BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, DC 20554

In the Matter of	
Service Rules for the 698-746, 747-762 And 777-792 MHz Bands	**WT Docket No. 06-150**
Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Systems	**CC Docket No. 94-102**
Section 68.4(a) of the Commission's Rules Governing Hearing Aid-Compatible Telephones	**WT Docket No. 01-309**

COMMENTS OF QUALCOMM INCORPORATED

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QUALCOMM Incorporated ("QUALCOMM"), by its attorneys and pursuant to the Notice of Proposed Rulemaking in this proceeding, hereby submits these Comments.[1]

I. INTRODUCTION AND SUMMARY

In the *NPRM*, the Federal Communications Commission ("FCC" or "Commission") seeks comment on possible revisions to the service rules governing wireless licenses in the 698-746, 747-762 and 777-792 MHz Bands ("700 MHz Band").[2] QUALCOMM has two interests in this proceeding. First, QUALCOMM is a licensee in the Lower 700 MHz Band, holding licenses in the D block covering the entire nation, having acquired five of its six licenses in a FCC

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1 *Service Rules for the 698-746, 747-762 and 777-792 MHz Bands*, Notice of Proposed Rulemaking, Fourth Further Notice of Proposed Rulemaking, and Second Further Notice of Proposed Rulemaking, FCC 06-114, released August 10, 2006 ("*NPRM*").

2 See 47 C.F.R. §27.1 *et seq.*

auction conducted in 2003. As described more fully below, QUALCOMM is in the midst of launching its innovative MediaFLO service, which will deliver a variety of new video, audio, and data services to wireless subscribers at mass market prices, using its Lower 700 MHz spectrum on a one-way basis. QUALCOMM has spent hundreds of millions of dollars inventing MediaFLO, designing its network, and constructing that network, all in reliance on the existing 700 MHz service rules.

Second, QUALCOMM is the inventor and developer of the essential technologies that underlie the preeminent 3G wireless broadband standards, known as 3G CDMA, a family of technologies which all the major U.S. wireless carriers have deployed or are deploying. QUALCOMM works on a continuous basis to invent and develop even more advanced wireless communications technologies, and, as a result, QUALCOMM is very interested in any changes to the rules governing the entire 700 MHz band.

In the *NPRM*, the Commission notes that changes have occurred in the four years since the Commission first adopted band plans and service rules for the 700 MHz band.[3] Chief among these is the passage of the Digital Television and Public Safety Act of 2005 ("DTV Act").[4] The Commission also notes that during these four years U.S. consumers have been introduced to a variety of new wireless services and technologies and the number of mobile telephone subscribers has almost doubled to a penetration of 69 percent.[5] For these reasons, the *NPRM* seeks to revisit the established rules. In some cases, the Commission's proposed areas of revision would affect both future and existing licensees.

In these Comments, QUALCOMM shows that the Commission should not change the technical and other rules governing QUALCOMM's MediaFLO service in the Lower 700 MHz band because there is no basis to do so. MediaFLO was specifically designed to deliver exciting new services to consumers by taking advantage of the favorable technical rules governing the Lower 700 MHz band, most notably the 50 kW power limit. The NPRM asks if there is a

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3 See *Reallocation and Service Rules for the 698-746 MHz Spectrum Band* (Television Channels 52-59), GN Docket No. 01-74, 17 FCC Rcd 11613 (2002) ("*Lower 700 MHz Order*").

4 See Deficit Reduction Act of 2005, Pub. L. No. 109-171, 120 Stat. 4 (2006) ("DRA"). Title III of the DRA is the DTV Act, which established a firm date of February 17, 2009 for recovery of TV Channels 52-59.

5 *NPRM* at 2-3, n.5.

demand or need for transmissions at that power level.[6] The answer is a resounding yes as that power level will enable QUALCOMM to deliver MediaFLO, and others to deliver competing services, at affordable mass market prices. There is strong demand for these services, as demonstrated by the strong demand for the initial, much more limited services by which wireless carriers are delivering video clips to cell phones. Moreover, the already-deployed network is predicated on the existing rules.

QUALCOMM explains herein that MediaFLO will operate at the permitted 50 kW without causing interference to wireless operations on adjacent channels, whether those channels are used for a service similar to MediaFLO or for a more traditional, low power wireless cellular-type service. The combination of the Commission's existing power flux density limit (which was derived on the assumption that a higher power service would operate immediately next to a lower power cellular type service) with voluntary measures, such as filtering and coordination, are more than ample to prevent any interference from MediaFLO operating at 50 kW or a similar service, or a cellular-type service, operating on the adjacent channels. There is no basis for the Commission to change the 50 kW power limit as applied to MediaFLO or the other existing licensees, who similarly have developed business plans and made technology decisions based on that limit, as well as on the other existing FCC technical and service rules.

