizations (SSOs) that respect intellectual property rights (IPR).

II. Qualcomm’s Innovation Story Supports the President’s Vision

President Obama’s *Strategy for American Innovation*¹ establishes a vision and a structure for reinvigorating the vitality of America’s economy and ensuring our country’s continued competitiveness in the global marketplace. The President’s *Strategy* outlines the central part innovation has played in our national prosperity and in international trade, and highlights the critical role the private sector plays as the driving engine of innovation.

¹ The White House, *A Strategy for American Innovation: Securing Our Economic Growth and Prosperity*, <http://www.whitehouse.gov/innovation/strategy> (last visited Mar. 1, 2011).

The private sector is an engine of innovation. Great ideas can come from many corners, and the capacity of decentralized, competitive markets to see innovative opportunities, prove their value, and enable their diffusion drives our economic growth and the creation of new, better jobs for the American people. The Obama Administration is committed to providing the best possible environment for private-sector innovation, whether by established firms or entrepreneurs.²

The story of Qualcomm's evolution from a gathering of a few communications technology entrepreneurs in the den of Dr. Irwin Jacobs, co-founder of Qualcomm, into an R&D powerhouse and the world's largest fabless semiconductor company with annual revenues of \$11 billion is a case study in how private enterprise, appropriately supported by U.S. laws and policies protecting private intellectual property rights, leads to creation of an entirely new industry and economic sector.

Qualcomm started with seven people in 1985 that began not with a specific product focus, but rather with an *idea* and the goal of innovating in digital wireless communications. Its early work focused on research and development on behalf of third parties; half of Qualcomm's work was pursuant to government contracts. Qualcomm's work on a mobile satellite communications system led Dr. Jacobs to the insight that employing CDMA³ might prove a significant advantage for mobile communications over incumbent technologies, such as TDMA.⁴

CDMA at that time was considered a theoretically promising technology that was unsuited to commercial applications due to technical difficulties and obstacles to its commercialization and timely deployment. Even when some suggested that CDMA defied the laws of physics, Qualcomm nevertheless pursued the technology relentlessly by investing research and development (R&D) dollars into development and deployment in working

² *Id* at 4.

³ CDMA stands for "code division multiple access," a wireless signal technology allowing numerous signals to occupy a single transmission channel, optimizing the use of available bandwidth.

⁴ TDMA stands for "time division multiple access," a technology for transmitting intermittently on the same frequency, with the timing of the transmissions arranged to arrive at a receiver in sequence.

prototypes. Between 1985 and 1988, Qualcomm used its innovations to develop a wireless, two-way messaging and positioning system, “OmniTRACS,” enabling trucking firms to closely track their drivers’ progress, and dispatchers to send messages to each other.⁵⁶ OmniTRACS, which also utilizes spread spectrum signaling, is now the largest satellite-based commercial mobile system for the transportation industry today.⁷ In 1989, Qualcomm demonstrated that its R&D efforts had produced solutions to the technical obstacles that had previously rendered CDMA unsuitable for use in commercial, wireless applications.⁸

Qualcomm’s focus on a business model based upon the development and licensing of intellectual property has generated an array of benefits for the U.S. economy, and consumers worldwide. Over the past 25 years, the company has grown from 7 to over 17,500 employees in 141 worldwide locations in over 30 countries with R&D centers in the U.S., Asia and Europe. As one of the largest employers in San Diego, California, Qualcomm plays a significant role in shaping and contributing to the dynamics of the San Diego regional economy. According to a San Diego Regional Chamber of Commerce study conducted in 2008, Qualcomm’s total economic impact to the San Diego region was approximately \$5.5 billion in 2007. Also from the same study, Qualcomm employed over 10,000 people directly in San Diego in 2007, and money spent by Qualcomm and its employees created and supported over 26,000 jobs touching a variety of goods and services in San Diego County. As of 2007, Qualcomm was responsible for economic output equal to approximately 3 percent of the Gross Regional Product of San Diego County and supported an estimated 2.4 percent of total jobs. And of course, all of these numbers are much higher today,

⁵ Statement by Dr. Irwin Mark Jacobs, Co-Founder Qualcomm, prepared for the hearing on Reauthorization of the SBIR and STTR Programs, before the U.S. Senate Committee on Small Business and Entrepreneurship, Feb. 17, 2011, 10:00 a.m.

