

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

In the Matter of

Service Rules for Advanced Wireless Services in
the 1.7 GHz and 2.1 GHz Bands

WT Docket No. 02-353

COMMENTS OF MOTOROLA, INC.

Steve B. Sharkey
Director, Spectrum and Standards
Strategy
Motorola, Inc.
1350 I Street, N.W.
Washington, D.C. 20005

Robert D. Kubik
Manager, Spectrum and Regulatory
Policy
Motorola, Inc.
1350 I Street, N.W.
Washington, D.C. 20005

February 7, 2003

TABLE OF CONTENTS

SUMMARY	ii
I. INTRODUCTION	1
II. THE COMMISSION SHOULD PERMIT FLEXIBLE USE OF THE AWS BANDS UNDER THE PART 24 REGULATORY FRAMEWORK.....	2
III. SPECTRUM BLOCKS AND PAIRING ISSUES	5
IV. BAND CLEARANCE AND REIMBURSEMENT	9
V. INTERFERENCE CONTROL	10
A. In-Band Interference Control	10
B. Out-of-Band and Spurious Emission Limits.....	13
VI. POWER LIMITS AND BAND PLANS	14
VII. CONCLUSION.....	16

SUMMARY

Motorola recommends the adoption of service rules for Advanced Wireless Services (“AWS”) in the 1710-1755 MHz and 2110-2155 MHz bands that are based upon the Part 24 rules that currently govern the Personal Communications Services (“PCS”). Adopting the Part 24 framework would establish regulatory parity for advanced wireless services deployed in either the PCS or AWS bands. It would also provide prospective licensees with a level of regulatory comfort that is critical to encourage investment to develop new products and services for the AWS bands. Moreover, the ongoing deployment of 2.5G and early 3G services in the PCS bands shows that the Part 24 rules provide sufficient flexibility for the development of advanced wireless services. In Motorola’s view, there is no need to craft a particular strain of Part 27 rules for AWS when the Part 24 framework is perfectly adequate and would allow sufficient flexibility.

Motorola supports the Commission’s tentative conclusion to allow licensees to use the AWS bands for any use permitted by the Table of Allocations, but with one caveat: the Commission should clearly designate the lower segment of the band for mobile station transmission and the upper segment for base station transmission. This designation would follow the ITU recommendation for terrestrial IMT-2000 spectrum, would be consistent with the existing designation for the GSM 1800 and UMTS spectrum in Europe, and would conform with the current utilization of the PCS bands. Adopting this conventional duplex orientation would reduce potential equipment design issues, facilitate the development of multi-mode equipment, and lower equipment costs for consumers due to greater economies of scale.

Motorola recommends that all spectrum in the AWS bands should be licensed in paired spectrum blocks to support the deployment of frequency division duplex (“FDD”) systems, which Motorola believes will be the primary enabling 3G technology. FDD technology throughout the entire allocation is a more efficient use of the spectrum for wide area 3G mobile operations than mixed use of the band with the alternative, Time Division Duplex (“TDD”).

To provide the highest level of technological neutrality, Motorola recommends that licensed spectrum blocks should be no smaller than 20 MHz (*i.e.*, two paired 10 MHz segments), with increments of 5 MHz. Based on these considerations, Motorola proposes that the Commission establish one 30 MHz spectrum block (2 x 15 MHz) and three 20 MHz blocks (2 x 10 MHz). This arrangement would initially ensure four licenses per service area, which should be sufficient to provide healthy competition within each market.

Motorola recommends that the Commission adopt the same field strength limit and power attenuation requirements that currently apply to the PCS bands. We also support the use of the TIA Technical Report 10-F guidelines to determine interference to fixed microwave incumbents in the 2110-2155 MHz band, and the development of mandatory coordination procedures with regard to Department of Defense (“DOD”) operations in the 1710-1755 MHz band. Motorola also supports the industry assessment that DOD aeronautical telemetry operations must be cleared from this band before it can be used effectively for AWS and urges the Commission to commence a proceeding to consider relocation of issues as soon as possible.

