

**Before The
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

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In The Matter Of)	
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The Spectrum Policy Task Force)	ET Docket No. 02-135
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COMMENTS OF QUALCOMM INCORPORATED

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GHz. QUALCOMM, as a company devoted to technological innovation, supports the development of new communications technologies. But, the issue is not whether the Commission should embrace new technologies, but rather on what spectrum and at which technical parameters. The nation's radio spectrum is a scarce public resource, and to ensure that the resource is not wasted, the Commission should carefully weigh the efficiency of competing proposed uses of spectrum before making spectrum allocation decisions and establishing technical parameters for the use of spectrum.

QUALCOMM discusses herein its 3G CDMA technology, CDMA 2000 1X, which enables wireless carriers to provide exciting, innovative high speed 3G wireless data services, using their existing spectrum. This technology will also allow these carriers immediately to double the capacity of their networks for voice traffic, with a second doubling also possible through additional enhancements, but without requiring any new spectrum. A number of major carriers, including Verizon Wireless, Sprint PCS, ALLTEL, Leap Wireless, and Qwest Wireless, are in the midst of deploying this 3G technology. QUALCOMM believes that these deployments will create tremendous demand for 3G services as consumers begin to enjoy them, and thus, there will be a need for new spectrum to service such demand over the next 5 to 10 years. At present, however, through the efficiency of QUALCOMM's 3G CDMA technology, American wireless carriers can provide innovative 3G services without any new spectrum.

Second, with regard to harmful interference, as the Commission provides for greater unlicensed uses of spectrum, QUALCOMM believes that the Commission should place the burden squarely on unlicensed users not to cause harmful interference to licensed services. In authorizing particular unlicensed uses, the Commission should reaffirm that this burden can only be met with real world, collaborative test data supplied by the developers of unlicensed technologies. The proponents of an unlicensed use should make prototype devices widely and freely available for such testing. The definition of harmful interference in Section 2.1 of the Commission's rules is broad and adequate; the issue is whether the definition is met in particular

circumstances. In deciding harmful interference issues, the Commission should not permit speculation and surmise to substitute for hard data.

Wireless users can suffer in tangible ways from harmful interference to existing wireless services from new unlicensed services, such as ultra wideband (“UWB”). As QUALCOMM has demonstrated in the case of harmful interference from UWB, such harmful interference can consist of blocked calls, dropped calls, and an overall reduction in network capacity. These kinds of degradation do constitute harmful interference under any reasonable interpretation of the present definition in Section 2.1 of the Commission’s Rules and should be deemed as harmful interference under any revised definition the Task Force may consider.

In particular, QUALCOMM urges the Commission to fully protect E911 services from any and all harmful interference. These services can provide the millions of Americans who call 911 from their wireless phones with a substantially added measure of safety. QUALCOMM’s position location technology, known as assisted GPS, once fully deployed, will enable the police and emergency rescue personnel to locate wireless callers to 911 precisely and with a very high degree of accuracy. The Commission must protect both GPS and the wireless communications link from any and all harmful interference for E911 service to live up to its full life-saving potential. Indeed, consumers will not enjoy any added safety from E911 service if although the GPS band is protected, E911 calls are dropped, blocked, or precluded because the communications link is not adequately protected. Harmful interference to E911 service from UWB devices is likely to pose an especially difficult problem in low signal, blocked environments, where GPS signals are very weak and where public safety personnel most need reliable E911 service so they can precisely locate and rescue people in emergencies.

As a result, the Commission should insist on clear and convincing data to establish that an unlicensed use will not interfere with a safety of life service such as E911. Protecting existing safety of life services from harmful interference is a core function that the Commission has ably fulfilled since its creation, and the public interest demands no less. The Commission should not permit the developers of unlicensed uses, in effect, to shoot first and ask questions later. Rather,

all bona fide concerns about harmful interference should be resolved conclusively on the basis of hard data before the public is put at risk or, even worse, suffers any harm.

