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Before the
Federal Communications Commission
Washington, D.C. 20554

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In the Matter of	)	
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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

FOURTH MEMORANDUM OPINION AND ORDER

Adopted: April 5, 2006 **Released: April 11, 2006**

By the Commission:

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I. INTRODUCTION

1. By this action, we consider two petitions for reconsideration ("Petitions") of the *Seventh Report and Order* in this proceeding, one filed by the Association for Maximum Service Television and National Association of Broadcasters (together, "MSTV/NAB") and the other by the Society of Broadcast

Engineers, Inc. ("SBE").[1] In the *Seventh Report and Order* ("*AWS Seventh Report and Order*") in this proceeding, the Commission, among other things, allowed primary access to the band 2025-2110 MHz for Department of Defense ("DOD") uplink earth stations at 11 sites to support military space operations (also known as tracking, telemetry, and commanding or "TT&C") on a co-equal basis with stations in the incumbent Television Broadcast Auxiliary Service ("BAS"), Cable Television Relay Service ("CARS"), and Local Television Transmission Service ("LTTS").[2] For simplicity, in the remainder of this document the BAS, LTTS, and CARS services collectively will be referred to as BAS. The actions taken in the *AWS Seventh Report and Order* were specifically designed to facilitate the introduction of new advanced wireless services ("AWS") in the band 1710-1755 MHz by providing replacement spectrum for clearing that band of incumbent Federal Government operations that would otherwise impede the development of new nationwide AWS services.[3] These actions were consistent with proposals made in the *AWS Fourth NPRM* and previous actions in this proceeding and with the United States Department of Commerce, National Telecommunications and Information Administration ("NTIA") *2002 Viability Assessment*, which addressed relocation and reaccommodation options for Federal Government operations in the band 1710-1755 MHz.[4]

2. In this Memorandum Opinion and Order, we deny both the MSTV/NAB and the SBE petitions. In this regard, we find that the Petitioners have not raised any new arguments or concerns that were not already considered by the Commission in its adoption of the *AWS Seventh Report and Order* and that the

[1] *See* Association for Maximum Service Television and National Association of Broadcasters (together, "MSTV/NAB"), Petition for Reconsideration, filed Jan. 28, 2005; Society of Broadcast Engineers, Inc. ("SBE"), Petition for Reconsideration, filed Nov. 24, 2004. The Petitions were placed on a public notice whose March 30, 2005, release was published in the Federal Register on April 13, 2005, with oppositions due by April 28, 2005. *See Petitions for Reconsideration of Action in Rulemaking Proceeding*, FCC Public Notice, Report No. 2699, (rel. Mar. 30, 2005); 70 FR 19469 (Apr. 13 2005). No filings were received in response to either petition.

[2] *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; 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, Seventh Report and Order* in ET Docket No. 00-258, WT Docket No. 02-8, 19 FCC Rcd 21350, 21363-21367, ¶¶ 27-33 (2004) ("*AWS Seventh Report and Order*"); *see* 47 C.F.R. Part 74, Subpart F – Television Broadcast Auxiliary Stations; 47 C.F.R. Part 78 – Cable Television Relay Service; 47 C.F.R. Part 101, Subpart J – Local Television Transmission Service.

[3] *See 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, Second Report and Order* in ET Docket No. 00-258, 17 FCC Rcd 23193 (2002) ("*AWS Second Report and Order*"). AWS is the collective term that we use for new and advanced wireless applications, such as voice, data and broadband services provided over a variety of high-speed fixed and mobile networks, and which are popularly referred to as 3G systems. We have also adopted service rules for AWS operations in the bands 1710-1755 MHz and 2110-2155 MHz. *See Service Rules for Advanced Wireless Services in the 1.7 GHz and 2.1 GHz Bands, Report and Order* in WT Docket No. 02-353, 18 FCC Rcd 25162 (2003) ("*AWS Service Rules R&O*"). *See also Service Rules for Advanced Wireless Services in the 1.7 GHz and 2.1 GHz Bands, Order on Reconsideration* in WT Docket No. 02-353, 20 FCC Rcd 14058 (2005).

