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

In The Matter Of	)	
	)	
Service Rules for the 698-746, 747-762 and 777-792 MHz Bands	)	WT Docket No. 06-150
	)	
	)	
Implementing a Nationwide, Broadband, Interoperable Public Safety Network in the 700 MHz Band	)	PS Docket No. 06-229
	)	
	)	

COMMENTS OF QUALCOMM INCORPORATED

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SUMMARY

QUALCOMM Incorporated ("QUALCOMM") hereby submits these Comments on the Third Further Notice of Proposed Rule Making (the "Third FNPRM") in these proceedings.

The Third FNPRM contains an enormous internal contradiction. On the one hand, it recognizes the longstanding FCC and indeed US government-wide policy in favor of technology neutrality whereby each licensee is free to choose the technology it deploys. The Third FNPRM also recognizes that there are differing opinions as to the most appropriate technology to be deployed on the 700 MHz D Block spectrum. In recognition of these two factors, the Third FNPRM rejects the notion that the Commission should make a specific choice of technology for the D block. Third FNPRM at ¶ 107. On the other hand, the Third FNPRM proposes that the Commission auction two groups of regional D Block licenses with a technology mandate attached to them—one group of WiMAX licenses and another group of LTE licenses. Finally, after having singled out WiMAX and LTE for this special, unprecedented technology mandate, the Third NPRM goes on to ask whether this proposal is consistent with the Commission's "long-held" policy of technology neutrality. Id at ¶252.

This internal contradiction is untenable. Without question, the Commission's proposal to dictate the technology which could be deployed on the D Block if the regional licenses are awarded violates the Commission's long-held policy of technology neutrality, a policy which has been at the core of the Commission's highly successful wireless policy and also US government-wide policy, having been enshrined in a series of free trade agreements with countries around the world entered into by the US over many years. Further, for the very reasons that the Commission itself noted, there is no basis for the Commission to select LTE and WiMAX for this special, unprecedented technology mandate, or for the Commission to disfavor and actually

exclude the 3G technologies (EV-DO and HSPA) from operating on this spectrum if licensed on a regional basis. The Commission's sole basis for singling out WiMAX and LTE for this special treatment is this completely erroneous statement: "We note that the record supports a conclusion that two next generation technologies in particular, WiMAX and LTE, provide the most likely options to provide the necessary broadband level of wireless service to public safety entities." Id. at ¶108. Actually, the only citation relied upon by the Commission for that statement is a filing by a consulting firm (the InterIsle Consulting Group) which did not propose any technology mandate. Instead, the firm merely said that there is much to be gained by leveraging CMRS technology for public safety users, a statement which does not imply that the Commission should mandate LTE or WiMAX or any other technology, and that technologies "such as" WiMAX and LTE "are very promising. . ." In short, on its face, the Third NPRM offers no basis for its proposed technology mandate.

The Third NPRM's statement about the record is incorrect because Qualcomm's prior filings, which are reiterated herein, establish that EV-DO and HSPA already provide the necessary broadband level of wireless service to public safety subscribers and commercial subscribers, who altogether consist of tens of millions of Americans and hundreds of millions of people around the world today. It is undeniable that EV-DO and HSPA are proven wireless broadband technologies supported by deep, broad ecosystems of suppliers, thereby creating substantial economies of scale which can be leveraged by any D Block licensee seeking to reduce the costs of serving public safety agencies.

Likewise, the Third NPRM ignores the fact that public safety agencies across the country currently use commercial EV-DO and HSPA networks for their critical broadband applications. Using these networks, first responders have access to computer aided dispatch systems, can

query databases, transmit and receive pictures and video, and use location based services and traditional business applications. Virtually any capability that can be accessed through an intranet can be pushed over EV-DO or HSPA to first responders in the field.

The Third NPRM is also wrong in labeling WiMAX a next generation technology. In fact, there is no international definition of "next generation technology," and HSPA, CDMA2000 (EV-DO), and the TDD version of mobile WiMAX 802.16e in the 2.6 GHz band are all recognized by the ITU as air interfaces falling within IMT-2000, the designation given to the third generation of wireless technology.

