

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 MOTOROLA, INC.

Motorola, Inc.

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SUMMARY

Motorola provides these comments on the Commission's proposals concerning the technical, operational and licensing rules for the commercial spectrum blocks in the 700 MHz bands.

Motorola recommends that the Commission maintain the current spectrum block sizes and service areas associated with the unauctioned portions of the Upper and Lower 700 MHz bands. In general, Motorola recommends licensing commercial spectrum in wider spectrum blocks as this allows for more efficient deployment of services by minimizing the need for guard bands between licensees. Wider spectrum blocks also provide licensees flexibility to deploy advanced broadband technologies that operate using wider channels and which are capable of higher data rates than technologies operating with narrower channels. If the Commission divides the existing 10 + 10 MHz Upper 700 MHz D-block into two or more smaller blocks, an increasing amount of spectrum would need to be dedicated for use as guard bands to ensure compatibility among adjacent systems, resulting in less efficient and effective use of spectrum.

Motorola also generally supports larger service areas for commercial wireless systems. The economics of commercial wireless services demands continued subscriber growth to support the significant capital required for spectrum acquisition, system build out and reliable operation. In Motorola's experience, smaller service areas largely serve to increase the transactional costs for licensees attempting to offer regional or nationwide services demanded by wireless consumers.

Motorola believes that some changes to the 700 MHz power limits are needed, however, the Commission must ensure that there would be no increase in potential interference to adjacent band public safety operations. In this regard, Motorola believes that the existing out-of-band emissions limitations described in Section 27.53 of the Commission's rules must be maintained, regardless of any change in power levels.

Motorola recommends that the ERP limits should be described within a certain bandwidth, *i.e.*, as a power spectral density, so that all technologies, regardless of their bandwidth, are treated equally. This approach promotes technology neutrality and ensures a degree of compatibility with different forward-looking technology platforms that are expected to be deployed in these bands.

Motorola recommends the Commission adopt a power density level of 1000 W/MHz ERP for commercial operations in the 700 MHz bands. If the Commission adopts rules that allow increased power levels, Motorola also recommends that the Commission adopt a spectral power flux density limit within 1 kilometer of commercial base stations to protect public safety portable receivers from signal overload. Motorola believes that the aggregate total power from non-desired signals into the receiver front end should not exceed approximately -25 dBm.

For the Lower 700 MHz band, Motorola again recommends that the Commission express its power requirements as a power spectral density level to promote technology neutrality. Motorola recommends that the Commission adopt a power spectral density level of 1000 W/MHz to promote technology neutrality. Consistent with the existing rules, Motorola recommends that lower-band licensees be permitted to exceed the 1000

W/MHz, up to a maximum of 50 kW/6 MHz ERP, but subject to the pfd limit on the ground. The current PFD limit for the Lower 700 MHz band should be maintained.

Finally, Motorola supports revising the license terms for all 700 MHz commercial licenses as a result of the adoption of a date-certain for the end of the digital television transition. Motorola believes that an initial expiration date of February 17, 2019, is more appropriate than the proposed date of February 17, 2017.

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COMMENTS OF MOTOROLA, INC.

Motorola, Inc. (Motorola) hereby submits these comments in response to the above-captioned Notice of Proposed Rulemaking seeking comment on certain proposed technical, operational and licensing rule changes for commercial spectrum blocks in the 700 MHz bands.¹ These proposals directly affect the use of the commercial 700 MHz spectrum as well as public safety operations in adjacent bands. As a leading provider of both commercial and public safety wireless communications equipment, Motorola has a great interest in ensuring the implementation of rules that permit efficient and effective use of the 700 MHz bands. As further discussed below, Motorola urges the Commission to maintain a consistent approach for regulating commercial services and to implement policies that expedite the efficient utilization of this extremely valuable spectrum resource. At the same time, protection of critical public safety systems must remain a priority.

¹ *In the Matter of Service Rules for the 698-746, 747-762 and 777-792 MHz Bands*; WT Docket No. 06-150, FCC 06-114, rel. Aug. 10, 2006 (*hereinafter* "NPRM").

I. Background and Summary.

For the past 10 years, the Commission and Congress have acted together to implement an industry and consumer transition from analog to digital television (DTV) broadcast service. The transition to DTV will free a total of 108 MHz of spectrum that has been reallocated for commercial and public safety wireless services. Accurately described as “beach-front” spectrum property, the benefits derived from this reallocation may prove to be unprecedented in U.S. spectrum policy for its positive impact on Homeland Security, consumer information services and entertainment, and the U.S. Treasury.