Motorola recommends the adoption of effective isotropic radiated power (“EIRP”) spectral density limits for base station transmitters and mobile station power levels that are generally consistent with limits established in Part 24 for the PCS bands. A bifurcated approach to base station EIRP is recommended that would set a uniform power spectral density limit for

base transmitters with larger than 1 MHz bandwidths. Motorola also supports an exemption to these power limits for base stations that are located in rural areas, as defined by the existing Rural Service Area (“RSA”) geographic boundaries, provided that licensees comply with the Part 24 field strength limit at the edges of their service areas.

Finally, Motorola strongly supports legislative efforts that would enable the Commission to fund the relocation costs of both government and non-government incumbents from the AWS auction proceeds.

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

In the Matter of

Service Rules for Advanced Wireless Services in
the 1.7 GHz and 2.1 GHz Bands

WT Docket No. 02-353

COMMENTS OF MOTOROLA, INC.

Motorola, Inc. (“Motorola”) hereby submits these comments on service rules for Advanced Wireless Services (“AWS”) in the 1710-1755 MHz and 2110-2155 MHz bands proposed in the *Notice of Proposed Rulemaking* (“NPRM”) in the above-captioned proceeding.¹

I. INTRODUCTION

In this proceeding, the Commission is considering service rules to govern a new band for third generation (“3G”) wireless services in the United States. As the term “3G” suggests, the spectrum allocated for AWS will permit the development of new services that provide consumers with more advanced applications and capabilities than are presently available to users of “first generation” cellular service or “second generation” (“2G”) Personal Communications Service (“PCS”). While the Commission has allocated the 1710-1755 MHz and 2110-2155 MHz bands (“AWS bands”) for both fixed and mobile uses, it has recognized that “the dominant use of this spectrum is likely to be advanced wireless services or next generation cellular and PCS

¹ Service Rules for Advanced Wireless Services in the 1.7 GHz and 2.1 GHz Bands, WT Docket No. 02-353, Notice of Proposed Rulemaking, FCC 02-305 (rel. Nov. 22, 2002) (“NPRM”).

services,”² utilizing the International Mobile Telecommunications-2000 (“IMT-2000”) standard developed by the International Telecommunications Union (“ITU”).³ As such, the AWS spectrum will supplement the existing cellular and PCS allocations, enable the deployment of 3G services, and provide additional capacity to support the rapidly growing demand for mobile services in the United States.

Motorola therefore recommends the adoption of service rules based upon the Part 24 rules that already govern PCS. Adopting the Part 24 framework would establish regulatory parity for advanced wireless services deployed in either the PCS or AWS bands and would provide prospective AWS licensees with a level of regulatory comfort that is critical to encourage investment to develop new products and services for the AWS bands. Moreover, the ongoing deployment of 2.5G and early 3G services in the PCS bands shows that the Part 24 rules provide sufficient flexibility for the development of advanced wireless services. Like the current Part 24 rules, the AWS technical rules should include appropriate technical standards and coordination requirements to prevent harmful interference to incumbents.

II. THE COMMISSION SHOULD PERMIT FLEXIBLE USE OF THE AWS BANDS UNDER THE PART 24 REGULATORY FRAMEWORK

Motorola supports the Commission’s tentative conclusion to promote innovative services and encourage flexible and efficient use of the AWS bands by permitting licensees to use these bands for any use permitted by the Table of Allocations,⁴ but with one caveat: the Commission

² See *id.* ¶ 14.

³ See *id.* ¶¶ 3-8; Amendment of Part 2 of the Commission’s Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, including Third Generation Wireless Systems, ET Docket No. 00-258, Second Report and Order, FCC 02-304, ¶¶ 18-19 (rel. Nov. 15, 2002) (“AWS Allocation Order”).

⁴ See *NPRM* ¶ 12.

should clearly designate the lower, 1710-1755 MHz, segment of the band for mobile station transmission and the upper, 2110-2155 MHz, segment for base station transmission. This designation would codify the current utilization of the PCS bands, which has led to minimal interference between licensees and optimal spectrum efficiency, and would ensure that these same benefits will be realized in the AWS bands. Permitting flexibility to implement base or mobile transmitters in either band segment would lead to harmful interference to adjacent channel users if a licensee implements a non-standard pairing. Motorola has documented this interference concern in numerous proceedings.⁵ Addressing this risk at this early stage is consistent with the recommendations of the FCC's Spectrum Policy Task Force, which recognized the efficiencies inherent in grouping like systems or devices.⁶

The flexibility accorded by the Part 24 rules, as modified to reflect the duplex orientation, would allow licensees to offer fixed or mobile services, or any combination of the two. In Motorola's view, this level of flexibility is appropriate, provided that the Commission adopts technical rules and coordination requirements, similar to those in Part 24, to minimize interference to incumbent users that remain in the AWS bands.

