

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

In the Matter of

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

Amendments to Parts 1, 2, 27 and 90 of the Commission's Rules to License Services in the 216-220 MHz, 1390-1395 MHz, 1427-1429 MHz, 1429-1432 MHz, 1432-1435 MHz, 1670-1675 MHz, and 2385-2390 MHz Government Transfer Bands

WT Docket No. 02-8

COMMENTS OF MOTOROLA, INC.

Motorola, Inc. ("Motorola") hereby submits these comments on the *Fourth Notice of Proposed Rulemaking* ("*Fourth NPRM*") in the above-captioned proceeding.¹ Motorola welcomes this opportunity to provide comments on the Commission's proposal to make spectrum available for Federal Government operations that will be displaced from the 1710-1850 MHz band to make the 1710-1755 MHz segment available for advanced wireless services ("AWS"). Motorola supports efforts to clear the 1710-1755 MHz band of Federal Government operations and to accommodate such operations in appropriate alternative spectrum. Motorola

¹ 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, *Fourth Notice of Proposed Rulemaking*, 18 FCC Rcd 13235, 68 Fed. Reg. 52156 (Sept. 2, 2003).

therefore generally supports the Commission's proposals in the *Fourth NPRM*. Motorola opposes the Commission's proposed modifications to Part 15 of its rules that would eliminate the designation of the 1910-1920 MHz Personal Communications Services ("PCS") band for unlicensed PCS ("UPCS") operations. Motorola supports retaining the 1915-1920 MHz band for UPCS use and allowing isochronous devices to operate in this spectrum.

I. MOTOROLA SUPPORTS ALLOWING DOD EARTH STATIONS TO OPERATE IN THE 2025-2110 MHZ BAND ON A CO-PRIMARY BASIS

The *Fourth NPRM* proposes to revise footnote US346 to permit Department of Defense ("DoD") to operate tracking, telemetry, and command ("TT&C") transmit earth stations at eleven sites on a co-primary basis with Television Broadcast Auxiliary Services ("BAS") operations in the 2025-2110 MHz band. This proposal would allow DoD to move TT&C uplinks at these sites from the 1761-1842 MHz band to the 2025-2110 MHz band, thus freeing spectrum for relocation of DoD systems that are currently operating in the 1710-1755 MHz band. The Commission's proposal is consistent with the recommendation of the National Telecommunications and Information Administration ("NTIA") in its *2002 Viability Assessment*.²

Motorola has supported the relocation of these DoD satellite operations to the 2025-2110 MHz band in the past,³ and we continue to support this proposal. The proposal would

² NTIA, *An Assessment of the Viability of Accommodating Advanced Mobile Wireless (3G) Systems in the 1710-1770 MHz and 2110-2170 MHz Bands*, July 22, 2002 ("2002 Viability Assessment").

³ See Comments of Motorola, Inc., ET Docket No. 00-258, Aug. 8, 2002, at 8-9 ("Motorola 2002 Viability Assessment Comments"); Letter from Steve Sharkey to Magalie Roman Salas, ET Docket No. 00-258, IB Docket No. 99-81, June 21, 2001, at 1 and Attachment (proposed band plans) ("Motorola June 21, 2001 ex parte").

allow DoD to make more spectrum available in the 1755-1850 MHz band to accommodate relocation of systems that are currently operating in the 1710-1755 MHz, and will thus facilitate the introduction of AWS. The Commission's proposal would also provide the benefit of harmonizing U.S. space operations with the rest of the world.⁴ The International Telecommunications Union ("ITU") has allocated the 2025-2110 MHz band for satellite uplink operations on a co-equal primary basis in all regions and the 2025-2110 MHz band is widely used as a TT&C uplink band in other countries.⁵ Motorola continues to support the harmonization of U.S. spectrum use for Federal Government operations in the 2025-2110 MHz band with international allocations.⁶

Allowing DoD satellite operations in the 2025-2110 MHz band will also lead to more efficient use of this spectrum, providing that adequate coordination procedures are adopted to ensure that the DoD operations do not cause interference to incumbent BAS operations. The coordination procedures should take into account *actual* operating parameters and conditions that mitigate interference.