II. Background

QUALCOMM is one of the world's leaders in developing, delivering, and enabling innovative digital wireless communications products and services based on its digital technologies. Since its founding in 1985, QUALCOMM has developed products and services based on its code division multiple access ("CDMA") technology, which QUALCOMM has licensed to over 100 leading manufacturers of wireless communications infrastructure equipment and handsets around the world. QUALCOMM has developed chipsets, system software, satellite-based products, and wireless data products, all based on one or more variants of CDMA. QUALCOMM's first products for wireless systems were based on its cdmaOne standard, a second-generation ("2G") wireless standard which was used by wireless operators for some of the first digital cellular and digital PCS systems. The cdmaOne standard was and is the most spectrally efficient 2G standard, and wireless systems based on cdmaOne, even in limited and encumbered spectrum, can handle greater numbers of simultaneous users and larger quantities of minutes of use than systems based on any other 2G standard.

Here in the United States and around the world, the wireless industry is in the midst of deploying third generation ("3G") wireless systems. All of the various 3G standards are based on CDMA. In particular, QUALCOMM developed the CDMA2000 standard, which is comprised of three modes: 1x, 3x, and 1xEV. Wireless operators deploying systems based on CDMA2000 1x can provide advanced data services based on a forward peak data rate of up to 307 kbps using only a single 1.25 MHz carrier. In addition, the voice capacity of a wireless system using CDMA2000 1x is doubled, and QUALCOMM has developed solutions to enable such systems to double again their voice capacity, all without any additional spectrum. Thus, wireless operators deploying CDMA2000 1x in the United States can provide innovative and

exciting 3G high speed wireless data services and dramatically increase their systems' voice capacity in their existing spectrum. Currently, there are over 10 million people in the United States and around the world who are using 3G CDMA2000 1x, and the number is growing rapidly. In fact, in the United States and in South America, several wireless systems which use the TDMA 2G air interface are converting to CDMA2000 1x so that such systems can provide these exciting 3G services and gain substantially increased capacity in their existing spectrum.

Similarly, the first systems based on CDMA2000 1xEVDO have begun providing commercial service. CDMA2000 1xEVDO utilizes the same 1.25 MHz channel to provide high burst data-rate connections to the Internet at peak rates of 2.4 Mbps. Thus, American wireless operators can provide a compelling alternative to DSL and cable modem service in their existing spectrum through CDMA2000 1xEVDO. Indeed, QUALCOMM's studies have shown that on a per megabyte basis, CDMA2000 1xEVDO is the cheapest available wireless technology for the transmission of data.

In addition, QUALCOMM is developing chipsets and software to support wireless operators who opt to deploy WCDMA (also known as UMTS), and QUALCOMM is developing chipsets with multi-mode capabilities to support interoperability and global roaming. The WCDMA technology requires more spectrum than CDMA2000 since it is based on a 5 MHz channel.

Finally, QUALCOMM has been devoted to developing wireless technologies which enhance the public's safety. In particular, QUALCOMM worked for years to invent a position location solution in response to the Commission's E911 mandate so that the police and emergency rescue personnel will be able to locate millions of Americans who call 911 from wireless phones. After years of effort and an investment of over \$1 billion, QUALCOMM

developed its assisted GPS technology, which enables a global positioning system (“GPS”) receiver to be incorporated inside the chip which goes into a wireless phone. QUALCOMM’s assisted GPS technology, which enables the handset to take measurements based on both GPS and the terrestrial wireless system, provides precise, highly accurate, and robust position location service, in accordance with the Commission’s accuracy requirements and to meet the needs of the public safety community. There are now over 2 million people in the United States and around the world using wireless phones and other devices with QUALCOMM’s assisted GPS technology. This technology allows wireless operators to provide safety of life service without any need for additional spectrum or additional cell sites.

III. The Commission Should Favor the Most Efficient Use of Scarce Spectrum

The Commission’s policy of open technical standards has been a success. It has allowed CDMA to and other innovative technologies to develop and flourish. It is ironic that nations and regions that hitherto mandated a single standard for wireless communications, and had questioned the policy of the United States to allow multiple standards to arise and compete freely, are now planning a transition to CDMA, a technology that is a direct result of an open and competitive marketplace in the United States. Moreover, there is considerable merit in policies that foster flexibility in the use of spectrum, which keep the Commission out of the business of dictating decisions best left to the marketplace. Nevertheless, in making spectrum allocation decisions, the Commission inevitably must decide which uses to allow over scarce spectrum. Even the Commission’s allocations in the name of spectrum flexibility do not permit all conceivable uses of spectrum. Thus, as the Commission weighs competing uses, QUALCOMM believes that the Commission should favor the most efficient use of scarce spectrum. The Commission should define spectrum efficiency in terms of overall system capacity, range, and

speed of communication.