Motorola believes that the existing Part 24 rules provide the most appropriate regulatory framework for the AWS spectrum, and it therefore disagrees with the Commission's tentative proposal to utilize the Part 27 regulatory framework.⁷ The Commission's proposal to permit licensees the flexibility to offer fixed or mobile services in the AWS band does not dictate the

⁵ See, e.g., Comments of Motorola, Inc. ET Docket No. 00-258, Oct. 22, 2001, at 16-17; Comments of Motorola, Inc. ET Docket No. 02-135, July 8, 2002, at 10.

⁶ See Spectrum Policy Task Force Report, ET Docket No. 02-135, at 22 (filed Nov. 15, 2002) ("Task Force Report").

⁷ See *NPRM* ¶ 13.

adoption of a Part 27 regulatory framework, as the *NPRM* suggests.⁸ PCS licensees already have this degree of flexibility under Part 24.⁹ The Part 24 rules therefore provide sufficient flexibility for the development of 3G services. Indeed, the Commission recently recognized this point, observing that PCS “carriers have the flexibility to deploy advanced wireless, including 3G, technologies using their existing CMRS spectrum.”¹⁰ In Motorola’s view, there is no need to craft a particular strain of Part 27 rules for AWS when the Part 24 framework is perfectly adequate and would provide AWS licensees with the flexibility they need.

Moreover, because the “dominant use” of the AWS spectrum is expected to be for 3G cellular type services, akin to services that are being deployed, or are planned, in the PCS bands, it is appropriate to provide regulatory parity for these two allocations by adopting the Part 24 framework for the AWS bands. As the Commission has observed, the major PCS carriers have committed to, or are in the process of, deploying advanced wireless services in the PCS bands, so 3G services will eventually be available to consumers in both the PCS and AWS bands.¹¹ It is appropriate and logical, therefore, to apply the same regulatory framework to both bands. This consideration is bolstered by the likelihood that some existing PCS licensees will acquire AWS spectrum. A common Part 24 regulatory structure in both bands would avoid requiring such licensees to comply with two different regulatory regimes for the same 3G services, depending on which spectrum block is being utilized.

⁸ *See id.*

⁹ *See* 47 C.F.R. § 24.3.

¹⁰ Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, Seventh Report, FCC 02-179, 17 FCC Rcd 12985, 13039 (2002).

¹¹ *See id.* at 13041-43.

In addition, experience has shown that Part 24 rules have been effective in allowing the rapid deployment and development of 2G services. In contrast, services licensed under the Part 27 rules have experienced significant development problems. Most notably, the 2.3 GHz spectrum allocated for the Wireless Communications Service (“WCS”) has languished, even though it was auctioned more than two years after the first broadband PCS auction. There has been little actual use of the WCS spectrum since the completion of Auction 14 in April 1997, largely due to the fact that licensees have struggled with the uncertain technical and regulatory environment created by the Part 27 rules.¹² In Motorola’s view, the Commission should adopt the tried and tested Part 24 framework, which has been shown to facilitate rapid deployment of a “multitude of dynamic services,”¹³ rather than rules which have not led to the successful development of any service.¹⁴

III. SPECTRUM BLOCKS AND PAIRING ISSUES

Motorola recommends licensing based on paired spectrum blocks. Spectrum pairing is necessary for the deployment of frequency division duplex (“FDD”) systems, which Motorola believes will be the primary enabling 3G technology. As Motorola has previously noted, FDD technology is better suited for wide area 3G mobile operations than the alternative, Time