The reallocated broadcast spectrum is now divided into two distinct bands between 698 MHz and 806 MHz. Sixty megahertz of spectrum in the “Upper 700 MHz band” (746-806 MHz) has been allocated for both public safety services (24 MHz) and commercial operations (36 MHz). Forty-eight megahertz of spectrum in the “Lower 700 MHz band” (698-746 MHz) is allocated entirely for commercial uses. The Commission has already auctioned some commercial licenses in both the Upper and Lower 700 MHz bands and has made available portions of the safety spectrum for narrowband systems.² Both commercial and public safety deployment, however, has been limited due to the continued operation of incumbent TV broadcast stations. As a result of the Deficit

² Auctions for 700 MHz Guard Band Service licenses in the Upper 700 MHz band were conducted in 2000 and 2001. *See* Auction Results for Auctions 33 and 38 *available at* http://wireless.fcc.gov/auctions/default.htm?job=auctions_home. *See also, First Report and Order and Third Notice of Proposed Rule Making*, WT Docket No. 96-86, FCC 98-191, 14 FCC Rcd 152 (1998).

Reduction Act of 2005, these TV broadcast facilities are required to cease transmitting by February 17, 2009.³

The instant proceeding addresses the technical, operational and licensing rules principally applicable to the majority of the commercial spectrum blocks in both the Upper and Lower 700 MHz bands. Under existing statute, the Commission is required to commence the auctions for licenses before January 28, 2008, for the portions of these commercial blocks that have not yet been licensed. Therefore, it is timely to consider whether any changes are needed to the existing service rules that were originally adopted as early as 2000.⁴

As further discussed below, Motorola believes that the Commission should maintain the existing spectrum blocks and service areas for the commercial licenses yet to be licensed. In Motorola's view, larger spectrum blocks are better suited for broadband technologies and broader service areas result in a more efficient and faster deployment of spectrum for commercial wireless services. In addition, Motorola supports modifying the transmitter power requirements to be generally consistent with recommendations previously made for the Advanced Wireless Services and the Broadband Personal Communications Service. Finally, Motorola supports the Commission's proposal to modify the license terms for commercial 700 MHz licenses as a result of the recently imposed date-certain completion of the DTV transition.

³ Deficit Reduction Act of 2005, Pub. L. No. 109-171, 120 Stat. 4 (2006) ("2005 DRA").

⁴ See, e.g., Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission's Rules, *First Report and Order*, WT Docket No. 99-168 (2000).

II. Motorola Recommends that the Commission Retain the Existing Channelization and Service Areas for the 700 MHz Commercial Spectrum.

The Upper 700 MHz band contains two commercial spectrum blocks that have yet to be auctioned – the C-Block (747-752/777-782 MHz) and the D-Block (752-762/782-792 MHz). The Lower 700 MHz Band contains three commercial spectrum blocks that have yet to be auctioned – the A-Block (698-704/728-734 MHz), the B-Block (704-710/734-740 MHz), and the E-Block (722-728 MHz). The Commission seeks comment specifically on whether the Upper 700 MHz D-Block – currently allotted a total of 20 MHz – should be divided into two or more spectrum blocks.⁵ In addition, the Commission seeks more general comments on whether any of the remaining commercial spectrum blocks should be similarly divided, although the *NPRM* notes that the Commission likely has little flexibility to modify the Lower 700 MHz spectrum blocks as a result of the previously conducted auctions.⁶

In related fashion, the Commission also seeks comments on the size of the service areas associated with each commercial spectrum block to be auctioned. Currently, each of the unauctioned commercial spectrum blocks in the Upper and Lower 700 MHz bands is slated to be licensed based on the Commission’s Regional Economic Area Groupings (REAGs), which divide the U.S. and its territories into six regions. The *NPRM* seeks comment on whether any of the commercial spectrum blocks should instead be auctioned over smaller service areas, such as the 734 Cellular Market Areas (CMAs) that were used for the previously auctioned Lower 700 MHz C-Block.⁷

⁵ *NPRM* at ¶ 49.

⁶ *Id.* at ¶ 50.

⁷ *Id.* at ¶ 42.