⁶ Qualcomm was inducted this year into the Small Business Innovation Research Hall of Fame.

⁷ *Id.*

⁸ *Id.* Qualcomm not only bore the costs and risks of developing these technical solutions, but also those of testing and disseminating those solutions to the wireless industry.

given Qualcomm's continuous, rapid growth. Company revenues worldwide, which come from chipset sales as well as through licensing royalties, equal \$11 billion, and the federal government received \$1.4 billion in federal taxes from Qualcomm in 2010. Qualcomm has since its inception invested more than \$16.1 billion in R&D to generate technology that it licenses widely and openly. In 2010, Qualcomm spent \$.23 of every dollar in revenue (\$2.55 billion) on R&D. This investment benefits the overall development of the wireless industry and its ecosystem and, through the licensing of its technology, enables companies all over the world to profit from enhanced market opportunities. Qualcomm's philosophy is to enable many other companies in the wireless value chain to succeed. In this regard, Qualcomm has approximately 200 licensees, including directly and indirectly virtually every company in the telecommunications sector.

Qualcomm's continuing success as an innovator, job creator and facilitator of competitive growth has very much resulted from its ability to realize the benefit of intellectual property it has created through its R&D investments. In doing so, Qualcomm illustrates the importance of a major goal of the President's innovation strategy - that is to promote inventiveness and innovation through effective intellectual property policy:

Intellectual property (IP) rights provide critical incentives for commercial innovation. IP further allows new ideas to be traded between firms, finding their best uses in the marketplace, and is an important determinant of entrepreneurial funding. Because IP supports both innovation and entrepreneurship, public policy must ensure that innovators receive high-quality IP rights in a timely manner, while maintaining public access to basic discoveries and room for healthy experimentation.⁹

Qualcomm agrees fully with the President that innovation is critical to keeping America competitive in the global economy. Qualcomm would have been unable to deliver the benefits of its innovations to America and the world at large absent the incentive scheme created by the

⁹ The White House, Strategy for American Innovation: Promote Market-Based Innovation, <http://www.whitehouse.gov/innovation/strategy/market-based> (last visited Mar. 1, 2011).

patent system. Creating, testing and implementing new technology is inherently risky; nevertheless, Qualcomm's founders and later its shareholders were willing to take that risk based on the confidence that the U.S. patent system coupled with a diverse and flexible global standards setting system would allow it receive the rewards determined by the market to be appropriate.

III. The Current Standards System Is Effective

Qualcomm applauds the NTSC Committee on Technology for its commitment to U.S. standards policy as defined in the National Technology Transfer and Advancement Act (NTTAA) and Office of Management and Budget Circular A-119 (OMB Circular A-119) as outlined in the Charter the NSTC established for the Subcommittee on Standards.¹⁰ Therein, the NSTC states that one of the functions of the SOS is to inform audiences, including the international community, as to how and why the U.S. approaches standards in a voluntary consensus-based manner.¹¹

The voluntary consensus-based system is flexible, efficient, market driven, and market responsive. It consists of various SSOs, including international standards bodies, national standards bodies, and an ever-increasing number of consortia. These SSOs develop standards for use within a myriad of industries. The Office of the United States Trade Representative (USTR) states in its 2010 Report on Technical Barriers to Trade:

Voluntary standards can facilitate buyer-seller transactions, spur competition and innovation, increase the efficiency of production, unify markets, and promote societal goals. When used as the basis for establishing a technical requirement in a regulation, voluntary standards can help officials harness relevant technology to achieve regulatory goals in a cost effective manner. In the United States,

¹⁰ See OMB Circular A-119 Revised, Federal Participation in the Development and Use of Voluntary Consensus Standards and in Conformity Assessment Activities (rev. Feb. 10, 1998) (OMB Circular A-119) *available at* <http://www.whitehouse.gov/omb/rewrite/circulars/a119/a119.html>.