Indeed, EV-DO and HSPA meet the requirements for public safety spelled out in the Third NPRM. EV-DO and HSPA are perfectly suited right now to provide high quality, low cost wireless broadband services on the D Block to public safety users. Indeed, two critical requirements set forth in the Third NPRM are push-to-talk and quality of service. EV-DO and HSPA support both of these requirements. In particular, Sprint has deployed push-to-talk over EV-DO Rev A in 66 major markets around the United States. Sprint has also deployed quality of service across its entire EV-DO Rev A network.

The Commission should not exclude EV-DO and HSPA from the D Block if it is licensed regionally. Public safety needs reliable wireless broadband service today, not in a few years or in many years, and public safety needs low cost service, which will only be brought about if the technology selected is far down the cost curve. To exclude EV-DO and HSPA from this spectrum if licensed regionally, in all likelihood, will deprive public safety users of affordable wireless broadband service on this spectrum for many years and for no good reason.

In sum, there is simply no basis in policy or in fact for the Commission to exclude EV-DO and HSPA from being deployed on the D Block if it is licensed regionally and to mandate

LTE or WiMAX in that case. The licensees should have full flexibility to make not only their initial choice of technology, but also to select different technologies over time. The Commission must revise its proposal to make it technology neutral.

In the Third NPRM, the Commission does ask for specific input on modifications to its proposals which could be made to advance technology neutrality. Id. at ¶252. Qualcomm believes that the Commission should scrap the technology mandate for the regional licenses, and instead the Commission should simply require that regional licensees make their networks fully interoperable as a condition of holding their license—with the sanction of license revocation for failure to satisfy the condition. In addition, the Commission could refuse to approve any network sharing agreement entered into by a regional licensee if the network would not be fully interoperable with the other regional networks. These changes would preserve technology neutrality, while ensuring interoperability.

The Commission asks whether it is feasible to offer a set of regional licenses which would be technology neutral, in addition to the sets of regional licenses with the LTE and WiMAX mandates. For the reasons stated, Qualcomm believes that the Commission should not auction any licenses with a technology mandate. The regional D Block licenses should be auctioned on a technology neutral basis. Licensees should have full flexibility to select the technology of their choice now and into the future.

But, if there is to be a technology mandate, the Commission should certainly include the EV-DO and HSPA technologies, which are actually being used today to provide the wireless broadband service needed by public safety and which are ready today for deployment on the D Block with an extensive and well developed ecosystem of suppliers. These technologies are proven, and the winner of any FCC auction should not be precluded from using them.

TABLE OF CONTENTS

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COMMENTS OF QUALCOMM INCORPORATED

QUALCOMM Incorporated ("Qualcomm"), by its attorneys, hereby submits its Comments in response to the Third FNPRM, which the Commission released in the above-captioned proceedings on September 25, 2008.[1]

I. Background

A. Qualcomm's Interest

Qualcomm is a world leader in developing innovative digital wireless communications technologies and enabling products and services based on the digital wireless communications technologies that it develops. Qualcomm is the pioneer of code division multiple access ("CDMA") technology, which is utilized in the 3G CDMA family of wireless technologies. These technologies include CDMA2000 and HSPA, which are two technologies used in today's so-called third generation ("3G") wireless networks and devices, which enable tens of millions of Americans now to enjoy advanced, high speed, and ubiquitous wireless broadband services. Qualcomm broadly licenses its technology to over 150 handset and infrastructure manufacturers

[1] Third Further Notice of Proposed Rule Making, FCC 08-230, released September 25, 2008.

around the world, who make infrastructure equipment, handsets and other consumer devices, and develop applications, all based on the CDMA2000 and/or HSPA air interfaces.

Qualcomm is also a Commission licensee. Qualcomm holds licenses covering the entire nation for Block D in the Lower 700 MHz Band, Channel 55, 716-722 MHz. On that spectrum, Qualcomm's wholly-owned subsidiary, MediaFLO USA, has launched a service called MediaFLO to deliver high quality video and ultimately high quality audio and data to third generation cell phones. Today, even before the DTV transition has been completed, the MediaFLO service is available in over 60 major markets around the country, delivering news, sports, children's, and entertainment content to subscribers of Verizon Wireless and AT&T at mass market prices. In the recent 700 MHz auction, Qualcomm was the high bidder for licenses in the Lower 700 MHz B and E blocks, and Qualcomm was the sole bidder for a D block license, although Qualcomm's bid was below the D block reserve price.