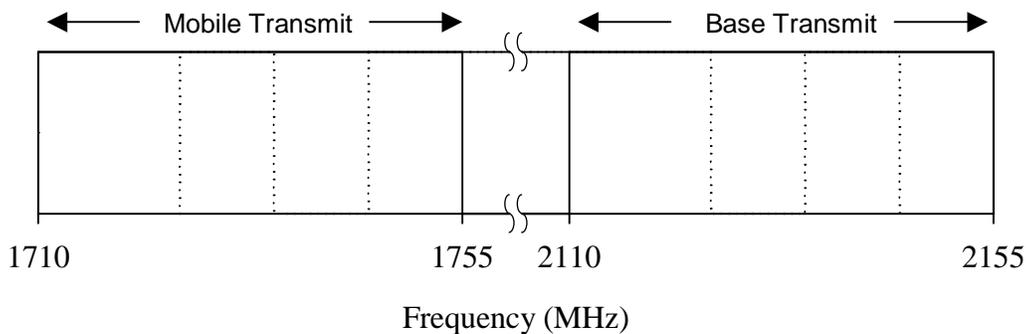
¹² See *id.* at Appendix A, A-4 to A-6. The Commission has noted that AT&T Wireless had utilized WCS spectrum to deploy fixed wireless services in two cities, but subsequently exited the fixed wireless business and sold these assets. See *id.* at A-4. WorldCom is offering fixed wireless services in a small number of cities, in part using WCS spectrum. See *id.* at A-5 to A-6.

¹³ *Id.* at 13038.

¹⁴ Part 27 rules currently apply only to WCS and the 698-746 MHz and 746-806 MHz bands. See 47 C.F.R. § 27.5. The WCS spectrum is barely used. See *supra* note 12. The underwhelming success of the WCS led Motorola to oppose the adoption of Part 27 rules for the 746-806 MHz band. See Comments of Motorola, Inc., WT Docket No. 99-168, July 19, 1999, at 3-6.

Division Duplex (“TDD”).¹⁵ Motorola recommends that licensed spectrum blocks should be no smaller than 20 MHz (*i.e.*, two paired 10 MHz segments). Based on the Commission’s recognition that the most likely services to be deployed in this spectrum will be based on recognized IMT-2000 standards, establishing spectrum segments of at least 10 MHz, and in any case, increments of 5 MHz, would provide the highest level of technological neutrality.

Given these recommendations for a minimum segment size of 10 MHz and for 5 MHz increments, Motorola proposes that the Commission establish one 30 MHz spectrum block (2 x 15 MHz) and three 20 MHz blocks (2 x 10 MHz).¹⁶ This arrangement would initially ensure four licenses per service area, which should be sufficient to provide healthy competition within each market. Licensees could obtain more than 20 MHz of spectrum in a market by obtaining multiple spectrum blocks. The availability of 20 MHz and 30 MHz spectrum blocks would help to ensure that licensees are not required to acquire more spectrum than they need for their operations. In addition, the combination of 20 MHz and 30 MHz blocks would allow licensees to aggregate a variety of license sizes.



¹⁵ See Reply Comments of Motorola, Inc., ET Docket No. 00-258, Mar. 9, 2001, at 9 (“Motorola 3G Reply Comments”) (noting the TIA’s assessment that “TDD systems are useful generally in low power, lower mobility applications”).

¹⁶ The suggested band plan indicates the 2x15 MHz blocks at the lower end of the AWS bands. This arrangement is intended to alleviate sharing issues with broadcast users below 2110 MHz. An alternative would be to locate the 2x15 MHz blocks at the upper ends of the AWS bands, which would alleviate sharing issues with DOD operations above 1755 MHz.

Furthermore, the Commission should specify mobile and base transmit bands for each of the AWS spectrum blocks according to the conventional duplex direction in order to maximize the benefits of harmonization with international spectrum allocations. Thus, the Commission should designate the 1710-1755 MHz frequency band as the uplink band (*i.e.*, mobile station transmit), and the 2110-2155 MHz band as the downlink band (*i.e.*, base station transmit). The ITU has recommended that terrestrial IMT-2000 spectrum allocations should follow this conventional orientation.¹⁷ In addition, this orientation would be consistent with the existing designation for GSM 1800 MHz spectrum and the Universal Mobile Telecommunications System (“UMTS”) spectrum in Europe. As Motorola has previously noted, adopting the conventional duplex direction that is used in the current 2G mobile spectrum will reduce potential equipment design issues, facilitate the development of multi-mode equipment, and lower equipment costs for consumers due to greater economies of scale.¹⁸

Moreover, adopting the conventional duplex direction for the AWS bands would harmonize with international use of these frequencies for 2G and 3G services: the 1710-1785 MHz band is used as the mobile transmit band in the DCS-1800 spectrum;¹⁹ and the 2110-2170 MHz band is designated as the base station transmit band for the UMTS spectrum in Europe.²⁰

¹⁷ See ITU Recommendation ITU-R M.1036-1, Spectrum Considerations for Implementation of International Mobile Telecommunications-2000 (IMT-2000) in the Bands 1885-2025 MHz and 2110-2200 MHz, § 4.1 (Jan. 1999).