Indeed, significant changes to the Rules would severely disrupt established business and technical plans, thereby delaying or denying service to consumers. The existing service rules were specifically adopted to "enable the flexible use of the Lower 700 MHz Band for a wide range of new services".[7] That flexibility was intended to allow for changes that may occur, both technological and operational, in the uses to which this spectrum may be put. Under these circumstances, changes to the rules would have a chilling effect on both auction participation and investment in telecommunications.

Furthermore, the changes in the American wireless industry since the adoption of the 700 MHz service rules actually support retention of the current rules, including the current band plan.

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6 *NPRM* at para. 95.

7 *Reallocation and Service Rules for the 698-746 MHz Spectrum Band* (Television Channels 52-59), GN Docket No. 01-74, 17 FCC Rcd 11613 at ¶3. (2002) ("*Lower 700 MHz Recon. Order*")

As QUALCOMM shows herein, to implement more advanced wireless technologies, to achieve faster data rates enabling a whole range of new services, licensees will require bandwidths of up to 20 MHz of paired spectrum, which coincides with the existing 700 MHz band plan. Moreover, delivery of one-way video, audio, and data services, either by the use of MediaFLO or competing technologies, will require 6 MHz of unpaired spectrum, which, again, coincides with the existing 700 MHz band plan.

For all of these reasons, QUALCOMM urges the Commission not to adopt widespread changes to the 700 MHz service rules, and, instead, to retain all or virtually all of the current rules, which will enable licensees, current and future, to deliver a wide variety of innovative new services to American wireless subscribers.

II. BACKGROUND

A. QUALCOMM

As already noted, QUALCOMM has two main interests: First, QUALCOMM is the licensee of the six licenses covering the Economic Area Groupings (EAGs) on Block D in the Lower 700 MHz Band, 716-722 MHz, QUALCOMM which will be used for deployment of a nationwide "mediacast" network known as MediaFLO. Second, QUALCOMM is the inventor and developer of essential technologies that underlie the preeminent 3G wireless broadband standards, known as 3G CDMA, which include both the CDMA2000 and the WCDMA/HSDPA technologies. QUALCOMM has licensed its inventions to over 135 companies, who cover the full gamut of the wireless industry, including handset manufacturers, infrastructure manufacturers, chipset manufacturers, and others.

1. MediaFLO

QUALCOMM holds licenses covering the entire nation on Block D in the Lower 700 MHz band, today's TV Channel 55. QUALCOMM purchased five of its six licenses in a FCC auction conducted in 2003 and the sixth license in a post-auction transaction. As the *NPRM* notes, QUALCOMM's wholly-owned subsidiary, MediaFLO USA Inc., will use these licenses to deploy and operate a nationwide one-way "mediacast" network, delivering high quality video and audio content, as well as innovative mobile data applications, to third

generation mobile phones at mass market prices and without impairing the capacity of existing wireless networks.

QUALCOMM invented the FLO (forward link only) technology specifically to operate in the Lower 700 MHz band under the existing technical rules, most notably the 50 kW power limit in Section 27.50 (c). Early efforts at delivering video to cell phones over a cellular or PCS network showed that there was such strong interest from consumers, there would be capacity problems. As a result, QUALCOMM decided to invent technology to deliver video to cell phones on a one-way dedicated network. In designing the technology to do so, it was critical that the dedicated network could be constructed and operated at a much lower cost than cellular and PCS networks because the revenue to be derived from MediaFLO-type services will be a fraction of the total revenue operators earn from their cellular and PCS networks. QUALCOMM focused its development efforts on the Lower 700 MHz band because of the 50 kW power limit governing the band under Section 27.50 (c), a limit that is much higher than the comparable limits in the PCS and cellular bands, combined with the favorable propagation of a radio signal at 700 MHz. Those two factors allowed QUALCOMM to design MediaFLO so that markets, even large markets, can be covered with only one or a few MediaFLO transmitters, as opposed to the hundreds of base stations used in a typical PCS or cellular system. By using many fewer transmitters than a cellular or PCS system, the MediaFLO service can be delivered at dramatically lower costs than cellular or PCS.

Consequently, the Commission's 50 kW power limit for the Lower 700 MHz band is a vitally important factor in QUALCOMM's ability to deliver MediaFLO to consumers at affordable, mass market prices, in accordance with QUALCOMM's business plan. That plan entails an investment of over $800 million for the construction and operation of MediaFLO over the next three to four years. QUALCOMM has already expended several hundred million dollars on developing MediaFLO and constructing the MediaFLO network.

QUALCOMM will serve as the wholesaler of MediaFLO and will offer the MediaFLO network as a shared resource to U.S. wireless carriers, enabling them to deliver mobile interactive multimedia to their wireless subscribers without the cost of network deployment and operation. Verizon Wireless will be the first carrier to offer MediaFLO service

to its subscribers. QUALCOMM and Verizon Wireless are working together on the nationwide launch of MediaFLO.

MediaFLO has been designed so that customers will have a familiar user experience, that is, a channel guide and the ability to pick and choose the type of content they want to view or listen to on their mobile phones. Some of the content will be available for real-time viewing while other content will be stored on the customer device for later viewing, a technique known as clip-casting.