Finally, Qualcomm's interest in this proceeding stems from another of its businesses. For many years now, Qualcomm, through its Qualcomm Government Technologies division (known as QGOV), has been developing a variety of applications of interest to the public safety community which leverage the CDMA2000 and/or HSPA technologies.

B. <u>The Rapid Proliferation of CDMA2000 and HSPA</u>

The CDMA2000 and HSPA technologies continue to proliferate rapidly around the world. To date, there are 515 wireless carriers in 138 countries who have deployed one of the 3G CDMA technologies. Of those 515 carriers around the world, 105 have deployed EV-DO, 44 of whom have deployed EV-DO Revision A. Another 221 of the 515 carriers have deployed HSDPA, 55 of whom have deployed HSUPA. These broad deployments create enormous demand for EV-DO Revision A and HSDPA equipment, thereby creating economies of scale

which bring down prices for carriers and ultimately consumers, including for public safety agencies and their employees who use broadband services based on these technologies.

Worldwide, there are now over 700 million subscribers using a 3G device. By 2012, the number of 3G subscribers is projected to reach nearly 1.8 billion, and at that time, most 3G subscribers will be using an EV-DO or HSPA-based device. This strong demand creates an ever-expanding market for 3G-based devices, including 3G phones, smartphones, PDAs, consumer electronics devices, and laptops. These devices include more than 617 EV-DO-based devices (90 of which incorporate EV-DO Revision A) and more than 805 HSDPA-based devices (97 of which incorporate HSUPA). The sheer number and wide variety of these devices is increasing every day, and that competitive market means that there are tremendous economies of scale to be leveraged for the benefit of public safety if EV-DO or HSPA is deployed on the D Block spectrum.

Here in the United States, there is fierce competition among the carriers in the provision of wireless broadband services, which has gone hand-in-hand with the rapid deployment and expansion of 3G CDMA networks. As a result, American consumers are enjoying the 3G services at ever-increasing rates. Moreover, as the Commission found in its most recent annual report on competition in the CMRS marketplace (the "Twelfth Report"), U.S. carriers have deployed competing 3G technologies, which has only intensified the competition as the carriers seek to differentiate their networks by providing what each claims to be the best and most advanced high speed wireless broadband network and by offering the most robust and compelling wireless broadband services to consumers.[2]

[2] See Twelfth Report, FCC O8-28, released Feb. 4, 2008 at Pgs. 61-62.

Accordingly, Verizon Wireless, Sprint, ALLTEL, US Cellular, and Leap Wireless, among other carriers, have deployed the CDMA2000 (EV-DO) high speed wireless technology, and their deployments are expanding. Verizon Wireless has upgraded its entire network to EV-DO Revision A, which supports both high speed downloads and uploads, and Sprint is in the midst of doing so throughout its entire network. On the other hand, AT&T has deployed the competing WCDMA/HSDPA technology, and it is expanding the footprint of its WCDMA/HSDPA network at a very rapid rate. Initially, AT&T deployed the HSDPA technology, and now, AT&T is in the midst of deploying HSUPA, thereby supporting high speed uploads and downloads. For its part, T-Mobile has also begun deploying HSDPA on its AWS-1 spectrum.

All told, the Commission found in the Twelfth Report that approximately 184 million Americans live within a census block in which two carriers provide mobile broadband service via EV-DO or WCDMA/HSPA, and 118 million Americans live within a block in which three carriers offer such service. Twelfth Report at para. 145. These numbers are literally increasing every day as the carriers constantly expand and enhance their mobile broadband networks.

In addition, the number and variety of devices, including handsets, PDAs, smartphones, and other consumer electronic devices, which incorporate CDMA2000 or HSPA is also growing by leaps and bounds every single day. These technologies are now embedded in numerous laptop models sold by the major laptop vendors offering consumers another way to access mobile broadband services. Wireless broadband via CDMA2000 or HSPA is or will soon be available in a whole variety of new consumer electronic devices—personal navigation devices, pocketable computers, mobile computing devices, and the like, all of which could be of tremendous use to public safety agencies and their employees.