There is no good reason for the Commission to reward inefficient uses of spectrum, particularly in the most crowded portion of spectrum, below 3.1 GHz. Such inefficient uses deprive the public of the highest use of a scarce public resource, and to encourage inefficiency stifles innovation and will ultimately diminish America's position in the global communications marketplace.

IV. The Commission Should Insist on the Provision of Hard Data Demonstrating the Absence of Harmful Interference to Licensed Services from Unlicensed Uses of Spectrum

The Public Notice devotes considerable discussion to the issue of harmful interference, and for good reason. From its creation in 1934, the FCC has had as one of its core functions to minimize if not eliminate harmful interference to authorized spectrum users. As the Commission moves to permit greater unlicensed uses of spectrum, QUALCOMM believes that the Commission should place the burden squarely on unlicensed users not to interfere with existing licensed users. This notion is at the core of Part 15 of the Commission's rules. Indeed, with regard to harmful interference from UWB devices or some other unlicensed use to PCS service, any other result would be fundamentally unfair. PCS licensees have paid billions of dollars for their licenses, while the promoters of unlicensed UWB have not paid the government anything for spectrum. As the Commission authorizes unlicensed uses, the Commission should reaffirm that the burden to show the absence of interference from unlicensed uses can only be met with real world, collaborative test data supplied by the developers of unlicensed technologies.

The proponents of an unlicensed use should make prototype devices widely and freely available for such testing. Unless and until such devices are made available for real world testing, the Commission should refrain from establishing technical parameters for the unlicensed

use based on mere promises about the performances of real devices. In deciding harmful interference issues, the Commission should not permit speculation and surmise to substitute for hard data. Moreover, to the extent that the Task Force gives consideration to any possible modification to the definition of harmful interference in Section 2.1 of the Commission's Rules, it should ensure that interference which consists of blocked wireless calls, dropped wireless calls, and/or an overall loss of network capacity—the type of interference which can be suffered by wireless phones from UWB devices—falls within the definition.

In particular, QUALCOMM is very concerned about such harmful interference from unlicensed uses to wireless phones which contain QUALCOMM's assisted GPS technology, which wireless operators use to provide E911 service. There are over 100,000 calls to 911 each day from wireless phones, and QUALCOMM's assisted GPS technology and the other position location solutions, once fully deployed, will substantially improve the ability of the police and other emergency personnel to locate the callers. E911 is, without question, a safety of life service. As already noted, assisted GPS technology will allow the callers to be located precisely and to a high degree of accuracy. . In the case of UWB, even if such harmful interference could be ameliorated in the handsets, the cost to do so could be prohibitive. QUALCOMM asks that the Spectrum Policy Task Force recommend that the Commission fully protect E911 service from any and all harmful interference

V. QUALCOMM's Prior Filings Address the Task Force's Questions About Public Safety and International Issues

In its prior filings in other Commission proceedings, QUALCOMM has addressed, at length, the issues raised by the Spectrum Policy Task Force related to public safety and international spectrum policy issues. See QUALCOMM's Comments in WT Docket No. 02-55 (May 6, 2002) concerning the reallocation of the 800 MHz band to provide greater contiguous

spectrum for public safety; QUALCOMM's Comments in RM-9920 (August 28, 2000), QUALCOMM's Comments and Reply Comments in ET Docket No. 00-258 (February 22, 2001 and March 9, 2001, respectively), which address international spectrum policy issues.

Public Safety Issues

With regard to the public safety issues, QUALCOMM applauds the Commission for its leadership in initiating a process in WT Docket 02-55 to explore in a timely manner options and alternatives to remedy the spectrum environment for public safety operations in the 800 MHz band. Recent events highlight the increasing demands and challenges that our public safety agencies face. Ensuring that these agencies are able to meet these challenges armed with advanced and effective communications capabilities is a chief priority for our industry and our nation.