¹¹ See Charter of the Subcommittee on Standards Committee on Technology National Science and Technology Council, Summer 2010.

responsibility for developing voluntary standards rests almost exclusively, and appropriately, with the private sector, as this is where the technical know-how for sophisticated products and complex processes resides.¹²

In particular, voluntary interoperability standards are well-suited to and extensively used within the Information and Communications Technology (ICT) industry. The ICT arena has been rapidly expanding and will continue to expand for the foreseeable future at a very rapid pace. The wireless communications industry, in which Qualcomm is a leader, has over 5 billion subscribers worldwide - a 632% increase over the past ten years.

An examination of the number of mobile communication device manufacturers, for example, offering their products based on different wireless technologies, such as CDMA, GSM, and UMTS confirms that competition is robust within the ICT industry. The voluntary standards process has evolved in wireless to the point that there is worldwide cooperation between national and regional SSOs in the form of partnerships to develop common standards. Competition occurs among the various manufacturers to build better products that conform to these standards. These standards have led to extremely sophisticated equipment that has been implemented in an efficient, cost-effective manner leading to a very competitive international marketplace. Continued innovation within the U.S. and throughout the world depends on viable standards and the current consensus-based voluntary system has proven highly effective in this regard.

IV. Changes to Current U.S. Policy Could Discourage Innovation

Governmental policies directed toward standardization therefore should be carefully considered, crafted and implemented to ensure that they do not inadvertently or otherwise discourage innovation. Two areas of focus may warrant particular attention in this regard.

¹² OFFICE OF THE U.S. TRADE REPRESENTATIVE, 2010 REPORT ON TECHNICAL BARRIERS TO TRADE 22 (2010).

These are: (a) governmental mandates of interoperability and related standards¹³, including mandates that impose restrictions on the inclusion of patented technology in such standards, and, (b) creating exceptions to constraints imposed by antitrust law that would otherwise prohibit the use of buyer cartels to dictate to owners of patents incorporated in standards the fees they must accept. Caution in these areas is particularly important in connection with interoperability and related standards involving emerging technologies that are increasingly becoming the focus of government legislation, regulation and procurement. Otherwise, U.S. policy would risk discouraging innovation by weakening the ability of inventors to recover their investment in risky R&D endeavors, diminish the availability of capital made available for inventive endeavors, and generally weaken economic growth and competitiveness.

(a) **Government Mandates of Standards**

Government mandated interoperability and related standards could be inferior to standards resulting from more collaborative efforts, and deter innovation. Such an approach would eliminate the ability of the private sector to effectively participate in the standardization process, and drive superior technical solutions through the contribution of their technologies. Rather, a mandated approach would pre-define a standard's technical parameters potentially without consideration of critical technical and practical factors.

This would be an approach that is contrary to the way the existing voluntary consensus-based standards system operates, including in connection with the development of standards as may be specified in federal agency rules and regulations. Innumerable examples exist of success stories where private and public stakeholders have cooperated in the development of such standards, in no small part because such an approach allows participation of all subject matter

¹³ E.g., testing and conformance standards.

experts and does not seek to impose less-informed technical requirements without the benefit of private stakeholder input.

Government procurement preferences for standards that exclude royalty-bearing patented technology are also inconsistent with this approach. A government mandated standard that pre-defines technology could eliminate incentives to invest in innovations most useful in standards because investors would be denied recovery of their costs, including compensation for risk. If the government-mandated standard achieves dominance, there would be little opportunity to support potentially competing standards based on other technologies.