C. The Constant Push to Upgrade and Enhance CDMA2000 & HSPA

As operators began deploying EV-DO and HSPA in its initial forms—EV-DO Release 0 and HSDPA—Qualcomm and the ecosystem of vendors who support these technologies were simultaneously working on upgrades to the technologies, and there is a constant and never-ending drive to enhance these technologies which continues to the present and shows no sign of slowing down into the future. The networks rapidly migrated to the first upgrade—EV-DO Revision A and HSUPA. Today, as noted supra, Verizon Wireless and Sprint provide wireless broadband service all over the nation via EV-DO Revision A, which supports peak data rates of 3.1 megabits per second ("Mbps") on the downlink and 1.8 Mbps on the uplink in a 1.25 MHz channel, and AT&T is concluding its network upgrade to HSUPA, which will support peak data rates of up to 1.8 Mbps to 5.6 Mbps on the uplink in a 5 MHz channel. AT&T has also announced that it will upgrade its downlink in the near future to support peak data rates of 7.2 Mbps to 20 Mbps on the downlink.

The EV-DO and HSPA-based networks currently in widespread operation in the United States already meet the requirements spelled out in the Third NPRM for the D Block. Thus, in excluding EV-DO and HSPA from the regional D Block licenses, the Commission is forbidding that the licensee or licensees from selecting the lowest cost, most widely available wireless broadband technologies. In short, public safety will have to wait longer and pay more for wireless broadband if the Commission proceeds with that approach. .

There is also a well-defined upgrade path for the EV-DO and HSPA technologies, and public safety would be able to reap the benefits of continuous enhancements to these technologies if the Commission does not forbid their deployment on the D Block if licensed regionally. The next upgrades to EV-DO and HSPA will result in dramatically faster data rates.

EV-DO Revision B enables the aggregation of three EV-DO carriers in a single 5 MHz channel. In its Phase I, EV-DO Rev. B will support downloads at a peak rate of 9.3 Mbps and eventually, in Phase II, at 14.7 Mbps, while supporting uploads at up to 5.4 Mbps. This technology will undergo an additional upgrade, now known as EV-DO Advanced, which, if implemented with four carriers, will support downloads of up to 32.0 Mbps and uploads of 12.4 Mbps. These upgrades are all backwards compatible, meaning that they will not require any new infrastructure. The net result of these upgrades to CDMA2000 will be wireless broadband service with data rates that are ten times faster than even today's fastest EV-DO-based networks achieve.

Likewise, there are substantial upgrades for HSPA technology on its roadmap. The initial version of the technology known as HSPA + (also called HSPA Evolved—HSPA Release 7) will support peak downloads of 28 Mbps and uploads of 11 Mbps. AT&T has targeted the HSPA + technology for deployment beginning in 2009. Future releases of HSPA, Releases 8 and 9, will increase the peak downlink speeds, first to 42 Mbps and then to 84 Mbps (using a 10 MHz channel).

The versions of EV-DO and HSPA which are deployed today are more than ample to meet public safety's requirements for wireless broadband as enunciated in the Third NPRM. These technologies today support very high speed data, extremely low latency video, and voice with tremendous capacity—and, they actually extend well beyond the requirements of the Third NPRM. Indeed, there is no requirement set forth in the Third FNPRM which cannot be met with a CDMA2000 or HSPA-based network. But, these technologies are not standing still. They are being enhanced on a continuous basis, and, therefore, there is no reason for the Commission to exclude them from deployment on the D Block if licensed regionally.

In particular, the requirements for push-to-talk and quality of service are emphasized in the Third NPRM, and EV-DO and HSPA support these requirements. Today, for example, Sprint is providing push-to-talk service via the QChat technology over its EV-DO Revision A network in 66 major markets around the United States with five different phone models. This technology delivers push-to-talk calls with sub-one second latency. Likewise, Sprint has deployed quality of service across its entire EV-DO Rev A network. Moreover, EV-DO Rev A supports multicast, which allows large groups of users to communicate within a confined area, such as the site of a natural disaster.