MediaFLO anticipates a range of programs with a broad mix of content. Our market research and consumer trials indicate that people want news, entertainment, sports and children's programming for mobile delivery. The underlying FLO technology is capable of supporting full-length programming, short-form content, audio programming and real-time entertainment and information feeds. The flexibility of the technology will make it possible to deliver any number of programs to the consumer.

As already noted, QUALCOMM's FLO technology, when deployed in the 700 MHz spectrum and subject to the existing 50 kW power limit, offers distinct efficiency and cost advantages in delivering content to a very large mobile subscriber base. Moreover, FLO technology is specifically designed to minimize the power consumption and size of mobile phones and to be integrated into existing handset designs.

There is already a diverse and deep eco-system growing up around MediaFLO, including semiconductor manufacturers, handset vendors, infrastructure manufacturers, software developers, and others. An organization called the FLO Forum was created in July 2005 to join business leaders interested in developing FLO-based networks, products, and services for the wireless industry. There are currently more than 60 companies who belong to the FLO Forum, and these companies are involved in every facet of the wireless and media industries.[8]

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[8] Additional information about the FLO Forum, including a list of its members, is available at www.floforum.org.

The FLO Forum has led the effort to standardize the FLO technology. In June 2006, the FLO Forum published three cornerstone technical specifications, the Service Information Specification, the FLO Services and Use Cases Specification, and the Multiplex to Transmitter Interface. In July 2006, the Telecommunications Industry Association's TR47.1 Subcommittee officially approved and published the FLO Air Interface Specification as TIA-1099. The TR47.1 Subcommittee in September 2006, ratified three additional specifications (TIA-1102, TIA-1103 and TIA-1104) relating to the Air Interface Minimum Performance Specifications.

In addition, the eco-system developing around MediaFLO includes many different handset vendors as well as multiple chipset vendors. Accordingly, at the CTIA Convention in April, attendees could view live demonstrations of MediaFLO over the air on handsets made by LG, Samsung, Kyocera, Motorola, Pantech, and Sharp.[9] Similarly, a recent announcement shows that the FLO eco-system now includes at least eight (8) chip manufacturers. On September 8, 2006, QUALCOMM announced that it has licensed Newport Media Inc. on a royalty-free basis, to use QUALCOMM's patented technologies to design, manufacture, and sell chips that implement the FLO technology. Thus, even at this early stage in the development of MediaFLO, both QUALCOMM and Newport Media are now able to make chips that support MediaFLO.

2. 3G Technologies

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 has developed core technology known as code division multiple access ("CDMA"). This technology has been incorporated into standardized wireless technologies deployed by wireless carriers in the United States and around the world, including cdmaOne, which is the second generation ("2G") version of CDMA and more recently, third generation ("3G") versions of CDMA. In addition to inventing these

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[9] See QUALCOMM Announces Citywide Coverage of FLO Technology During CTIA Wireless 2006 in Las Vegas, April 4, 2006 (available at http://www.qualcomm.com/press/releases/2006/060404_citywide_coverage_flotm1.html).

technologies, QUALCOMM sells chips based on them. QUALCOMM is the world's largest fabless semiconductor company.

In developing 3G wireless applications, QUALCOMM sought to achieve the greatest possible spectral efficiency while enabling high speed wireless data transmissions to support the full range of broadband applications and services. As a result, QUALCOMM developed a family of technologies known as CDMA2000, which comprise a third generation (3G) version of CDMA, and permitted wireless operators with 2G-based networks to upgrade to 3G in a backwards compatible manner. Similarly, to enable wireless operators with GSM-based networks to upgrade to 3G-based networks, QUALCOMM (and others) developed technology known as wideband CDMA (also known as WCDMA or UMTS). Both CDMA2000 and WCDMA are extensions of QUALCOMM's core cdmaOne technology. CDMA2000 uses 1.25 MHz channels; WCDMA uses 5 MHz channels.

One of the CDMA2000 technologies is known as 1xEV-DO (also known as EV-DO), an air interface that enables wide area wireless broadband communications over a single 1.25 MHz channel. EV-DO optimizes a 1.25 MHz channel for high speed wireless data communication. By dividing an allocation into separate voice and data channels, using EV-DO for data improves overall network efficiency and eliminates the chance that an increase in voice traffic will cause data rates to drop and vice versa. Release 0 enables peak wireless downloads of 2.4 megabits per second and uploads of up to 153 kilobits per second. It enables average data download rates of 400 to 700 kilobits per second.

The second version of 1xEV-DO, known as Revision A or "DOrA," enables peak downloads of 3.1 megabits per second and peak uploads of up to 1.8 megabits per second. With its reduced latency and optimized quality of service, DOrA also supports delay sensitive applications, such as mobile Voice Over Internet Protocol ("VOIP") push to talk, videotelephoning, instant multimedia and network gaming. Verizon Wireless and Sprint Nextel are currently in the midst of deploying DOrA this year and plan to launch commercial service early next year. Other carriers around the world are also deploying DOrA, with the first commercial service launching later this year.