[4] *See 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, Fourth Notice of Proposed Rulemaking* in ET Docket No. 00-258, 18 FCC Rcd 13235 (2003) ("*AWS Fourth NPRM*"); *AWS Second Report and Order*; and NTIA *Report*, "An Assessment of the Viability of Accommodating Advanced Mobile Wireless (3G) Systems in the 1710-1770 MHz and 2110-2170 MHz Bands," dated July 22, 2002 ("*2002 Viability Assessment*") (incorporated into the docket of this proceeding and available from NTIA at http://www.ntia.doc.gov/ntiahome/threeg/va7222002/3Gva072202web.htm). The Commission, which is an independent agency, administers non-Federal Government spectrum. NTIA, which is an operating unit of the U.S. Department of Commerce, administers Federal Government spectrum. *See* 47 C.F.R. § 2.105.

Commission's decision properly addressed the relevant facts in order to reach its conclusion that BAS and Federal Government operations will be able to co-exist in the band. We are, however, providing additional clarification on a matter raised in the SBE petition.

II. BACKGROUND

3. In the *AWS Seventh Report and Order*, the Commission undertook the specific task of reaccommodating Federal users in order to make the band 1710-1755 MHz available for AWS use. This decision was part of a larger and substantially more complex proceeding designed to make spectrum available for a variety of new and innovative wireless services and involving a variety of bodies, including this Commission, Federal stakeholders as represented through NTIA, and Congress.

4. In the Omnibus Budget Reconciliation Act of 1993 ("OBRA-93"), Congress directed the Secretary of Commerce to identify at least 200 megahertz of spectrum below 5 GHz for transfer to non-Federal services.[5] NTIA subsequently identified the band 1710-1755 MHz for transfer, with certain Federal operations to remain protected indefinitely and, in its *2002 Viability Assessment*, concluded that some of the protected Federal operations could relocate or modify their operations to allow reallocation of the band for AWS.[6] NTIA indicated that the Federal operations would relocate only if certain actions were accomplished, including that the Commission would provide DOD primary, co-equal access to the band 2025-2110 MHz for 11 DOD TT&C uplink earth stations relocated from the band 1755-1850 MHz.[7]

5. In November 2002, the Commission adopted the *AWS Second Report and Order*, which allocated 90 megahertz of spectrum in the bands 1710-1755 MHz and 2110-2155 MHz for AWS.[8] In June 2003, the Commission adopted the *AWS Fourth NPRM*, which proposed to make spectrum available for Federal operations that will be displaced from the band 1710-1850 MHz in order to relocate existing Federal operations from the 1710-1755 MHz segment, thus facilitating the introduction of AWS in the bands 1710-1755 MHz and 2110-2155 MHz bands.[9] In October 2004, based on the record generated by the *AWS Fourth NPRM*, the Commission adopted the *AWS Seventh Report and Order* which, in pertinent part, allowed Federal users access to the bands 2025-2110 MHz ("the 2 GHz band"). As part of that decision, the Commission allowed DOD to use the 2 GHz band on a primary, co-equal basis with non-Federal operations for uplink earth stations at 11 sites to support TT&C operations.

6. The 2 GHz band is currently used by the BAS for mobile TV pickup ("TVPU") operations, including electronic newsgathering ("ENG") operations to cover news-related events of interest,[10] the

[5] *See* OBRA-93, § 6001(a) (47 U.S.C. § 923(a)–(b)).

[6] *See* Spectrum Reallocation Final Report, Response to Title VI - Omnibus Reconsideration Act of 1993, NTIA Special Publication 95-32, dated February 1995 at Appendix E and page F-4; OBRA-93, § 6001(a) (47 U.S.C. § 923(c)(4)). *See 2002 Viability Assessment* at 1 and 2.

[7] Such access may make more spectrum available in the band 1755-1850 MHz to satisfy future DOD spectrum requirements, as well as absorb certain operations displaced from the band 1710-1755 MHz. The DOD TT&C uplink earth stations provide TT&C functions not only for military systems, but for other Federal systems as well, such as those operated in the Space Research and Earth Exploration-Satellite Services. A second condition, involving the relocation of Federal airborne telemetry and video operations from the band 1710-1755 MHz to other frequency bands, such as the band 2385-2395 MHz, does not pertain to the band 2025-2110 MHz that is the issue of the petitions for reconsideration under consideration in the instant proceeding.

[8] *See supra* n. 3.

[9] *See supra* n. 4. These proposals were consistent with the *2002 Viability Assessment*.

[10] A TVPU station is a land mobile station used for the transmission of TV program material and related communications from scenes of events back to the TV station or studio. *See* 47 C.F.R. § 74.601(a) (listing classes of TV broadcast auxiliary stations).