¹⁸ See Comments of Motorola, Inc., ET Docket No. 00-258, Feb. 22, 2001, at 21. The ITU explicitly based its duplex recommendation, in part, on the favorable impact on the “development of dual mode satellite/terrestrial terminals.” *Id.* § 4.1(iii).

¹⁹ As in the United States, the European 2G spectrum (*i.e.*, the DCS-1800 bands) is being upgraded to 2.5G and 3G services. For example, carriers in a number of European countries have deployed General Packet Radio Service (“GPRS”) technology to provide advanced wireless services using the DCS-1800 spectrum. See *NPRM* at 13040.

²⁰ See UMTS Forum, *UMTS/IMT-2000 Spectrum*, Report No. 6, June 1999 (“*UMTS Spectrum Report*”), § 3.5.4, at 52, available at http://www.umts-forum.org/reports_r.html. The UMTS Forum explicitly adopted the ITU duplex direction recommendation. See *supra* note 17.

Adopting the ITU duplex recommendation would thus significantly advance the possibility of a global downlink band for IMT-2000 at 2110-2155 MHz,²¹ which would enable manufacturers to achieve greater commonality in equipment design and achieve economies of scale, and would greatly facilitate global roaming.²²

Motorola opposes the allocation of any unpaired spectrum in the AWS bands. Unpaired spectrum is not necessary to support FDD systems that we expect to be the primary 3G technology. Although unpaired spectrum could be used to support TDD operations, they would not be well suited for wide area mobile services that are expected to be the dominant use in the AWS spectrum. Given the limited current allocation of 90 MHz for AWS and the anticipated high demand for 3G mobile services, the Commission should allocate the entirety of this spectrum on a paired band basis. Any allocation of unpaired spectrum would severely restrict the amount of paired spectrum that is available. Moreover, if the Commission were to assign unpaired spectrum in the AWS bands, guard bands would be required between the paired and unpaired spectrum blocks, or TDD uses in the unpaired spectrum would need to be limited to low power devices suitable only for indoor environments. In Motorola's view, neither of these alternatives would represent efficient use of the limited allocation of AWS spectrum. Accordingly, the entire 90 MHz of AWS spectrum should be licensed as paired blocks.²³

²¹ Countries outside Europe, such as China, Japan, and Korea, have also allocated spectrum in the 2110-2155 MHz band for IMT-2000 services. *See UMTS Spectrum Report* § 1.5 at 18.

²² The Commission recognized these benefits in selecting the 1710-1755 MHz and 2110-2155 MHz bands for AWS. *See AWS Allocation Order* ¶¶ 24, 29, 40.

²³ Motorola nevertheless continues to support TDD as a viable and useful technology, particularly for coverage of small areas with high data requirements. The Commission should consider additional spectrum allocations for AWS, some of which could be unpaired. The record in the 3G allocation proceeding (ET Docket No. 00-258) clearly established that the anticipated demand for 3G services by 2010 justifies an allocation of at least 160 MHz of spectrum for AWS. *See, e.g.,* Motorola 3G Reply Comments at 2-5. We therefore urge the Commission to proceed with the identification of additional bands for reallocation for AWS.

IV. BAND CLEARANCE AND REIMBURSEMENT

The *NPRM* notes that the National Telecommunications and Information Administration (“NTIA”) proposed legislation in the 107th Congress that would have authorized use of auction funds to pay relocation expenses of federal government incumbents.²⁴ Motorola strongly supports such legislation and urges the Commission to support the introduction of legislation in the 108th Congress that would fund the relocation costs of both government and non-government incumbents from auction proceeds.