Motorola believes that the existing band plans already provide a good mixture of bandwidths to accommodate varying business plans. The existing Upper and Lower 700 MHz band plans channelize a total of 84 MHz of commercial spectrum into nine different spectrum blocks ranging in bandwidth from 2 MHz to 20 MHz. Even if one were to exclude from this consideration the 6 MHz of spectrum in the A and B blocks assigned to 700 MHz Guard Band Managers, the unrestricted portions of the commercial 700 MHz spectrum provide greater bandwidth diversity (*e.g.*, seven spectrum blocks) than the recently auctioned 1.7/2.1 GHz AWS band, which channelizes 90 MHz of spectrum into six spectrum blocks. In sum, the 700 MHz band plans already provide for a diversity of spectrum opportunities and should be maintained.

In general, Motorola recommends licensing commercial spectrum in wider spectrum blocks. Wider blocks allow more efficient deployment of services by minimizing the need for guard bands between licensees and provide licensees the flexibility to deploy advanced broadband technologies that operate using wider channels and which are capable of higher data rates than technologies operating with narrower channels. For example, if the Commission divides the existing 10 + 10 MHz D-block into two or more smaller blocks, an increasing amount of spectrum would need to be dedicated for use as guard bands to ensure compatibility among adjacent systems, resulting in less efficient and effective use of spectrum. Furthermore, even if broadband technologies can be deployed in smaller spectrum blocks from a purely technical perspective, it does not necessarily result in a commercially viable business plan. Bandwidth restrictions affect a service providers' downlink to uplink data ratio, frequency reuse plans and cell sizes all of which can impose a higher percentage of

overhead within the available spectrum. Technologies with broader bandwidths can also offer higher instantaneous data rates to users and will offer advantages to licensees deploying broadband systems intended to provide a competitive option to wired networks. In summary, broadband systems are often more efficient from both a technical and economic perspective when deployed in broader bandwidths.

Motorola also generally supports larger service areas for commercial wireless systems. The economics of commercial wireless services demands continued subscriber growth to support the significant capital required for spectrum acquisition, system build out and reliable operation. Currently, growth is typically accomplished by increasing coverage areas and offering new and innovative services such as higher speed data and video. This has been the trend for the cellular and PCS bands as carriers have consolidated while continuing to provide consumers with competitive service options.⁸ In Motorola's experience, smaller service areas largely serve to increase the transactional costs for licensees attempting to offer regional or nationwide services demanded by wireless consumers.

This latter fact was borne out in the results of Auction 66. In that auction, the A-block and the F-block licenses were both paired blocks of 20 MHz licenses. The A-block was auctioned over 734 CMA service areas whereas the F-block was auctioned over 12

⁸ See e.g., In the Matter of Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993 Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services, WT Docket No. 06-17, FCC 06-142, rel. September 29, 2006, at ¶ 55 (“*Since the end of 1999, carriers have been building nationwide footprints through various forms of transactions . . . [a]s the Commission has previously concluded, operators with larger footprints can achieve certain economies of scale and increased efficiencies compared to operators with smaller footprints.*”)

regional areas. The net value of all high bids for A-block licenses totaled \$2.243 billion whereas the F-block net total was \$4.174 billion – an 86 percent increase in valuation by prospective service providers. In Motorola’s opinion, bidders discounted the value of A-block licenses largely because of the future costs they could face when forced to aggregate additional licenses and coverage areas to meet wireless customer needs. The need for aggregate licenses not only increases costs, but also can slow the overall deployment of services until the consolidation occurs. Motorola urges the Commission to consider this real-world valuation of spectrum and offer 700 MHz licenses that are in the greatest demand by the marketplace. In so doing, the Commission will help ensure that licenses will go to entities that value the spectrum the most and that are most capable of deploying new innovative services as quickly as possible.⁹

Furthermore, large regional or even national licensees increase the opportunities to deploy new technologies, such as WiMAX. Consumers today generally demand nationwide, if not global, availability of their mobile service. Accordingly, the potential for deploying new, highly efficient technologies is maximized if a carrier can be assured of being able to achieve a nationwide deployment without having to reach agreements with other licensees or be delayed by consolidating licenses post auction.