CARS for mobile operations,[11] and the BAS for fixed operations such as studio-transmitter link ("STL") stations, TV relay stations, and TV translator relay stations.[12] Communications common carriers in the LTTS may also be assigned any of the BAS channels in the band to provide service to TV broadcast stations, TV broadcast network-entities, cable system operators, and cable network entities.[13]

7. In its decision in the *AWS Seventh Report and Order*, the Commission recognized the concerns of the broadcasting community that sharing of the 2 GHz band by TV BAS stations and DOD TT&C uplink earth stations would be challenging in some instances, given the high power and close proximity of some of these earth stations to nearby cities served by BAS.[14] However, it affirmed its confidence that such sharing is feasible and will promote the public interest, particularly in the ultimate provision of AWS to the public. To maintain its longstanding policy that first-licensed facilities have the right of protection from later-licensed facilities operating in the same band, and to facilitate compatible operations, the Commission required each DOD earth station to coordinate with all potentially affected BAS stations prior to earth station authorization.[15] Additionally, for the rare situation where no reasonable coordination can be negotiated, the Commission stated that the issue may be raised to the FCC and NTIA to jointly arbitrate resolution.[16]

III. DISCUSSION

A. Petitions

8. *MSTV/NAB Petition for Reconsideration.* In their petition for reconsideration, MSTV/NAB claim that the Commission improperly established a framework for BAS-Federal Government coordination in the band because it did not require NTIA to disclose the complete technical parameters for all of the 11 DOD TT&C uplink earth stations to be relocated to the 2 GHz band.[17] MSTV/NAB argue that without this information, it is impossible to assess the impact of the earth stations on incumbent BAS operations and therefore the Commission's confidence that spectrum sharing is feasible is unsupportable.[18]

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[11] *See* 47 C.F.R. § 78.18(a)(6).

[12] A TV STL station (studio-transmitter link) is a fixed station used for the transmission of TV program material and related communications from the studio to the transmitter. A TV relay station is a fixed station used for transmission of TV program material and related communications for use by TV broadcast stations or other purposes as authorized in Section 74.631. A TV translator relay station is a fixed station used for relaying programs and signals of TV stations to TV translators or other communications facilities that the Commission may authorize. *See* 47 C.F.R. § 74.601(b)-(d). *See generally* 47 C.F.R. § 74.600 ("Eligibility for license"). The majority of these fixed operations are in higher frequency bands allocated to the BAS.

[13] LTTS operations are limited to the permissible uses described in Sections 74.631 and 78.11. *See* 47 C.F.R. § 101.803(b).

[14] *See AWS Seventh Report and Order*, 19 FCC Rcd at 21358, 21359, and 21363, ¶¶ 12, 14, and 27. The *AWS Seventh Report and Order* was adopted on October 14, 2004, and published in the Federal Register on December 29, 2004, to become effective on January 28, 2005. *See* 19 FCC Rcd 21350 (rel. Oct. 21, 2004), 69 FR 77938 (Dec. 29, 2004).

[15] *See AWS Seventh Report and Order*, 19 FCC Rcd at 21363, ¶ 27. *See, e.g., Amendment of Parts 2 and 90 of the Commission's Rules to Provide for Narrowband Private Land Mobile Radio Channels in the 150.0-150.8 MHz, 162-174 MHz, and 406.1-420 MHz Bands that are Allocated for Federal Government Use, Notice of Proposed Rulemaking* in ET Docket No. 04-243, 19 FCC Rcd 12690, 12706 and 12707, ¶ 40 (2004). *See also* 47 C.F.R. §§ 2.104(d)(3)(iii), 2.105(c)(2)(iii).

[16] *See AWS Seventh Report and Order*, 19 FCC Rcd at 21363, ¶ 27.

[17] *See* MSTV/NAB Petition at 1 and 6; Comments to the *AWS Fourth NPRM* at 4 and 13.

[18] *Id.* at 6.