Since the adoption of the *NPRM*, the Commission has released the Spectrum Policy Task Force Report, which addresses a broad range of spectrum policy issues, including reimbursement of relocated incumbents. The Task Force Report recommends that Congress should enact legislation to authorize use of auction funds to pay relocation expenses of incumbents,²⁵ and that the Commission should support legislative proposals on this issue, including measures that would reimburse non-government incumbents.²⁶ Motorola has recently submitted comments on the Task Force Report in support of these policy and legislative recommendations.²⁷ As noted in those comments, such authority is essential for two reasons. First, it would provide certainty to incumbent licensees that they will be reimbursed for all costs associated with relocation, and it

²⁴ See *NPRM* ¶ 34; see also Letter from Theodore W. Kassinger, General Counsel, Dept. of Commerce, to The Honorable Richard B. Cheney, President of the Senate, July 23, 2002 (enclosing draft bill titled the “Federal Spectrum Relocation Payment Procedures Act”), available at <http://www.ntia.doc.gov/ntiahome/congress/2002/legistransmittal7232002.htm>. This proposed legislation would establish a Spectrum Relocation Fund for this purpose. Two other bills introduced in the 107th Congress proposed the creation of such a fund. See H.R. 4641, 107th Cong. § 202 (2002); H.R. 5638, 107th Cong. § 4 (2002).

²⁵ See Task Force Report at 67 (Task Force Policy Recommendation 31(e)).

²⁶ See *id.* at 69 (Legislative Recommendations).

²⁷ See Comments of Motorola, Inc., ET Docket No. 02-135, Jan. 27, 2003, at 26-27.

would thus encourage incumbents to relocate voluntarily. Second, the legislation would provide much needed certainty to prospective licensees regarding the cost of spectrum for new services.²⁸

V. INTERFERENCE CONTROL

A. In-Band Interference Control

To control in-band interference, Motorola recommends the use of a boundary limit approach, as currently employed in the PCS bands under Part 24 rules.²⁹ This approach has proven to be effective in the deployment of PCS service while allowing for flexibility when adjacent licensees can agree to higher limits. The Part 24 field strength limit of 47 dBuV/m is more appropriate than the 40 dBuV/m limit prescribed for the commercial 700 MHz bands under Part 27³⁰ because it would generally allow more reliable communications in boundary regions. In addition, Motorola recommends requiring the same level of coordination that is presently mandated under the Part 24 rules.³¹

Motorola recommends adoption of an inter-block emission limit that would require an AWS licensee to attenuate transmitter power by at least $43 + 10 \log_{10}(P)$ dB on any frequency outside of its frequency block. The Commission has adopted such an emission limit for the PCS bands³² and it would be an appropriate interference control for the AWS bands as well. This level of attenuation, coupled with the licensees' obligation to coordinate use at frequency block boundaries, should be sufficient to prevent harmful in-band interference between AWS licensees. No attenuation should be required between commonly held channel blocks.

²⁸ *See id.*

²⁹ *See* 47 C.F.R. § 24.236.

³⁰ *See id.* § 27.55(b).

³¹ *See id.* § 24.237(a).

³² *See id.* § 24.238(a).

The Commission must also adopt appropriate measures to limit interference to incumbents remaining in the AWS bands. With regard to the 2110-2155 MHz band, the *NPRM* notes that some incumbent fixed microwave incumbents may remain in the band after AWS systems become operational and asks whether the procedures described in TIA Telecommunications Systems Bulletin 10-F would be appropriate interference guidelines for the band.³³ Motorola supports the use of these TIA procedures to determine AWS interference to incumbent microwave receivers. The Commission adopted the use of such procedures for the PCS bands³⁴ and experience has shown that they provide workable guidelines. As previously noted, Motorola supports proposals to fund the relocation of incumbents from AWS auction proceeds.

With regard to the 1710-1755 MHz band, the *AWS Allocation Order* authorizes the Department of Defense (“DOD”) to continue fixed microwave and tactical radio relay (“TRR”) operations in at Cherry Point, North Carolina and Yuma, Arizona on a primary basis indefinitely.³⁵ Motorola recommends that the Commission develop mandatory coordination procedures between AWS licensees and the DOD operations at these locations. To the extent practicable, these procedures should include all 1710-1755 MHz band licensees that would be impacted by government operations in these locations. Motorola notes that interference from AWS to remaining DOD operations in this band would be limited if the Commission were to designate 1710-1755 MHz as the mobile transmit band for AWS, as we recommend above.³⁶

³³ See *NPRM* ¶ 61.