⁹ The Commission also must be mindful of its current statutory obligations associated with the conduct of the 700 MHz auctions. Congress has not only required the Commission to initiate the auctions before January 28, 2008, it has also required that all monies raised in the auction must be deposited before June 30, 2008. Therefore, the Commission currently has an obligation to ensure that the auction and the final issuance of licenses, which will trigger transfer of auction revenues to the Treasury, supports these deadlines. Significantly increasing the number of licenses available in the auction by reducing the size of the service areas creates additional opportunities for delay.

Motorola also urges the Commission to maintain parity in licensing areas across adjacent spectrum. For example, the C and D blocks of the Upper 700 MHz band should have consistent service areas to allow licensees the potential to obtain and aggregate spectrum in a given regional market with reduced transactional costs in the secondary markets. Motorola notes that the Commission has already established rules to facilitate rural deployments through its secondary markets leasing provisions and, most recently, in the AWS auction, which distributed 50 MHz of spectrum over CMA and EA service areas. Coupled with the Lower 700 MHz C block licenses that have already been auctioned in rural areas, Motorola believes that any issues associated with rural deployments has little to do with spectrum availability. In fact, it would be beneficial to the public in terms of competition and rapid deployment of services if the Commission implemented auction rules to permit combinatorial bidding, which would allow licensees to more readily obtain a nationwide footprint.

After considering the options and how best to accommodate the various technologies, Motorola recommends that the Commission maintain the current spectrum block sizes and service areas associated with the Upper and Lower 700 MHz bands. The existing rules appear to offer a good balance between allowing multiple entries and providing the requisite licenses necessary to provide the anticipated services, within the spectrum capacity available. Competition and the potential for deployment of new services would be further enhanced if the Commission develops auction rules that allow combinatorial bidding so that licensees can obtain a large regional or nationwide footprint more readily. Further division of the spectrum blocks could result in additional need for

guard bands and a resultant decrease in spectrum efficiency and operational effectiveness for broadband services.

III. Motorola Recommends that the Commission Modify the Existing Policies on Power.

The *NPRM* seeks comment on whether to modify the power limits that apply to base stations operating in either the unauctioned or previously auctioned spectrum in the 700 MHz bands.¹⁰ As discussed in the *NPRM*, the current power limit for base stations operating in the Upper 700 MHz Band is 1 kW ERP and the power limit for base stations operating in the Lower 700 MHz Band is 50 kW ERP.¹¹ To help ensure that transmissions in excess of 1 kW in the Lower 700 MHz band would not cause interference to adjacent band operations, the Commission has required Lower 700 MHz band licensees operating base stations at power levels above 1 kW ERP to comply with a power flux density (PFD) limit of 3000 microwatts per square meter at all locations on the ground within one kilometer of their base stations.¹² Essentially, the *NPRM* is seeking comment on whether the Upper 700 MHz power level should be increased (with the addition of a PFD limit) and whether the lower 700 MHz power level should be decreased. For both bands, the Commission asks if rural areas should have a 2 kW ERP limit with no PFD limit, similar to the approach used for the Broadband PCS & AWS services.¹³

¹⁰ *NPRM* at ¶ 90.

¹¹ *Id.*

¹² *Id.* See also, 47 C.F.R. § 27.27.55(b) of the Commission's Rules.

¹³ *NPRM* at ¶ 96.

Motorola believes that changes to the 700 MHz power limits are needed and appreciates the Commission raising these issues for industry consideration. First and foremost, no change should occur in the Upper 700 MHz band power levels that would increase potential interference to adjacent band public safety operations. In this regard, Motorola believes that the existing out-of-band emissions limitations described in Section 27.53 of the Commission's rules must be maintained, regardless of any change in power levels. These restrictions were developed over a multi-year proceeding and have not been demonstrated to be excessive in their design.

Motorola recommends that ERP limits should be described within a certain bandwidth, *i.e.*, as a power spectral density, so that all technologies, regardless of their bandwidth, are treated equally. This approach promotes technology neutrality and ensures a degree of compatibility with different forward-looking technology platforms that are expected to be deployed in these bands.