Critical governmental operations would be deprived of potentially superior solutions, firms' innovation investment incentives will be diminished, and even if there may be licensing costs attendant to the use of patented technology, such costs could pale in comparison to resulting inefficiencies and waste in government operations. More specifically, to the extent a licensing fee exists in connection with standardized products or services that are part of a government procurement program, such costs could be *de minimis* when compared to the benefits standards users would have to forego, and or the additional costs (e.g., implementation, maintenance, and replacement) that the government and other users would have to incur. Indeed, readily available industry standardized technology will typically result in lower costs, greater selection of solutions conforming to standard, greater richness in types of implementations conforming to the standard, less risk due to financial or other issues with a company, and smooth transitions to the next generation technologies. IPR licensing fees for industry standardized technologies may also be less than the fees for other approaches.

In summary, the development of interoperability and related standards should continue to be pursued through the existing private voluntary standards system in the U.S. Such an approach

has and will continue to allow for the involvement of all stakeholders in the development of standards, based upon consideration of all available technical solutions. This will also allow firms to continue investments in innovation because they will not be deprived of the opportunity to have their technology included in government influenced standards, and realize a proper return on their innovation-related investments.

Furthermore, with standards effectively being developed internationally, the U.S. must guard against mandating a particular standard that is inconsistent with the direction of the rest of the world. To do so would put U.S. manufactures at a disadvantage in that they would be required to develop to both U.S. and international standards. Indeed, there are those who contend that that one of the reasons Japan has lost much of its international competitiveness in the wireless industry is that many of its domestic standards were different than those being used in the rest of the world. Japanese manufacturers were then forced to develop both and were not able to adequately compete against the expanding competition in the used more universally outside of Japan.

Governmental mandates of standards might be appropriate as a last resort, such as may be required in cases of a national emergency.¹⁴ But, if the government mandates standards more frequently than on these extremely rare occasions, it will produce an imbalance between the country's need to benefit from innovative technologies incorporated into standards and deter incentives of firms to invest in the future by create next generation technologies because there will diminished opportunity to earn a reasonable return on the investments necessary to create technology, including through the protection of intellectual property rights and obtaining

¹⁴ For example, the USTR report states: "The United States and other governments have a right to adopt and enforce measures to pursue legitimate objectives such as protecting human health and the environment and preventing deceptive practices. At the same time, it is appropriate to question standards-related measures that appear non-transparent, discriminatory, or otherwise act as unwarranted barriers to U.S. trade." *Id.* at 5.

licensing revenues. This, in turn, could adversely affect innovation due to investment incentives being diminished. When innovation is adversely affected, consumer choice, job growth, and revenue growth may also be negatively affected as the President has noted.

(b) Joint Negotiations of License Terms

For years, the private, voluntary standard setting system has successfully co-existed with, and indeed has thrived under, generally recognized antitrust law principles. Recently, however, some have made proposals that would, in essence, allow otherwise potentially antitrust suspect conduct to address what are claimed to be flaws in the standards development process. The claimed standardization flaws involve the inclusion of patented technology in standards, and the potential need to obtain licenses for such patents. Thus, some contend that joint negotiation of licensing terms should be permitted *ex ante* - *i.e.*, before a standard is finalized - so that potential licensing costs are minimized. Some have argued that such steps should particularly be made in connection with standards relating to public procurement or government programs.

Mandating such an approach, however, is neither necessary nor appropriate. First, for the reasons discussed above, even in the public procurement context the issue of potential licensing costs has not and should not deter effective standardization. Such costs indeed may be *de minimis*.

Second, Qualcomm and many other patent owners, *ex ante*, commit to license their essential patent claims on reasonable and nondiscriminatory (“RAND”) terms, announce maximum rates, and freely engage in bilateral negotiations with interested parties. The foregoing diminishes or eliminates theoretical concerns about “patent hold-up” without undue diminution of innovation incentives. By contrast, mandating or even encouraging *ex ante* joint negotiations would insulate from antitrust scrutiny coordinated action that would create and

facilitate the exercise of monopsony or oligopsony power over licensing terms, and most specifically royalties that could be charged by a patent owner for the use of its standards-essential patent claims.¹⁵ This would, contrary to the teachings of *A Strategy for American Innovation*, increase the “inherent risk and uncertainty of innovation;” reduce rather than “enhance private sector innovation incentives;” accelerate not reverse the decline in “corporate R&D” and “other R&D metrics, and” ultimately delay or deny to the economy and consumers many of the benefits that the patent system was designed to promote.