D. The Deep CDMA2000 & HSPA Ecosystems

As noted supra, Qualcomm licenses its technology to over 150 companies, who manufacture infrastructure and subscriber devices (phones, smartphones, consumer electronic devices, and so on). These companies span the entire wireless industry. The result of this broad technology licensing program is that there is a deep ecosystem of vendors who supply equipment based on EV-DO and/or HSPA. Consequently, any D block licensee and the public safety groups will be able to leverage substantial economies of scale if they opt for an EV-DO or HSPA-based network.

In particular, the number of companies manufacturing devices based on the 3G technologies, including EV-DO and HSPA, continues to increase, along with the different types of devices themselves. At last count, 111 companies have manufactured at least one CDMA2000 device, and 129 companies have manufactured at least one WCDMA or HSPA device. These devices span all price points—from low end 3G phones to very high end smartphones and other consumer electronics devices. Eighteen laptop manufacturers now offer

at least one laptop model with a form of 3G embedded inside, and more than 100 such laptop models have been brought to market.

The cost of both network equipment and subscriber devices will be a critical consideration for public safety and any D block licensee in selecting a technology. The deep EV-DO and HSPA ecosystems creates substantial economies of scale that can be leveraged by D Block licensees to reduce the costs of devices and services for public safety subscribers. Indeed, public safety agencies are currently using EV-DO and HSPA-based devices for state-of-the-art high speed wireless broadband services. As noted supra, first responders use these devices on the existing EV-DO and HSPA networks to gain high speed wireless access to computer aided dispatch systems, to query databases, to transmit and receive pictures and video, and to use location based services and traditional business application

II. The Commission Should Not Mandate LTE or WiMAX for the Regional D Block Licenses

As already noted supra, the Commission begins its discussion on the issue of technology selection by correctly stating as follows:

> "We disagree with commenters who argue that the Commission should make a specific choice of technology. In view of these commenters' differing opinions regarding the most appropriate technology, there does not appear to be a basis for a determination regarding the viability of any particular technology for the shared network at this time."

Third NPRM at ¶107.

But, rather than concluding from the above that the Commission should simply follow technology neutrality and allow D Block licensee or licensees to deploy any technology they wish, as long as interoperability is ensured, the Third NPRM stops short. It draws the following conclusion after making the above statements:

> "Thus, we tentatively conclude that the public interest would be better served by allowing certain flexibility to parties interested in the D Block to make a determination regarding the technology for the network."

Id.

Thus, instead of simply allowing the regional D Block licensees to pick the technology because as the Commission itself found, there is no basis for the Commission to make the choice of technology, the Commission is proposing to give the licensees only "certain flexibility," meaning that any potential bidder for the regional D Block licenses has a choice of two and only two technologies—LTE or WiMAX. The rationale for this technology mandate is not only belied by the foregoing statements in the Third NPRM itself, but also by others as well.

The Commission starts by saying that it has tentatively concluded that the shared commercial-public safety network to be deployed on the D Block must use a common air interface to ensure nationwide interoperability. It simply does not follow at all that the Commission must dictate that only LTE or WiMAX can be deployed to attain nationwide interoperability. The Commission can and should dictate nationwide interoperability, period. The Commission can adopt rules which dictate that all regional networks, if there are to be regional networks, should be fully interoperable with one another. Failure to comply with this requirement by any licensee should lead to sanctions up to and including license revocation. The Commission can easily enforce this requirement since each regional licensee would have to specify its technology as part of its network sharing agreement, which would have to be submitted to the Commission for its approval.

It is clear, therefore, that the Commission does not need to dictate that only LTE or WiMAX can be deployed if the spectrum is licensed regionally just to attain nationwide interoperability. The Commission can and should stay out of the business of picking a

technology. And, of course, without regard to multi-mode devices, the regional networks would be fully interoperable if they each used EV-DO or HSPA. Thus, the understandable desire for nationwide interoperability does not hold water as a rationale for the LTE/WiMAX technology mandate which the Commission has proposed for the regional licenses.

Likewise, the rationale in the Third NPRM for the selection of LTE and WiMAX as opposed to other technologies, such as EV-DO and HSPA, for the technology mandate does not hold water. The entire rationale is as follows:

> "We note that the record supports a conclusion that two next generation technologies in particular, WiMAX and LTE, provide the most likely options to provide the necessary broadband level of wireless service to public safety entities."