9. MSTV/NAB also assert that the Commission fatally failed to properly consider two studies provided in MSTV/NAB's comments in response to the *AWS Fourth NPRM*, which MSTV/NAB contend show that relocation of the DOD TT&C uplink earth stations would require extraordinary coordination and would result in extensive interference to incumbent BAS operations.[19] One of these studies identified all BAS facilities within the coordination zone of each DOD earth station, showing that a large number of BAS licensees would need to coordinate with each earth station, some with multiple earth stations, and a significant number on an ongoing, proactive basis, to prevent interference from the earth stations. The study concluded that a significant impact on BAS licensees in large, congested markets would result.[20] The second study purported to demonstrate that the high powers of DOD earth stations would cause interference, and in some cases cause complete overload, to nearby BAS receive sites, such as those at Goffstown, New Hampshire, any time the earth station operates and concluded that the DOD earth stations would cause harmful interference to nearby BAS systems much of the time.[21] These studies, MSTV/NAB argue, contain evidence that the DOD earth stations would cause unavoidable interference to BAS facilities. As such, they conclude that the Commission's decision mandating sharing was both unsupported by the evidence in the record and inconsistent with the Commission's goals.[22]

10. Finally, MSTV/NAB argue that the Commission erred in not demonstrating, by specific evidence, that the spectrum sharing techniques that can permit sharing will be effective in situations where BAS and DOD facilities will share the band 2025-2110 MHz.[23] As an example, MSTV/NAB note that one of the techniques, time-sharing, would present broadcasters with the choice of covering a breaking news story with a corrupted news feed, or not covering the story at all.[24]

11. In light of the deficiencies that they allege, MSTV/NAB contend that sharing of the 2025-2110 MHz BAS band with DOD operations should not be allowed until the record shows that measures to protect incumbent BAS operations would be feasible and productive.[25] MSTV/NAB also assert that we should facilitate prospective coordination efforts by establishing a formal process through which the Commission, NTIA, and DOD would investigate, with input from affected parties, the feasibility of coordination and would define the precise technical parameters to be used for coordinating each of the 11 DOD TT&C earth stations.[26]

12. *SBE Petition for Reconsideration.* SBE indicates that, in its comments responding to the *AWS Fourth NPRM*, it stated that allowing up to 11 DOD TT&C earth stations to share the 2 GHz band with BAS incumbents would only be feasible if the BAS operations were converted to digital and the earth

[19] *Id.* (contending that the coordination techniques discussed by the Commission fail to effectively resolve these concerns).

[20] *Id.* at 7.

[21] *Id.*

[22] *Id.* at 7 and 8.

[23] *Id.* at 1 and 8.

[24] *Id.* at 8; Comments to the *AWS Fourth NPRM* at 12 and 13. MSTV/NAB also refer to SBE Comments to the *AWS Fourth NPRM*, in which SBE expresses concern that implementation of real-time coordination with DOD could be "unrealistic." *See* MSTV/NAB Petition at 4 and 8 (describing SBE Comments to the *AWS Fourth NPRM* at 6 and 7).

[25] *See* MSTV/NAB Petition at 9. MSTV/NAB claims that by imposing the coordination requirements without more certainty regarding sharing techniques, coordination efforts would be wasteful of both BAS and DOD resources, could hinder their ability to serve their constituencies (causing, for example, consumers to be deprived of access to new or enhanced services), and could divert time and effort from more effective spectrum allocation strategies. *See* MSTV/NAB Petition at 5 and 8-9.

[26] *Id.* at 9.

station antenna side-lobe suppression were improved by 30 dB by the addition of a "pie plate" shroud around the periphery of the antenna.[27] SBE claims that these steps would result in up to a 60 dB improvement in the desired-to-undesired (D/U) signal ratio at fixed receive-only (RO) antennas associated with ENG operations, which it asserts could change the BAS-DOD relationship from frequency sharing to frequency re-use.[28] Accordingly, in its petition for reconsideration, SBE asks us to require that all DOD TT&C earth stations have their sidelobe suppression upgraded to at least 90 dB.[29] Similarly, SBE faults our conclusion that the use of shielding berms around an earth station would be one means of enabling sharing of the band. SBE claims that such berms would need to be impracticably high – 100 to 200 feet above ground level – to protect ENG RO antennas typically located on tall buildings, towers, or mountain tops, and thus would severely restrict the earth station's low elevation look angles to a degree unacceptable to DOD.[30] SBE also claims that the Commission inaccurately characterized SBE's position as to whether the 11 DOD TT&C earth stations could successfully share the 2 GHz band with BAS operations converted to digital by omitting SBE's contention that both digital operations and earth station side-lobe suppression measures – as discussed above – must be required.[31]