The next version of 1xEV-DO under development is known as Revision B or Rev. B. It will allow carriers to aggregate multiple EV-DO carriers simultaneously to achieve significantly faster data rates. Initial devices based upon Rev. B are expected to allow the aggregation of three carriers within a 5 MHz bandwidth to support a combined three channel data speed of up to 14.7 Mbps on the downlink. The Rev. B standard actually permits the aggregation of up to 15 carriers within a 20 MHz bandwidth to attain significant downlink and uplink data rates. QUALCOMM expects the first commercial products based on Rev. B to be data modems, which should be available in late 2007, with additional wireless devices available soon thereafter.

Finally, QUALCOMM is now working on the fourth version of EV-DO, which is known as Revision C or Rev. C. This new air interface will utilize OFDMA technology and require new spectrum. Rev. C will use a bandwidth of up to 20 MHz to deliver data at peak rates of 140 Mbps on the downlink and 34 Mbps on the uplink. Rev. C products will begin to be launched in 2009. -Accordingly, the CDMA2000 roadmap is very consistent with the Commission's 700 MHz band plan. New spectrum will be required for Rev. C, and the spectrum should have a bandwidth of up to 20 MHz to achieve the fastest data rates.

The same is true of the WCDMA/HSPA roadmap. The first technologies on this roadmap are WCDMA (also known as UMTS) and HSDPA. Carriers in the United States, notably Cingular Wireless, and around the world have already deployed WCDMA and HSDPA. These high speed, wide area wireless technologies require a 5 MHz channel. WCDMA has a peak data rate of 384 kilobits per second. HSDPA (high speed downlink packet access) substantially increases data speeds on the downlink to peak speeds of up to 7.2 mbps. Handset vendors around the world are today selling phones with QUALCOMM chips to deliver services based on HSDPA. Wireless carriers who have deployed or will deploy HSDPA can attain similar enhancements to their uplink data rates by deploying HSUPA (high speed uplink packet access). QUALCOMM is currently sampling chips containing HSUPA, which allow devices to achieve peak speeds of 2 megabits per second on the uplink.

The WCDMA/HSPA roadmap will then offer carriers two options to achieve even faster data rates. QUALCOMM and other companies are currently working on

developing these technologies. The first option is a known as HSPA Evolution. This technology uses the same 5 MHz channels used by HSDPA and HSUPA. The second option is referred to as LTE or long term evolution. LTE will require new spectrum. It will use bandwidths of up to 20 MHz.

Thus, QUALCOMM's interests in this proceeding are two-fold: first, as an existing licensee, poised to bring an exciting and valuable new service to the American public; and second, as the developer of premier technologies for use by many existing and future 700 MHz licensees.

B. The *NPRM*

In essence, the *NPRM* asks whether there is value to revisiting the *Lower 700 MHz Order* and the *Lower 700 MHz Recon. Order* in view of changed circumstances caused by the DTV Act and wireless innovations. Specifically, the Commission asks for advice on changes in seven areas: (1) size of service areas; (2) size of spectrum blocks; (3) facilitating access to spectrum; (4) criteria for renewal; (5) length of license terms; (6) power limits and (7) 911/E911 matters.

The DTV Act established February 17, 2009 as the end of the DTV Transition. By that date, all analog television will have ceased and any DTV assignments on Channels 52-69 will have relocated to the core (Channels 2-51). At the same time, the 698-806 MHz Band will be made available for new uses including public safety, commercial and other new radio services.

The specific change wrought by the DTV Act is the addition of a nationwide firm date for the end of the transition. Prior to the DTV Act, the Communications Act required that analog broadcasters were to cease operations by December 31, 2006. However, the Commission was required to grant extensions at the request of individual licensees on a market-by-market basis under certain circumstances. Conventional wisdom was that these extensions might prevent recovery of the 700 MHz Band for many years, at least on a nationwide basis.

Clearly, the DTV Act brought a significant and beneficial change. Not only will the firm date for the end of the transition allow recovered spectrum to be used for new wireless

services, the firm date also hastens the nationwide conversion to digital television. For both these reasons, QUALCOMM applauds the passage of the DTV Act. However, for the most part, we do not believe that passage of the Act requires revision of the 700 MHz Band service rules.

The *NPRM* also notes "innovative wireless services and technologies" and increased mobile telephony penetration as occurring within the last four years.[10] The *NPRM* describes the evolution of the CMRS industry which has increased demand for valuable spectrum, such as the 700 MHz Band.[11] Yet, again, QUALCOMM does not believe that these developments actually warrant revision of the service rules particularly as they apply to existing licensees who have already made substantial investments in reliance on the existing rules, such as QUALCOMM. It is hardly unexpected that there should be technological evolution, increased subscribership and new services. Indeed these are the objectives of the existing service rules. They are not justification for changes to those rules.