³⁴ See 47 C.F.R. § 24.237.

³⁵ See *NPRM* ¶¶ 23-25; see also 47 C.F.R. § 2.106 footnote US378.

³⁶ See *supra* pp. 7-8. Designating 1710-1755 MHz as the mobile transmit band would harmonize with the designation of this frequency band in Europe and would be consistent with the conventional duplex direction.

With regard to DOD precision guided munitions (“PGM”) operations in the 1710-1720 MHz band — which are authorized to continue on a primary basis until inventory is exhausted or December 31, 2008, whichever is later³⁷ — Motorola supports the development of coordination procedures with affected licensees if PGM inventories are still remaining once AWS begins deployment. To the extent practicable, such coordination procedures should consider limiting PGM operations to lower altitudes and/or night operations, and the possibility of providing some advance notification of PGM operations to affected AWS licensees.

Motorola supports the industry view that DOD aeronautical mobile operations need to be relocated from the 1710-1755 MHz band before the band can be used effectively for AWS.³⁸ As both the *NTIA 3G Viability Assessment* and the *NPRM* recognize, aeronautical telemetry operations at a number of the sixteen protected DOD sites would have a significant impact on AWS operations within a wide radius of these DOD locations.³⁹ Because aircraft employing these systems can operate at altitudes up to 50,000 feet, these aeronautical telemetry operations potentially cause unacceptable interference to AWS operations within a radius of more than 400 kilometers from the edge of the DOD protected areas, effectively blocking large portions of the country from commercial 3G services.⁴⁰ Accordingly, Motorola supports the industry experts’ conclusion that all aeronautical mobile systems must be cleared from the 1710-1755 MHz band

³⁷ See 47 C.F.R. § 2.106 footnote US378.

³⁸ See *NTIA, An Assessment of the Viability of Accommodating Advanced Mobile Wireless (3G) Systems in the 1710-1770 MHz and 2110-2170 MHz Bands*, 9 (July 22, 2002) (“*NTIA 3G Viability Assessment*”), available at <http://www.ntia.doc.gov/ntiahome/threeg/va7222002/3Gva072202web.htm>; see also *id.* Appendix (“Industry Analysis of Sharing Between Advanced Wireless Systems and DOD Operations in the 16 Protected Sites”) at 24-25 (“*Industry Appendix*”).

³⁹ See *NTIA 3G Viability Assessment* at 7, 16; *NPRM* n.148.

⁴⁰ See *Industry Appendix* at 24-25.

so that it can be used for AWS.⁴¹ In November 2002, the Commission noted that it will initiate a proceeding to explore the relocation of incumbents and possible mitigation techniques “in the near future.”⁴² We urge the Commission to commence that proceeding as soon as possible to resolve the aforementioned sharing issue, along with sharing issues associated with out-of-band emissions from high power transmitters operating above 1755 MHz.⁴³

B. Out-of-Band and Spurious Emission Limits

Motorola supports the adoption of out-of-band emission limits that are consistent with limits established in Part 24 for the PCS bands. Part 24 specify an attenuation requirement of $43 + 10 \log_{10}(P)$ dB below the transmitter power for all out-of-band frequencies, as well as rules governing compliance with this requirement.⁴⁴ Motorola believes that these Part 24 attenuation and compliance rules are appropriate for the AWS bands and, in conjunction with licensees’ obligation to coordinate use to minimize out-of-band interference, is sufficient to protect operations in nearby bands from harmful interference. There is no need, therefore, for the Commission to mandate different attenuation requirements for specific frequency bands and types of service, as it has done for WCS.⁴⁵ Accordingly, Motorola urges the Commission not to adopt its tentative conclusion to develop a multitude of out-of-band emission limits for AWS.

⁴¹ Motorola supports the reimbursement of all reasonable relocation costs for incumbents and the funding of such costs from AWS auction proceeds. *See supra* section IV.

⁴² *See AWS Allocation Order* ¶ 26.

⁴³ *See DOD, Investigation of the Technical Feasibility of Accommodating the International Mobile Telecommunications (IMT) 2000 Within the 1755-1850 MHz Band, Interim Report*, App. C at C-3 to C-4 & figure C-2 (Oct. 27, 2000) (discussing the extensive out-of-band emissions from DOD satellite uplink sites due to the absence of baseband filtering); *see also id.* at C-15 to C-17 (noting that off-tuning of 12 MHz or greater provides only limited interference reduction due to the unfiltered satellite uplink transmissions).