In its efforts to establish a flexible regulatory framework to meet current and future public safety communications needs, the Commission has set the goal of ensuring that the availability of sufficient spectrum to accommodate efficient, effective telecommunications facilities and services for public safety communications.¹ QUALCOMM supports this goal and the Commission's related spectrum management objectives of enhancing spectrum efficiency, promoting nationwide interoperability, and minimizing harmful interference.² Other relevant objectives the Commission has identified for public safety communications include: avoiding undue delay in equipment development, supporting future communications technologies,

¹ The Development of Operational, Technical and Spectrum Requirements for Meeting Federal, State and Local Public Safety Agency Communication Requirements Through the Year 2010, Establishment of Rules and Requirements for Priority Access Service, *First Report and Order and Third Notice of Proposed Rulemaking*, WT Docket No. 96-86 (August 6, 1998) (para.1).

² *Id.*

promoting a competitive equipment market, providing flexibility to public safety organizations to meet local needs, and enabling the provision of voice, data, images and video.³

As the Commission itself acknowledged in the Notice of Proposed Rule Making in WT Docket No. 96-86, in the early 1970's, when the Commission adopted rules for the use of the 800 MHz band for land mobile operations, including private land mobile radio systems and public safety radio services, "the technology available at that time did not readily accommodate the use of contiguous spectrum at a single base station site." Id. at para. 10. Therefore, rather than make contiguous spectrum available to each radio service, it made channel pairs made available that were "interleaved" between channels allotted to the other radio services.

Since that time, wireless communications technology has been significantly enhanced. Through the use of innovative and spectrally efficient technologies, today's wireless communications networks are capable of providing a wide range of robust, high-quality voice and data services, with minimal interference amongst adjacent licensees. The availability of these new technologies, along with a restructuring of the 800 MHz public safety allocation, will offer public safety agencies significantly greater opportunities to meet their advanced wireless communications requirements, while avoiding the historical difficulties associated with the 800 MHz allocation scheme.

International Policy Issues

With regard to the international policy issues raised in the Public Notice, QUALCOMM believes that although the Commission's flexible spectrum allocation policy has resulted in myriad benefits to the U.S. wireless industry and consumers, including efficient use of spectrum, technological innovation and early deployment of advanced services, some of the Commission's

³ *Id.* (para. 10).

spectrum allocation decisions have been less advantageous. For example, although many countries in the Americas and some parts of Asia use the 800 and 1900 MHz bands in the same manner that the United States does, the U.S. cellular and PCS bands are not used on a harmonized basis at a global level.

QUALCOMM concurs with the Commission's statements that "global roaming would be facilitated by having a single global band for 3G systems," but believes that this is an unlikely outcome for the foreseeable future.⁴ Therefore, regional and global roaming will be possible through the use of multi-band handsets. Given that it is equally unlikely that all operators will use the same technology for the foreseeable future, it is also safe to say that regional and global roaming will also be dependent on the existence of multi-mode handsets. The development of multi-band, multi-mode equipment has been an expensive and lengthy process, which requires dedicated engineering resources. QUALCOMM believes that this situation is improving significantly with the introduction of new technologies that drive down cost and reduce complexity in multi-band, multi-mode handsets. QUALCOMM's product road map includes the chipsets that handset vendors will need to produce such multi-band and multi-mode handsets.

Nevertheless, it is true that by reducing the number of possible frequency bands used around the world, and harmonizing that use to the greatest extent possible, wireless equipment manufacturers will be able to focus their efforts on developing equipment with fewer variations, speeding up time-to-market for the equipment as well as reducing equipment costs. The U.S. wireless market is one of the largest in the world with over 110 million subscribers.⁵ While this is a sizeable market, it is but a fraction of the one billion global subscribers that are expected in 2002. QUALCOMM recognizes that only a small percentage of these subscribers will ultimately

⁴ *Notice of Proposed Rulemaking*, ET Docket No. 00-258, released January 5, 2001 at n.47.

⁵ *The World of Wireless Communication, Statistics and Surveys, CTIA's Semi-Annual Wireless Industry*

have the need for global roaming capabilities. There are nevertheless significant advantages to be gained from creating global economies of scale for wireless equipment.

Therefore, as the Commission considers making additional spectrum available for wireless services, it should take into consideration the use of those frequencies by countries around the world and attempt to harmonize that use to the greatest extent possible with other countries. U.S. consumers and industry will ultimately benefit from the opportunities created by spectrum harmonization, both in terms of international roaming and lower equipment costs.

QUALCOMM would be pleased to provide the Spectrum Policy Task Force with any additional information to support the Task Force as the Task Force deems necessary.

Respectfully submitted,

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