Motorola shares the Commission's concern that earth station operations in the 2025-2110 MHz band would cause interference to AWS operations in the adjacent 2110-2155 MHz band unless adequate measures are put in place to prevent harmful interference. As the *Fourth NPRM* notes, DoD TT&C uplink transmitters operate at powers of up to 10 kW⁷ and such high

⁴ See *Fourth NPRM* ¶ 26.

⁵ See Motorola 2002 Viability Assessment Comments at 9; Motorola June 21, 2001 ex parte at 1.

⁶ See *id.*

⁷ See *Fourth NPRM* ¶ 35.

power operations create the significant potential for harmful interference to mobile receivers in the 2110-2155 MHz band.

The February 2001 *DoD Final Report* recognized the potential for substantial interference to AWS receivers.⁸ The report analyzed scenarios with frequency separations of 4 MHz, 8 MHz and 12 MHz between earth station transmitters and AWS receivers, and determined that increasing the frequency separation achieved progressively greater reductions in the interference to AWS base station receivers; a frequency separation of 12 MHz greatly reduced the level of interference to AWS receivers.⁹ Although interference to AWS mobile receivers would be less extensive than for AWS base station receivers due to their typically lower height above ground, the potential for interference is still significant. Moreover, as DoD recognized, frequency separation alone does not provide a complete solution. Even a separation of 12 MHz “does not singly provide sufficient isolation between the systems to eliminate the potential for EMI,”¹⁰ and additional frequency separation yields only “minimal benefit” because out-of-band emissions are not significantly reduced beyond a separation of 12 MHz.¹¹ Thus, even if frequency separation is used, “additional filtering of the [earth station] terminals will be required to mitigate interference to the IMT-2000 systems in the adjacent band.”¹²

⁸ See DoD, *Investigation of the Feasibility of Accommodating the International Mobile Telecommunications (IMT) 2000 Within the 1755-1850 MHz Band*, Feb. 9, 2001, Appendix B, § B.4.2.1 (“*DoD Final Report*”).

⁹ See *id.* § B.5.2 and figures B-18, B-19 and B-20.

¹⁰ *Id.* § B.5.2 at B-50.

¹¹ *Id.* § B.5.2 at B-47.

¹² *Id.* at B-50.

One approach to mitigating interference would be to restrict use of the top 12 MHz of the 2025-2110 MHz band and to adopt filtering requirements. However, because the proposed TT&C operations are at a limited number of sites, it may be reasonable to implement coordination procedures that will consider the specific TT&C operations and propagation losses in the vicinity of each DoD earth station to resolve interference concerns. These concerns might be addressed by utilizing mitigation techniques such as power control, operation of TT&C stations at higher elevation angles, baseband filtering, and frequency offsets if necessary.

Accordingly, Motorola recommends that the Commission adopt requirements to implement interference mitigation techniques in order to reduce interference to AWS operations; this approach is less onerous than restricting all TT&C operations from the upper portion of the 2025-2110 MHz band. The Commission should require coordination between DoD and AWS licensees in the 2110-2120 MHz sub-band (Block A) to limit interference from earth station transmitters utilizing the upper portion of the 2025-2110 MHz band. This can be achieved by adding “Advanced Wireless Services (in the 2110-2120 MHz band)” to the list of services that require coordination in footnote US346. In addition, since out-of-band emissions will impact all AWS licensees, the Commission should work with Industry, NTIA and DoD to develop a baseband filtering requirement for DoD earth station transmitters, which should then be adopted as a new out-of-band emission limit in the NTIA Manual.¹³ Such measures will be necessary to ensure that AWS receivers will be able to operate free from harmful interference.