⁴⁴ *See* 47 C.F.R. § 24.238.

⁴⁵ *See id.* § 27.53.

VI. POWER LIMITS AND BAND PLANS

Motorola supports the adoption of effective isotropic radiated power (“EIRP”) spectral density limits for base station transmitters and mobile station power levels that are consistent with limits established for the PCS bands. In Part 24, the Commission has adopted a base station peak EIRP of 1640 watts for antenna heights up to 300 meters, with progressively lower EIRP limits for increasing antenna heights above 300 meters; and a peak power limit of 2 watts EIRP for mobile/portable receivers.⁴⁶ The existing Part 24 power limits for base station transmitters are applied irrespective of the bandwidth utilized by the licensee’s deployed technology. In essence, this allows technologies that utilize a narrower bandwidth to radiate a higher power per unit bandwidth.

For the AWS bands, Motorola recommends the following bifurcated approach. For base stations with emissions bandwidths of 1 MHz or less, the Part 24 power limits would apply. For emissions bandwidths of greater than 1 MHz, Motorola recommends the adoption of the base station transmitter power limits specified in Part 24, but as applied to a 1 MHz bandwidth.⁴⁷ This adjustment would ensure that all wideband systems would radiate the same power per unit bandwidth, regardless of the technology utilized. Motorola also recommends that the Commission adopt a peak power limit of 2 watts EIRP for mobile/portable receivers in the AWS bands, identical to the limit in the PCS bands.

Motorola also supports an exemption to these power limits for base stations of AWS licensees that are located in rural areas. Permitting this flexibility in rural areas would allow

⁴⁶ *See id.* § 24.232.

⁴⁷ For example, the current Part 24 rules allow 1640 watts EIRP for transmitters of height above average terrain (“HAAT”) less than 300 meters. *See id.* § 24.232(a). Motorola’s proposal would specify 1640 watts/MHz EIRP (for base stations with emissions bandwidths greater than 1 MHz).

licensees to provide greater geographical service coverage with fewer base station transmitters, reducing the cost of building out systems in such areas. This approach should enable faster deployment of 3G services in rural America, consistent with Congress's statutory directive to promote "the development and rapid deployment of new technologies, products, and services for the benefit of the public, including in rural areas."⁴⁸ It would also be consistent with the Commission's stated policy of fostering service to rural areas and encouraging build out of systems in such areas.⁴⁹

Motorola proposes a definition of "rural area" that coincides with established Rural Service Area ("RSA") geographic boundaries. Thus, base stations operating within RSAs would not be subject to the Part 24 power limits. However, transmissions from such base stations would be required to be sufficiently attenuated to meet the 47 dBuV/m field strength limit suggested above. Furthermore, AWS licensees intending to operate a base station in a rural area above the EIRP spectral density limits discussed above should be required to coordinate with co-channel licensees and adjacent channel licensees that operate within the same RSA.

⁴⁸ 47 U.S.C. § 309(j)(3)(A).

⁴⁹ See *NPRM* ¶¶ 20, 46; see also *Facilitating the Provision of Spectrum-Based Services to Rural Areas and Promoting Opportunities for Rural Telephone Companies to Provide Spectrum-Based Services*, WT Docket No. 02-381, Notice of Inquiry, FCC 02-325, ¶¶ 1-11 (rel. Dec. 20, 2002) ("*Rural Areas NOI*"). In the *Rural Areas NOI*, the Commission is seeking comment on whether increasing power limits in rural areas would be beneficial. See *id.* ¶ 27.

VII. CONCLUSION

For the foregoing reasons, Motorola supports the adoption of service rules for the AWS bands consistent with these comments.

Respectfully submitted,

/s/
Steve B. Sharkey
Director, Spectrum and Standards Strategy
Motorola, Inc.
1350 I Street, N.W.
Washington, D.C. 20005
(202) 371-6900

/s/
Robert D. Kubik
Manager, Spectrum and Regulatory Policy
Motorola, Inc.
1350 I Street, N.W.
Washington, D.C. 20005
(202) 371-6900

February 7, 2003