In sum, the *NPRM* asks whether changes in the 700 MHz service rules are warranted. QUALCOMM believes, for the most part, that changes are not warranted by the passage of the DTV Act or the evolution of services. Only if comments received in this Docket provide strong justification should changes in the Part 27 service and technical rules be considered. In the meantime, as discussed below, QUALCOMM strongly urges the Commission not to make unwarranted changes to the Part 27 rules and, in particular, not to lower the power limits.

III. DISCUSSION

A. The Commission Should Make Changes to the Service Rules for Existing Licensees Only Upon a Showing of Need.

1. The Existing Rules Were Intended To Be Flexible and To Encourage Investment in New Technologies.

The existing service rules for the Lower 700 MHz Band were first established in 2002 after a rulemaking in which over 40 parties, both broadcasters and new service providers,

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[10] *NPRM* at para 1.

[11] *Id.* at para. 28.

offered comment.[12] While taking steps to protect broadcasters during the transition, the Commission nevertheless built flexibility into the rules to "allow service providers to select the technology they wish to use to provide new services that the market may demand."[13] Such flexibility was intended to keep the rules relevant even in the face of changing technologies and evolving services and, not incidentally, to encourage investment and technology development. The allocation rules followed the requirements of Section 303(y) of the Communications Act authorizing the Commission:

> to allocate electromagnetic spectrum so as to provide flexibility of use, if
>
> (1) such use is consistent with international agreements to which the United Stats is a party; and
>
> (2) the Commission finds, after notice and opportunity for public comment, that
>
> (A) such an allocation would be in the public interest;
>
> (B) such use would not deter investment in communications services and systems, or technology development; and
>
> (C) such use would not result in harmful interference among users.[14]

While protecting against interference, the Commission specifically envisioned that the flexible approach in its rules:

> will support investment in and development of a variety of broadcast-type applications in the band, including two-way interactive services and services using coded orthogonal frequency division multiplex ("COFDM") technology.[15]

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12 See *Reallocation and Service Rules for the 698-746MHz Spectrum Band (Television Channels 52-59)*, GN Docket 01-74, 16 FCC Rcd. 7278 (2001) ("*Lower 700 MHz Notice*"); see also *Lower 700 MHz Order* and *Lower 700 MHz Recon. Order*.

13 *Lower 700 MHz Notice* at para. 1.

14 47 U.S.C. §303(y).

15 *Lower 700 MHz Order* at para 15.

The Commission even anticipated MediaFLO, mentioning that this investment could open applications like "video transmissions to mobile receivers, similar to services being developed in Europe and Asia."[16]

QUALCOMM, as a technology developer striving to develop new lines of business for itself and its partners in the wireless industry, was inspired by the flexibility inherent in the rules to invent MediaFLO. The favorable propagation characteristics of the 700 MHz spectrum, as well as the 50 kW power limit for base stations, made a nationwide multicast network economically feasible. Moreover, while the Part 27 rules protected against interference to existing broadcasters, they also looked forward to the end of the DTV transition and the use of the recovered 700 MHz spectrum for new services. In short, the rules themselves anticipated improvement in technology and the evolution of services, as well as the end of the DTV transition. It is simply not necessary to change the rules in order to accommodate these developments. Nor does the NPRM offer other reasons for proposing revisions to the rules. Without reasons, and given the reliance on the rules by existing licensees and erstwhile auction participants, it would be unwarranted to make revisions to Part 27.

2. Changes in the Rules Could Cause Delay in Delivery of Service.

It is clear that the Commission intended the Lower 700 MHz Band service rules to encourage investment in new services, leading to their deployment in the earliest possible time frame. It is also clear that those rules are accomplishing their purpose. QUALCOMM, relying on the Commission's promised open environment and, particularly on the invitation to develop mobile video transmission, has invested hundreds of millions of dollars in MediaFLO. The MediaFLO system was designed in reliance on the Part 27 service rules. If the Commission were to revise those rules now it would jeopardize QUALCOMM's investment and would likely hamper and delay the deployment of MediaFLO.

Nor is QUALCOMM alone in this concern. Other 700 MHz licensees have spent four years in an effort to develop commercial services while assuring protection of incumbent broadcasters. Now that the DTV Act has provided a firm date for the end of the DTV Transition,

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[16] *Id.*

their efforts have redoubled. All of their efforts, all of their investment, have been in reliance on the service rules. Should those rules now change, those efforts may have been for naught, that investment wasted.

QUALCOMM is confident that this is not the result the Commission seeks. The Orders adopting the service rules, as well as Section 303(y) of the Communications Act, seek to encourage investment, not deter it. Similarly, the Commission does not desire to take action that will effectively delay the delivery of the new services. Yet these would be the consequences of significant changes to the Part 27 service rules.

In sum, the Commission should not make changes to the Part 27 service rules as they apply to existing licensees without a strong showing of need. Certainly such a showing is lacking in the *NPRM* itself. QUALCOMM will look closely at the Comments filed in the proceeding to determine whether any comment provides evidence of changed circumstances sufficient to warrant changes in the Part 27 service rules, when those changes could negatively impact existing licensees.