13. SBE asks that we confirm that a DOD TT&C uplink earth station at 2 GHz must demonstrate protection not only to fixed TV BAS links, such as STLs and TV relays (also known as inter-city relays ("ICR"), but also to fixed RO antennas associated with ENG TVPUs, which are more difficult to protect, because no allowance can be made for antenna directivity, as such antennas are either omnidirectional or remotely steerable.[32] SBE also seeks clarification of the statement in paragraph 27 of the *AWS Seventh Report and Order*, that "[f]or those rare situations where no reasonable coordination can be negotiated, the issue may be raised to the FCC and NTIA to jointly arbitrate resolution."[33] Specifically, SBE expresses concern that in cases where DOD cannot demonstrate protection to ENG RO sites, joint FCC/NTIA arbitration may over-rule the protection requirements and authorize the DOD earth station over BAS objections.[34]

B. Decision

14. The record of this proceeding provided sufficient basis for the Commission to determine that, as a general proposition, incumbent BAS facilities will be able to share the band 2025-2110 MHz with relocated DOD TT&C uplink earth stations, and doing so serves the public interest by promoting spectrum efficiency and allowing for the rapid introduction of new and innovative AWS services. In the

[27] *See* SBE Petition at 1 and 2.

[28] *Id.* (explaining that sharing means both services cannot operate at the same time in the same area, while re-use means they can operate simultaneously).

[29] *Id.* at 2 and 4.

[30] *Id.* at 2.

[31] *Id.* at 1.

[32] *Id.* at 2. SBE also states that the Commission made an observation at ¶ 27 of the *AWS Seventh Report and Order* that once the DOD earth station is authorized, later BAS operations would have to protect DOD earth station operations, and SBE contends that observation shows a misunderstanding of the fact that the interference threat would be entirely from the DOD earth station to BAS. *See* SBE Petition at 3. However, the observation at ¶ 27 of the *AWS Seventh Report and Order* states that later BAS operations must accept interference from the DOD earth station, clearly appreciating the one-way nature of the potential for interference: "Once the DOD TT&C uplink earth station has begun coordination, new BAS, CARS, and LTTS stations for which coordination begins later must accept interference from the DOD earth station, as is normally the case for new stations sharing spectrum on a co-primary basis." *See AWS Seventh Report and Order*, 19 FCC Rcd at 21363, ¶ 27.

[33] *See* SBE Petition at 3.

[34] *Id.*

AWS Seventh Report and Order, the Commission adopted an approach that paired the application of a variety of interference mitigation techniques with a requirement of coordination (and further FCC/NTIA arbitration and resolution, if necessary) to allow for shared, co-primary use of the band. Neither MSTV/NAB nor SBE has raised any new arguments or concerns that were not already considered or would otherwise warrant reconsideration of that decision and we are therefore denying their petitions.

15. In the *AWS Seventh Report and Order*, the Commission determined that sharing techniques currently exist that can be deployed to enable the 11 DOD earth stations to be engineered into 2 GHz without harming existing BAS operations.[35] Although the Petitions question whether particular interference mitigation techniques would be practical in particular situations, they do not refute the Commission's determination that such techniques are established and accepted means of allowing for co-channel operations and can collectively resolve a variety of sharing situations.[36] Moreover, to ensure successful coordination in individual situations, the Commission required that coordination be accomplished with BAS licensees of stations within the coordination contour of the earth station, consistent with Appendix 7 of the ITU Radio Regulations, and engage the local BAS frequency coordinator(s), where available, in support of achieving such coordination.[37] For the rare situation where no reasonable coordination can be negotiated, the Commission stated that the issue may be raised to the FCC and NTIA to jointly arbitrate resolution, and that the Commission will not concur with authorizing operation of any 2 GHz DOD TT&C uplink earth station in the absence of successful coordination between DOD and the affected BAS incumbents. Finally, to ensure that future BAS licensees have a means for coordinating their proposed operations with the DOD TT&C uplink earth station, DOD earth stations are required to maintain a point of contact for coordination.[38] We conclude that the use of proven interference mitigation techniques and these coordination safeguards will ensure successful shared DOD-BAS use of the band.