Thus, any government policy that would require or encourage joint *ex ante* negotiation of licensing terms among standards implementers and individual patent owners would be imprudent. Such an approach would bear many indicia of buyer cartels that are highly problematic under current U.S. antitrust precedent. Creating a special exception to antitrust law so that standards implementers may aggregate their buyer power and dictate license terms to owners of patents, including patents incorporated or proposed for incorporation in a standard, is fundamentally inconsistent with President Obama’s call for policies that “enhance private sector investment incentives.”

As *A Strategy for American Innovation* correctly acknowledges, R&D costs “are typically not easily undertaken by private investors.” Investment incentives already include the “inherent uncertainty of innovation,” the likelihood that innovators and their investors will realize “little if any immediate commercial return” and the fact that “private firms do not capture the full gains of

¹⁵ See James. F. Rill, Christopher J. MacAvoy, “Ex Ante Licensing Negotiations in Standard Setting and the Rule of Reason,” Antitrust Report, Mathew Bender, IV at 82-92; (2010)(“joint negotiations [of license fees by standards implementers] “should pass muster under the rule of reason only in narrow and rare circumstances”); J.G. Sidak, “Patent Hold-Up and Oligopolistic Collusion in Standard-Setting,” 5 Journal of Competition Law and Economics 123 (2009)(proponents of joint license fee negotiations by standards implementers have failed to demonstrate that social cost of patent hold-up outweighs social cost of oligopsonistic collusion); see also R.G. Noll, “Buyer Power and Economic Policy,” 72 Antitrust L. J. 589, 608-09 (2005)(observing that an agreement by competing booksellers on the royalties they would pay for best sellers as a means to prevent them from realizing monopoly profits would diminish incentives for and output of best sellers).

their innovations.”¹⁶ Government should neither require nor tolerate the use of buyer cartels to interfere with the incentive scheme created by patent law, which relies on the use of bilateral negotiations to determine market-based license fees.

Moreover, requiring or encouraging joint negotiations would be inconsistent with how licensing negotiations are actually conducted. Indeed, from its experience as both a licensor and licensee that implements standards, Qualcomm understands that patent licenses negotiated bilaterally between two parties are rarely, if ever, limited to claims essential to a standard. Patent licenses for claims essential to a standard are usually part of a more complex agreement that includes other patents and claims, and perhaps rights to use the licensee’s patents.

In addition, the actual negotiation discussions vary from licensee to licensee. Each licensee has its own sensitivities, interests, business plans and requirements. Often the negotiations consist of tradeoffs amongst and between several of provisions that are being negotiated. Sometimes licensees will have unusual requests that need to be considered and, if possible, accommodated.

As a result of the bilateral negotiations described above, Qualcomm has been able to enter into license agreements covering Qualcomm's patented technologies with approximately 200 licensees and has enabled the use of Qualcomm's technologies in a rapidly growing and expanding range of applications and devices providing an increasingly valuable set of services to consumers worldwide.

Qualcomm thus urges the U.S. to continue its current policy supporting standards developed through the current voluntary consensus-based standards system in which SSOs define balanced patent policies to meet the needs of their stakeholders, and the relevant industry.

¹⁶ *Strategy* at 10.

Policies favoring one business model over another should not be imposed on standards development even in those cases where the standard may be relevant to a public initiative or objective.

V. The Current Standards System Will Support Smart Grid, Healthcare IT, and Cyber Security in the Future

The current voluntary consensus-based standards system will continue to provide the same benefits, such as, flexibility, efficiency, and market responsiveness, for smart grid, healthcare IT, cyber security, and other emerging technologies. As the USTR states, “[a]pplication of principles such as consensus, openness, and transparency when developing standards helps ensure standards are globally relevant and respond to both technical and regulatory needs.”¹⁷ Further, many standards that have been widely adopted and have stimulated further innovation have been developed in or ratified by SSOs that permit reasonable and nondiscriminatory (RAND) licensing including reasonable royalties.