B. Consideration Of Areas Of Proposed Revision Fail To Show Need For Change

It is clear that neither passage of the DTV Act nor the evolution of wireless services warrant changes in the service rules for existing licensees as a general matter. It is also clear that these events do not warrant changes in the specific areas the Commission asked Commenters to address.

1. Size of Service Areas

In this matter, the Commission asks commenters to provide specific, factual support for adoption of specific-sized service areas for *unauctioned* spectrum. The Commission is thus not proposing any change to the size of existing license areas. Nevertheless, the Commission asks for

> Evidence based on changed legal circumstances, the state of technology, the demand in rural areas, spectrum access

> constraints, the fungibility of 700 MHz spectrum with other bands and relevant costs, such as those related to acquiring spectrum.[17]

Although this matter does not directly affect already auctioned spectrum, QUALCOMM will be interested to see the evidence supporting change provided by the Commenters. The economies of scale in the wireless industry continue to be quite strong, which argues in favor of the big geographic area licenses as provided in the existing 700 MHz band plan.

2. Size of Spectrum Blocks

The *NPRM* seeks comment on whether it should make changes in the size of spectrum blocks for both the Upper and Lower 700 MHz Bands. The Commission seeks comment on this issue primarily for unauctioned spectrum, but also asks for comment on two issues relating to already auctioned spectrum; "whether to change the size and location of the spectrum blocks in the Lower 700 MHz Band, and the use of a "two-sided" auction."[18]

At the outset, we must address a matter raised by the Commission concerning MediaFLO. In discussing changes to the size of spectrum blocks, the Commission mentions its understanding that there are indications that the MediaFLO system could operate on 5 megahertz blocks as well as on 6 megahertz blocks.[19] The Commission references a presentation made in April 2005 at an international conference in which the FLO air interface was described. That presentation stated that the FLO technology was capable of delivering greater than 6 Mbps throughput in 6 MHz and that the physical layer supports channel widths of 5, 6, 7 and 8 MHz.[20] Indeed, slightly smaller channel blocks could support a product based on the FLO air interface. However, the U.S. MediaFLO system was designed to take full advantage of the 6 MHz unpaired spectrum made available in Block D. Moreover, operation on less than a 6 MHz spectrum block could compromise features in a FLO-based system. Therefore, QUALCOMM cautions against

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17 *NPRM* at para. 27.

18 *NPRM* at para. 49.

19 *Id* at 52.

20 MediaFLO overview at 9, available at http://www.cdg.org/news/events/CDMASeminar/05_LatinAm/050420/6c%2015-30%20Omar%20Javaid.pdf.

assuming, as the Commission appears to do, that a full-featured multi-media system like MediaFLO can easily be accommodated on less than 6 MHz of spectrum. That is not the case.

With regard to the optimal size of spectrum blocks for EV-DO, the Commission asks for comment on whether the 20 megahertz Block D in the Upper 700 MHz Band should be subdivided into two 10 megahertz blocks.[21] As the Commission recognizes, this would decrease overall spectrum efficiency. Using 1xEV-DO, the data throughput of the two 10 megahertz blocks would be significantly less than the throughput achieved using a single 20 megahertz block.[22] Furthermore, the existing band plans for the 700 MHz spectrum allow only one 20 MHz block (752-762 MHz and 782-792 MHz). As part of the Commission's effort to achieve flexibility, QUALCOMM recommends maintaining at least one large spectrum block in the 700 MHz Band.

Moreover, as QUALCOMM has shown herein, both the CDMA2000 and the WCDMA/HSPA technology roadmaps include technologies that will utilize, indeed require, a 20 MHz bandwidth to achieve the fastest possible data transmissions. Retaining the 20 MHz spectrum block will facilitate the delivery of the most technologically advanced wireless services to the American public in the latter part of this decade and into the next decade. The public interest lies in allowing the deployment of these technologies and, therefore, retention of the 20 MHz block in the 700 MHz band plan.

The *NPRM* asks whether the 700 MHz band plan needs modification, either in terms of spectrum blocks or geographic areas, for wireless systems deploying OFDM technology, such as the MediaFLO technology already discussed herein or the FLASH-OFDM technology pioneered by Flarion, a company recently acquired by QUALCOMM.[23] The answer is no. As already noted, the full-featured MediaFLO system requires 6 MHz of unpaired spectrum and the Commission's band plan includes one additional such block. Similarly, FLASH-OFDM operates in 1.25 MHz channels of paired spectrum, which is also consistent with the paired blocks in the Commission's existing band plan. As previously discussed, because of

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21 *NPRM* at para 55.

22 See *NPRM* at n. 144.

23 *NPRM* at para 39.

economies of scale in the U.S. wireless industry, these technologies and others are most economically deployed across large geographic areas, again, consistent with the existing band plan.