16. We disagree with the contention by MSTV/NAB that we could not reach this conclusion without additional detailed and specific information about the 11 DOD TT&C uplink earth stations to be relocated in the 2 GHz band. In analyzing situations where BAS incumbents would be operating in proximity to the 11 DOD TT&C earth station sites, the Commission acknowledged that location data supplied by SBE indicate a significant potential for interference from DOD TT&C earth stations at the 11 sites into fixed receive-only receivers used in connection with BAS ENG TVPUs, and made its determination with this in mind.[39] Site-specific analysis, however, is more appropriate to the point of coordination, well before construction and operation, as is normally the case for any satellite earth station or terrestrial station

[35] These sharing techniques may include, for example, limiting power, pointing direction, and vertical elevation of the DOD earth station antenna, or adjusting satellite orbit coverage; constructing berms, installing RF shielding, or redesigning the earth station antenna to increase sidelobe suppression; operation on adjacent ENG channels, where available; taking advantage of ENG receive antenna sidelobe suppression, where the antenna pointing need not be toward the DOD earth station; arranging time-sharing agreements for DOD use during off-peak hours when TV BAS use is at a minimum. *See AWS Seventh Report and Order*, 19 FCC Rcd at 21364 and 21365, ¶ 29, n. 63 and n. 64. We acknowledge that some of these techniques, such as constructing berms, may not be feasible in certain cases. *See* SBE Petition at 2 (expressing concern about the feasibility of berms, given their effect on earth station look angles). This reinforces our conclusion that the selection of specific mitigation and sharing techniques must be made on a case-by-case basis at the time of coordination of a particular DOD earth station. *See infra* ¶ 16.

[36] *See* MSTV/NAB Petition at 8 and 9. *See also* SBE Petition at 2 (claiming that the use of shielding berms around DOD uplink antennas will be impractical).

[37] *See AWS Seventh Report and Order*, 19 FCC Rcd at 21363, ¶ 27. Local BAS frequency coordinators may not be available in all areas. We note that SBE maintains a list of local frequency coordinators, by county, on its website at http:www.sbe.org.

[38] *Id.*

[39] *Id.*, 19 FCC Rcd at 21364 and 21365, ¶ 29 and n. 63.

anticipating operation in spectrum in which coordination is required. At that time, DOD will be able to take timely advantage of the latest technological capabilities, as well as any changes to BAS equipment or use, and select the sharing and mitigation techniques most appropriate to each particular situation, to achieve the most effective sharing with BAS.[40] Because the most effective techniques for sharing will be different at each site, the Commission purposely declined to mandate sharing techniques to be used in each situation. Doing so would have been impractical and was not necessary to the determination that sharing in the band is feasible. Moreover, the Commission also observed that while enabling relocation of earth station operations from the band 1755-1850 MHz to the 2 GHz band will over time allow DOD the flexibility to accommodate additional systems in the lower band, DOD may eventually choose not to use the 2 GHz band for some of its 11 sites, due to coordination difficulties with incumbent operations.[41] Given the breadth of options available in each particular situation, we do not share MSTV/NAB's belief that more concrete and reliable scientific and technical evidence, or more investigation and analysis is necessary before we can require sharing in the band.[42]

17. In acknowledging that sharing at some of the sites will be difficult, the Commission examined the particularly challenging situation in Denver. It determined that the Buckley AFB ("Buckley") site exhibited numerous and significant interference potentials into ENG receive antennas located on tall buildings and towers in nearby downtown Denver, generally to the west of Buckley, and into mountain site antennas further west, which may tend to point back toward Denver for coverage, and thus toward Buckley.[43] The Commission noted that existing sharing techniques – such as limiting power, pointing direction, or vertical elevation of the DOD earth station antenna; adjusting satellite orbital coverage; constructing berms, installing RF shielding, or increasing earth station antenna sidelobe suppression; operation on adjacent ENG channels; taking advantage of ENG receive antenna sidelobe suppression;

[40] The Commission also observed that, while the *NTIA Manual* requires that DOD TT&C earth stations in the 2 GHz band conform to certain operational and technical limits specified in the ITU *Radio Regulations*, and these limitations give an idea of how the earth stations might operate, the situation may change before relocation to the 2 GHz band, which is not expected for at least several years. *Id.*, 19 FCC Rcd at 21364 and 21365, ¶ 29.

[41] *Id.*, 19 FCC Rcd at 21366, ¶ 30.

[42] *See* MSTV/NAB Petition at 8 and 9.