¹³ Manual of Regulations & Policy Procedures For Federal Radio Frequency Management (“NTIA Manual”). This out-of-band emission requirement could be waived for the 2110-2120 MHz band on a site-by-site basis by agreement between DoD and the AWS Block A licensee.

As with incumbent BAS operations, coordination with AWS operators in the 2110-2120 MHz band should be successfully concluded prior to the relocation of any DoD satellite operations.¹⁴

Motorola supports the proposal to allow DoD to operate fixed and mobile (except aeronautical mobile) stations in the 2025-2110 MHz band on a secondary basis at six sites in the southwestern U.S.¹⁵ However, Motorola recommends a modification to the proposed footnote. The words “and coordinated” should be deleted because the phrase “secondary and coordinated basis” could be interpreted to connote a more elevated status than a secondary allocation provides. Accordingly, to avoid confusion as to the status of the military operations at these six sites, Motorola proposes that the term “and coordinated” not be included in the footnote. Instead, we propose an additional sentence: “Upon request, primary users should provide sufficient information to allow secondary military users to protect the primary operations.” This modification would clarify the coordination obligations on primary users.

II. MOTOROLA SUPPORTS THE PROPOSED ALLOCATION CHANGES TO THE 2360-2400 MHZ BAND TO ACCOMMODATE MILITARY AIRBORNE TELEMETRY SYSTEMS

The *Fourth NPRM* proposes a number of allocation changes to the 2360-2400 MHz band, including various changes to allocate the 2360-2395 MHz band for aeronautical mobile operations on a primary basis. These proposed changes would enable DoD to relocate all of the airborne telemetry and video systems that currently operate in the 1710-1755 MHz band to the 2360-2395 MHz band.

¹⁴ See *Fourth NPRM* ¶ 31.

¹⁵ See *Fourth NPRM* ¶ 38.

Motorola strongly supports these proposed allocation changes because they are critical to the deployment of AWS in the 1710-1755 MHz band. As the *2002 Viability Assessment* recognized, industry experts concluded that “all aeronautical mobile systems . . . must be cleared from the 1710-1755 MHz band if the band is to be used for [AWS].”¹⁶ The industry experts noted that military airborne telemetry operations present the “worst case” interference scenario, with potential for interference at distances of more than 400 km from the location of military airborne telemetry operations, which would potentially “block[] off large portions of the country from commercial service.”¹⁷ Relocation of these military operations is therefore essential to the introduction of AWS.

Motorola supports the Commission’s proposal to make the 2385-2395 MHz band available for relocation of airborne telemetry systems. The *2002 Viability Assessment* identified this band as suitable relocation spectrum for these operations and Motorola supported that recommendation.¹⁸ As we have previously noted, there has been only very limited interest expressed in alternative uses of the 2385-2395 MHz band in the Commission’s ET Docket No. 00-221 proceeding.¹⁹ Furthermore, this band is adjacent to the 2360-2385 MHz band currently used for commercial and military airborne telemetry operations, and the proposed allocation changes would thus create a contiguous 35 MHz band for these operations.

¹⁶ *2002 Viability Assessment* at 9.

¹⁷ *Id.* at 24-25.

¹⁸ See Motorola 2002 Viability Assessment Comments at 7-8; see also Letter from Steve B. Sharkey to Magalie Roman Salas, ET Docket Nos. 00-258 & 00-22, July 18, 2001, at 1 (“Motorola July 18, 2001 ex parte”) (encouraging the Commission to consider the 2385-2400 MHz band for accommodation of Federal Government users relocated from the 1710-1850 MHz band).

¹⁹ See Motorola 2002 Viability Assessment Comments at 7-8; Motorola July 18, 2001 ex parte at 1-2; see also *Fourth NPRM* ¶ 63 (noting that there is no equipment authorized or anticipated for use in the 2390-2400 MHz band, seven years after the Commission made this band available for unlicensed use).