Finally, with regard to reconfiguring existing spectrum blocks, the Commission asks whether changes are necessary to the competitive bidding or secondary market rules to allow aggregation of spectrum. In particular, the Commission asks whether a "two-sided auction" could be implemented under the existing rule. In a "two-sided auction" licenses for previously assigned spectrum could be offered for sale in a single auction.[24] QUALCOMM does not oppose this proposal since it is clear that inclusion in such an auction on the part of an existing licensee would be entirely voluntary.

3. Facilitating Access to Spectrum and Provision of Service to Customer

In this portion of the *NPRM*, the Commission seeks comment on whether its existing "substantial service" performance requirements and related policies serve to facilitate rural deployment of wireless services in the 700 MHz Band.[25] First, the Commission considers modifying performance requirements for unauctioned licenses. QUALCOMM supports the existing performance requirements. Wireless carriers who obtain spectrum through the Commission's auctions have strong financial and market incentives to launch wireless services to the broadest possible footprint. Second, the Commission considers options to facilitate access to spectrum in the secondary markets for all 700 MHz Band licensees.[26] QUALCOMM supports rule changes that would promote more efficient secondary markets, provided that such changes do not create unjustified burdens on existing licensees. For example, the Commission suggests that it might require licensees to make "good faith" efforts to negotiate with potential spectrum lessees. Included among these "good faith" efforts might be a requirement that 700 MHz

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24 *NPRM* at para 58

25 *NPRM* at para 60.

26 See *Promotion Efficient Use of Spectrum through Elimination of Barriers to the Development of Secondary Markets, WT Docket No. 00-230, 18 FCC Rcd* 20604 (2003) *(Secondary Markets First Report and Order);* 19 FCC Rcd. 17503 (2004) *(Secondary Markets Second Report and Order)*

licensees have a minimal number of meetings with potential spectrum lessees and/or provide terms for an acceptable leasing arrangement.[27]

QUALCOMM believes that such a requirement would be unreasonably burdensome, particularly when, as in its case, the licensee will be using all its spectrum and is not interested in leasing any part of it to a spectrum lessee. We sympathize with the Commission's desire to bring service to rural areas, and, in fact, today, the U.S. wireless operators are continuously expanding their wireless broadband footprints because there is strong demand for these services in rural areas, just as there is in suburban and urban areas. There is every reason to expect this trend to continue as wireless broadband services continue to improve, and new services, such as MediaFLO, are launched. However, forcing potential lessees to meet with potential lessors, especially those who do not have any spectrum to lease, is likely to be fruitless.

4. Criteria for Renewal

The *NPRM* asks for comment on whether to amend its rules to modify the requirements and procedures for renewal of 700 MHz licenses, both auctioned and unauctioned.[28] As a general matter, QUALCOMM sees no reason for a change in renewal requirements. Clearly an existing licensee, having invested significantly in developing and deploying a system should be entitled to a renewal expectancy. However, we recognize that the Rules refer specifically only to circumstances in which there is a competing application. To accommodate the more likely case where there is no competing application, the Commission could attempt to identify the specific factors that it will consider in granting a renewal. A different, more flexible, approach may be to require "substantial service," without defining specifically what that might be (except, of course, for known safe harbors). This approach would be similar to a general demonstration that renewal is in the public interest.

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27 *NPRM* at para 71.

28 *NPRM* at para 80.

5. Length of License Terms

The Commission asks whether the license terms applicable both to the auctioned and unauctioned spectrum should be revised.[29] Generally, Part 27 licensees have a term of 10 years. In the 700 MHz Band, licensees are given a firm expiration date: January 1, 2015.

In this case, QUALCOMM supports a change in the Rules occasioned both by the delay in auctioning all of the spectrum and the passage of the DTV Act. Indeed, establishing an expiration date 10 years after the firm date provided by the DTV Act (February 17, 2009) is a reasonable way of assuring that licensees will have ample time after the end of the DTV transition to establish a viable commercial service that can meet whatever renewal requirements the Commission establishes.

6. Power Limits and Related Requirements

Here the Commission asks for Comment on whether to modify the power limits that apply to base stations operating in either the unauctioned or the auctioned spectrum. This is a critical matter for QUALCOMM because the technical and business plans for MediaFLO have been developed based on the existing Part 27 power limits. As the Commission notes in the *NPRM*,

> The 50 kW ERP power limit in the Lower 700 MHz Band was adopted to allow high-power broadcast as well as mobile and fixed services.[30]

In the first instance, the Commission asks whether revisions should be made to the 50 kW ERP power limit that applies to base stations in the unauctioned portion of the Lower 700 MHz Band. The Commission asks whether it should reduce the power limit from 50 kW to 20 kW, or 10 kW, or 5 kW or even 1 kW because of possible concerns that the Lower 700 MHz Band power flux density ("PFD") limit does not adequately protect against adjacent channel or co-channel interference.[31]

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29 *NPRM* at 84.

30 *NPRM* at para. 90.

31 *NPRM* at para. 96.