RAND policies promote technology and business competition consistent with U.S. standards policy. Several examples of successful standards with RAND policies in the communications area include:

- CDMA. First published in 1993 by TIA. CDMA is still being enhanced today.
- UMTS/WCDMA: First published in 2000 by ATIS. It is still being actively enhanced today.

The standards above led to the establishment of worldwide partnership projects, 3GPP2 and 3GPP. In addition, IEEE 802.3 (Ethernet) came from a proprietary specification developed in the 1970's. Ethernet II (10 Mbps) became the IEEE 802.3 standard in 1983 with a few modifications. Since then it has been enhanced many times. Essentially every computer in the

¹⁷ OFFICE OF THE U.S. TRADE REPRESENTATIVE, 2010 REPORT ON TECHNICAL BARRIERS TO TRADE 23 (2010).

world supports the 802.3 series of standards for high speed wired communications. Wi-Fi, which is also known as IEEE 802.11 is another example.¹⁸ In 1990, the Institute of Electrical and Electronics Engineers (IEEE) formed the 802.11 working group and through a voluntary consensus-based process, the Wi-Fi standards were adopted and continue to evolve.¹⁹ The Wi-Fi standard is in use globally today in a myriad of products. The IEEE 802.11 standards have evolved in the last twenty years to become one of the primary ways to access the Internet wirelessly.²⁰

VI. Recommendations Regarding Federal Agency Participation

Qualcomm appreciates the SOS's commitment to the current standards system and the fact that the current Administration understands the tremendous impact standards have on U.S. competitiveness, innovation and job creation. Qualcomm also supports a strong private public partnership whereby the U.S. government ("USG") participates as one of the various stakeholders in the process as opposed to an overseer.²¹ In this regard, the USG is in the best position to provide government requirements.

Since the USG can be such an important stakeholder in helping to define public needs for standards, the USG like all important stakeholders should participate along side the private sector in consortia that meet the openness and other requirements of OMB Circular A-119 for voluntary consensus-based standards. Many standards originate from work done in these groups. For example, the well known USB and Bluetooth specifications are developed in industry fora. Essentially what has become important is industry recognition of the standard, rather than the

¹⁸ IEEE, IEEE-SA STANDARDS BOARD BYLAWS § 6.2 (Feb. 2011), *available at* http://standards.ieee.org/develop/policies/bylaws/sb_bylaws.pdf.

¹⁹ Press Release, IEEE, IEEE 802.11 Working Group, on Its Way to 5 GB/S, Celebrates 20 Years of Contributions to Wireless LANs (Sept. 13, 2010), *available at* <http://standards.ieee.org/news/2010/20anniv.html>.

²⁰ *Id.*

²¹ USG should participate through its experts. NIST may serve as a resource in this regard.

group that develops the standard. Companies often prefer to initiate standards development work in smaller consortia since those SSOs allow their members to focus and often move a new technology forward more rapidly. It is also a good approach for a company which has done some pioneering work to get that work deployed into the industry.

Further, consistent with our earlier comments, standards bodies (technical groups) work to develop technical solutions to meet the needs and requirements of applicable stakeholders. Participants should not be side-tracked from their primary purpose by having to consider licensing issues that are best left to bilateral discussions outside of the standard-setting process.

Finally, the USG can help by promoting standards education at the University level to meet the needs of both the public and private sectors. Today the private sector is providing the vast majority of standards training for U.S. companies. Other countries are ahead of the United States in this regard developing a multidisciplinary approach to standards education.

VII. Conclusion

Qualcomm appreciates the opportunity to share its views in response to the RFI. The U.S. market driven voluntary consensus-based standards development process has proven effective in driving innovation and responding effectively and efficiently to market needs. This policy, as embodied in the NTTAA and OMB Circular A-119, can be relied upon to create interoperability standards in support of smart grid, healthcare IT, cyber security, and other emerging technologies identified in the RFI.