Motorola has previously indicated its support for specifying radiated power as a function of bandwidth for other commercial wireless services. The FCC's technical rules for wireless services are often biased against wider bandwidth technologies because they allow technologies that utilize a narrower bandwidth to radiate a higher power per unit bandwidth.¹⁴ Such an approach is particularly inappropriate when trying to promote effective broadband systems and new technologies. Motorola therefore recommends that

¹⁴ Motorola has urged the Commission to modify the Advanced Wireless Service and Broadband PCS rules to permit stations in these two services with bandwidths greater than 500 kHz to operate within maximum limits of 3280 W/MHz EIRP in non-rural areas and 6560 W/MHz EIRP in rural areas. Motorola notes that these recommendations remain pending at the Commission and we urge the Commission to act expeditiously on these recommendations. *See e.g.*, Comments of Motorola, Inc., WT Docket No. 03-264, December 19, 2004.

the Commission adopt radiated power levels in both the Upper and Lower 700 MHz bands on a power per unit bandwidth basis. Furthermore, any changes in power levels should consider parity with other commercial wireless bands¹⁵ as long as doing so does not result in increased interference to adjacent 700 MHz public safety operations. With these considerations in mind, Motorola recommends the Commission adopt a power density level of 1000 W/MHz ERP for commercial operations in both the Lower and Upper 700 MHz bands. This level would allow for higher transmit power levels for any technology wider than 1 MHz.

Allowing increased power could increase the area around Upper 700 MHz commercial base stations where interference could occur to public safety systems. Therefore, if the Commission adopts rules that allow increased power levels, Motorola recommends that the Commission also specify a spectral power flux density within 1 kilometer of the commercial base stations to protect typical Class A public safety portable receivers from receiver overload. This approach is similar to the method used in the Lower 700 MHz band for high power transmitters to help avoid interference to adjacent operations. In order to provide protection from receiver overload for typical public safety portables, the aggregate total power from non-desired signals into the receiver front end should not exceed approximately -25 dBm.

With regard to the Lower 700 MHz band, Motorola is concerned that the high power levels permitted may result in incompatibility between broadcast-type operations and wide area commercial cellular networks. Nonetheless, Motorola understands that C

¹⁵ For example, in the PCS and AWS bands, the Commission specifies power in terms of EIRP, whereas power for the 700 MHz band is stated using ERP. 1000 W ERP is equivalent to 1640 W EIRP.

and D block licenses have already been issued and those licensees have already begun establishing business plans based on the existing rules. Therefore, Motorola does not recommend a reduction in the maximum permitted power at this time. As noted above, Motorola proposes that the Commission adopt a power spectral density level of 1000 W/MHz to promote technology neutrality. Consistent with the existing rules, Motorola recommends that lower-band licensees be permitted to exceed the 1000 W/MHz, up to a maximum of 50 kW/6 MHz ERP limit, but subject to the pfd limit on the ground. The current power flux density limits should continued to be applied, with a measurement bandwidth specified to avoid confusion.

IV. Other Issues.

The *Notice* also seeks “comment on whether the license terms applicable to both the unauctioned and auctioned spectrum in the 700 MHz Band should be revised and, if so, in what manner.”¹⁶ At present, Section 27.13(b) of the Commission’s rules provides that non-broadcast licenses for the 698-764 MHz and 776-794 MHz bands will have terms that “extend until January 1, 2015.”¹⁷

As the Commission points out in the *NPRM*, the fundamental presumption underlying the January 1, 2015 date has now shifted. Specifically, Congress enacted the DTV Act and “the new firm deadline for the DTV transition, [is] February 17, 2009,” rather than the target date of 2006 for the DTV transition.¹⁸ Thus, the *NPRM* solicits comment on a revised license term date of February 17, 2017, which is based on the same 8-year schedule upon which the existing 2015 date was derived.

¹⁶ *NPRM* at ¶84.

¹⁷ 47 C.F.R. §27.13(b).

¹⁸ *NPRM* at ¶85 and n.201.

Motorola believes the logic underlying this proposal is fundamentally sound, and that licensees – both new and existing auction winners – must be given reasonably adequate time to design systems, design and build equipment, and implement systems. Motorola also notes that 10 years is the expected license term for wireless services. In many cases, commercial licensees will not be able to commence construction until after the end of the DTV transition. Therefore, Motorola believes that it would be more appropriate to establish February 17, 2019, as the license term for all non-broadcast 700 MHz licenses and would support a longer license term as providing even greater stability.

V. Conclusion.

Motorola urges the Commission to proceed expeditiously in its review of the 700 MHz commercial auction rules so that this valuable resource can be put to market as soon as possible. Utilization of this spectrum will provide tremendous public benefits and all efforts should be exhausted to ensure that it is efficiently and effectively managed and distributed.

Respectfully submitted,
Motorola, Inc.

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