This matter was thoroughly discussed in the *700 MHz Order* and the *700 MHz Recon. Order*. The Commission determined that a 50 kW ERP limit would "promote efficiency and maximize flexibility to the extent practicable by allowing the greatest number of services to co-exist."[32] To protect against potential interference, the Commission adopted a PFD standard, as well as a notification requirement.

The PFD limit was intended to mitigate any risk of interference with lower power adjacent channel operations "so as not to outweigh the added flexibility that is afforded by the higher power limit."[33] Specifically, the Commission required that licensees operating base stations at power levels in excess of 1 kW ERP must design their systems such that transmission from their base station antennas produce PFD levels that are no greater than the PFD levels that would ordinarily occur from stations operating at power levels of 1 kW or less, that is 3 milliwatts per square meter at any ground level location within 1 km of their base station transmitter. As the Commission recognized, this can be accomplished using high antenna sites since these can coexist with lower power/low antenna height operations.[34] In addition, the Commission recognized that other factors could mitigate against interference, such as improved filtering or avoiding spectrum at the edge of an authorized block.

In addition to these techniques, the Commission adopted a notification requirement to give licensees an opportunity to take steps to mitigate potential interference to their adjacent channel stations. Specifically, the Commission required a licensee intending to operate a higher-power base or fixed station to notify all adjacent channel Part 27 licensees authorized to construct and operate base stations within 75 km of the higher power station. Such notice must be filed with the Commission and adjacent channel licensees prior to station operation.

These protections – the PFD limit and the notification requirement – were all adopted by the Commission to mitigate concerns about higher power operation. The Commission believed that operators could take advantage of the higher power and still protect

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32 *700 MHz Order* at para. 103.

33 *700 MHz Order* at para. 104.

34 *700 MHz Order* at para. 105.

against interference. QUALCOMM believed that the Commission was right and, seeing an opportunity to develop a mobile video system, designed the MediaFLO network according to the Part 27 service rules. Literally hundreds of millions of dollars later, the MediaFLO system can co-exist with lower-power adjacent channel operators. Using antennas located at great height,[35] using sophisticated masking and filtering techniques, and using voluntary coordination methods, the MediaFLO network is ready to go on the air compliant with the existing Part 27 rules.[36]

It is unwarranted for the Commission now, *sua sponte*, to suggest that revisions should be made to the power limits for existing licenses in Blocks C and D.[37] The MediaFLO business plan was created to comply with the Part 27 rules adopted, and reconsidered, by the Commission over four years ago. A reduction in power limits would require a significant increase in the number of base stations, which will have a significant economic impact on the MediaFLO operation. Part of QUALCOMM's vision was of MediaFLO as a mass-market consumer item, available at a reasonable price. A change in the power limits will likely drive prices up, a result that would surely be contrary to the pubic interest.

And why would the Commission opt for that result? There does not appear to be any evidence supporting a reduction in the Part 27 power limits. Apparently, no operator has requested a reduction. There have been no reports of interference.

The Commission asks for comment on whether and to what extent applying a revised power limit to existing licensees would promote the public interest and the provisions of the Act. We see no public interest benefit to a reduction in the power limits because operation with mitigated interference is possible within the present power limits. On the other hand, changing the rules would certainly delay or deny the deployment of the MediaFLO service to millions of customers.

Perhaps more important, however, is the chilling effect a rule change will have on investment in telecommunications. If the Commission changes its rules after only four years,

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35 As currently planned, the lowest MediaFLO antenna, other than those on tops of mountains or large hills, will be located on top of a ten-story building .

36 Among the voluntary coordination efforts QUALCOMM has undergone is discussion with adjacent channel operators regarding techniques they can use, such as limiting adjacent channel operation to the downlink.

37 *NPRM* at para. 97.

when those rules are used to decide whether or not to participate in auctions, to develop new technology or to create a new service, when those rules are designed not to be obsolete after changes in technology, and when there appears to be no overarching reasons to change the rules, then investors will – and should – be wary of investing in Commission-regulated enterprises.

7. 911/E911

The Commission has determined tentatively that it should amend its Part 20 Rules to clarify that certain services in both auctioned and unauctioned spectrum in the 700 MHz Band should be subject to its 911/E911 and hearing aid compatibility requirements[38] QUALCOMM supports these requirements and is in agreement that the 911/E911 rules should be extended to services in the 700 MHz Band that meet the Commission's criteria for inclusion.

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38 *NPRM* at para 90.

IV. CONCLUSION

As a general matter, QUALCOMM believes that the Commission should not change the technical and other rules governing the MediaFLO service in the Lower 700 MHz Band. There is no evidence supporting fundamental changes, such as a reduction in the 50 kW power limit. MediaFLO was specifically designed to deliver exciting new services to consumers by taking advantage of the Part 27 Rules. Without firm evidence of changed circumstances, the Commission should not disrupt established business and technical plans. Doing so would not only delay or deny the deployment of services like MediaFLO, but would have a chilling effect on investment in telecommunications.

Respectfully submitted,

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