In addition, this proposed allocation for airborne telemetry would be consistent with uses of this spectrum in other countries and would thus promote harmonization with international spectrum allocations.²⁰

III. MOTOROLA OPPOSES THE PROPOSED MODIFICATIONS TO PART 15 THAT WOULD ELIMINATE 10 MHZ OF UPCS SPECTRUM AT 1910-1920 MHZ

Without any explanation, Appendix A to the *Fourth NPRM* proposes modifications to Part 15 of the Commission's rules that would eliminate the designation of 1910-1920 MHz for UPCS use.²¹ The *Fourth NPRM* proposes to amend sections 15.301, 15.303 and 15.319 to remove references to the 1910-1920 MHz band, and to delete section 15.321.²²

To the extent that the proposed rules in the appendix accurately reflect the Commission's intentions, Motorola opposes this proposal to eliminate 10 MHz of spectrum for unlicensed use, particularly as the Commission has provided no explanation for any change of position from the *Third NPRM* released earlier this year.²³ In the *Third NPRM*, the Commission sought comment on whether it should re-designate some, or all, of the 1910-1920 MHz UPCS band for licensed use.²⁴ The *Third NPRM* noted several possible options, including retaining the 1915-1920 MHz band for UPCS use.²⁵ The *Fourth NPRM* therefore

²⁰ See *Fourth NPRM* ¶ 49.

²¹ See *Fourth NPRM*, Appendix A at 39-40.

²² See *id.*

²³ 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, *Third Report and Order, Third Notice of Proposed Rulemaking and Second Memorandum Opinion and Order*, 18 FCC Rcd 2223 ¶¶ 46-52 (2003) ("*Third NPRM*").

²⁴ See *Third NPRM* ¶¶ 49-52.

²⁵ See *id.* ¶ 52.

represents a departure from the position taken in the *Third NPRM*, without providing any explanation.

Motorola continues to support retaining the 1915-1920 MHz band for UPCS operations, but allowing greater flexibility to make this spectrum available for isochronous devices.²⁶ Such action would encourage the further deployment of innovative low power unlicensed devices in the 1915-1930 MHz band. While Motorola supports re-designation of the 1910-1915 MHz spectrum for licensed PCS use (paired with 1990-1995 MHz),²⁷ duplexer technology constraints preclude re-designating the entire 1910-1920 MHz band for licensed PCS uses.²⁸ Motorola therefore supports retaining the 1915-1920 MHz band for UPCS use and allowing isochronous devices to operate in this spectrum.

VII. CONCLUSION

For the foregoing reasons, Motorola supports the Commission's proposals in the *Fourth NPRM* to facilitate clearance of the 1710-1755 MHz band of Federal Government operations. Motorola recommends that the Commission adopt requirements to implement interference mitigation techniques to reduce the potential for harmful interference to AWS receivers in the 2110-2155 MHz band, and work with Industry, NTIA and DoD to develop an appropriate out-of-band emission limit for DoD earth stations operating in the 2025-2110 MHz band. In addition, Motorola recommends one modification to the proposed footnote for military fixed and mobile operations on a secondary basis in the 2025-2110 MHz band.

²⁶ See Comments of Motorola, Inc., ET Docket No. 00-258, Apr. 14, 2003, at 7-10 ("Motorola Third NPRM Comments").

²⁷ See *id.* at 2-4, 7; Reply Comments of Motorola, Inc., ET Docket No. 00-258, Apr. 28, 2003, at 2 ("Motorola Third NPRM Reply Comments").

To the extent that the proposed rules in the appendix accurately reflect the Commission's intentions, Motorola opposes the proposal to eliminate 10 MHz of UPCS spectrum in the 1910-1920 MHz band; instead, Motorola supports retaining the 1915-1920 MHz spectrum for UPCS operations and making this spectrum available for isochronous devices.

Respectfully submitted,

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²⁸ See Motorola Third NPRM Comments at 4-6; Motorola Third NPRM Reply Comments at 2-4.