Id. And, the only citation in support of the above statement is the following fragment from a filing by a consulting firm by the name of the InterIsle Consulting Group ("InterIsle"). InterIsle did not propose a LTE/WiMAX

mandate. Rather, the statement cited by the Commission is as follows:

> ". . .there is much to be gained by leveraging CMRS technology on behalf of Public Safety users. Technologies such as WiMAX and especially LTE are very promising. . ."

Id.

The statement that WiMAX and LTE are very promising does not in any way, shape, or manner provide any support or justification for the Commission's proposal to mandate that the regional D Block licensees be permitted only to deploy LTE or WiMAX. EV-DO and HSPA are not just "very promising." They are proven technologies which are already used to provide high quality, low cost wireless broadband service to tens of millions of Americans. There is no basis whatsoever for the Commission's proposal to forbid regional D Block licensees from deploying these technologies and instead for the Commission to mandate LTE or WiMAX. The Third

NPRM falls far short of providing a justification for jettisoning the well-established Commission policy of technology neutrality. There is no good reason to preclude the most widely deployed wireless broadband technologies, EV-DO and HSPA, from being deployed on the D Block if it is licensed regionally.

As noted supra, technology neutrality is more than just, in the words of the Third NPRM, a "long held" Commission policy. Technology neutrality is also more than just a highly successful Commission policy. Rather, technology neutrality is also the official policy of the United States government as reflected in a series of bilateral free trade agreements, including those between the United States and Chile, Singapore, Australia, Morocco, and Bahrain. A provision regarding technology neutrality is also included in the Central American Free Trade Agreement ("CAFTA"), as well as in other free trade agreements either not yet fully implemented (Peru and Oman) or not yet ratified by Congress (Panama, Colombia, and Korea). The United States government has been very successful in reaching agreements with foreign governments which, to varying degrees, encourage or require technology neutrality.

The proposed WiMAX/LTE technology mandate for the regional D Block licenses is inconsistent with the spirit, if not the letter, of these free trade agreements. The Third NPRM does not even consider the consequences to United States' interests around the world from the adoption of a technology mandate. The free trade agreements are reciprocal. Adoption of a technology mandate by the Commission could be used by foreign countries to adopt technology mandates of their own—just the sort of conduct that the free trade agreements were designed to prevent.

At minimum, the existence of these provisions in these free trade agreements creates an even heavier burden for the Commission to overcome in adopting a technology mandate. In this

case, with respect to the proposal to mandate LTE or WIMAX for the D Block spectrum if it is licensed regionally, that heavier burden has not been met.

Finally, the Third NPRM ignores the facts that LTE is still under development and the only mobile WiMAX deployment in the United States is in its infancy. On the other hand, EV-DO and HSPA are proven technologies, having been deployed here and all around the world in hundreds of networks. There is no basis for the Commission to mandate technologies without any track record and to preclude the use of the proven, time tested technologies.

The case to allow EV-DO and HSPA is even stronger considering that public safety agencies all over the country are already using EV-DO and HSPA-based commercial networks to access to a wide variety of wireless broadband services. Likewise, the Commission is mandating that the D Block licensee meet a series of requirements, but only EV-DO and HSPA meet these requirements today. For example, there is no WiMAX or LTE push-to-talk service available anywhere in the United States or the world for that matter. WiMAX is not even marketed for voice service. But, high quality push-to-talk service over EV-DO Rev A is available in 66 markets across the country with five different handset models in a full commercial deployment. There is no good reason for the Commission to forbid the use of technologies which are already being used today for public safety, while mandating technologies not yet used or even tested by public safety.

For all of these reasons, the Commission should revert to a technology neutral policy for the proposed D Block regional licenses. The Commission should allow deployment of any technology on the regional networks, but it should require full interoperability as a condition of granting the regional licenses.

III. Conclusion

Wherefore, Qualcomm respectfully requests that the Commission adopt rules consistent with the comments set forth herein and revise the proposal for regional D Block licenses to provide that those licenses will be auctioned on a technology neutral basis.

Respectfully submitted,

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