[43] At n. 63, the Commission stated that worst case analysis of location data provided by SBE indicates significant interference potentials, often in multiple directions, around several of the eleven TT&C earth station sites, due to line of site (LOS) conditions, owing to the height of ENG receive antennas with respect to their surroundings, whether on tall buildings or towers in urban areas or on mountain sites, in order to obtain maximum visibility from potential ENG transmit locations. The Buckley site, in particular, exhibits numerous interference potentials, ranging from 71 to 95 dB, into ENG receive antennas located around downtown Denver, generally southwest, west, and northeast of Buckley, all at distances from 15 to 18 km. In addition, several interference potentials, ranging from 79 to 87 dB, occur at mountain sites located west and northwest of Buckley, at distances from 40 to 100 km. These sites could pose a challenge because their antennas may tend to point eastward and southeastward, toward Denver and its suburbs, and therefore toward Buckley, which is located just east of Denver, during most of their use. The Commission emphasized, however, that these potentials are typically worst case, with the TT&C uplink at maximum power, which could be reduced by as much as 20 dB, and antenna pointing within 3 degrees of the horizon plane, where more restrictive, skyward pointing, such as to the GSO arc, could offer an improvement up to 40 dB, or more through antenna redesign to increase sidelobe suppression. TT&C site mitigation could also include construction attenuating features such as berms, as well as taking advantage of existing manmade and terrain obstructions. Further, on-going case-by-case coordination with BAS ENG operations has the potential to take advantage of the fact that the TT&C antenna spends relatively little time pointing in a particular direction, much less at an elevation of 3 degrees; of a typical ENG receive antenna sidelobe suppression of 20 dB, where the antenna main beam pointing need not be toward the TT&C earth station; and/or operation on adjacent ENG channels, where they are available. Finally, the Commission noted that, during on-going coordination, receiver threshold degradation, on which this worst case analysis was based, may be supplanted by less stringent criteria which fully consider actual ENG power, modulation, performance, or other requirements.

arranging time-sharing agreements; or using specific criteria which fully consider ENG power, modulation, and performance – could address those interference potentials. It concluded that because these sharing techniques, together with coordination, can facilitate implementation of the DOD TT&C earth stations at the 11 sites, there are no insurmountable technical obstacles that would prevent a primary, co-equal allocation for such earth stations at 2 GHz.[44] The situations MSTV/NAB describe in the studies referenced in their petition for reconsideration are no more challenging than those at Buckley, and therefore, we conclude that the Commission fully considered the interference concerns of the nature raised by MSTV/NAB.[45]

18. To the extent that MSTV/NAB are concerned that the number of BAS licensees with which a DOD earth station will need to coordinate is too large to be practical, we note that earth stations typically are subject to large coordination distances, varying up to 500 km, and consequently, in spectrum shared with terrestrial microwave systems, large numbers of licensees with which to coordinate.[46] Earth station coordination in the 2 GHz band would be no exception in this regard. The effective engagement of local BAS frequency coordinators, where available in addition to BAS licensees, should be able to facilitate the accomplishment of coordination. Moreover, the establishment of a single BAS coordinator for large areas, for which the BAS coordinator for the Los Angeles/Southern California area may be a model, would be particularly advantageous.[47] With respect to MSTV/NAB's concern for real-time coordination

[44] *See AWS Seventh Report and Order*, 19 FCC Rcd at 21364 and 21365, ¶ 29.

[45] *See* MSTV/NAB Petition at 7. *See also* MSTV/NAB Comments to the *AWS Fourth NPRM* at 7-10 and Exhibit B. For example, the case noted by MSTV/NAB's analysis with respect to a prospective DOD earth station at New Boston Air Force Station ("AFS"), New Hampshire, considers an omnidirectional ENG receive-only ("RO") antenna with an isotropic gain of 10 dB in Goffstown, New Hampshire, within line-of-site and only 5 km from the earth station. This separation distance, when compared to the multiple 15-18 km distances in the Buckley case, represents a decrease in free space loss ("FSL"), due to the variation of FSL with the square of distance, and thus an increase in the potential for interference, by a factor of approximately 9-13 (or 9.5-11 dB). However, the 10 dB gain of the omnidirectional antenna, compared with the greater 22 dB gain of the directional antenna in the Buckley case, represents a counterbalancing decrease in the potential for interference by a factor of 12 dB. We recognize that the omnidirectional antenna in the New Boston case disallows the use of off-axis attenuation to mitigate interference, as is possible with the directional antenna in the Buckley case; however, the Buckley case involves the potential for multiple interference cases in several directions in close proximity to the earth station, which could present an equivalent challenge, should those sites operate simultaneously. Moreover, notwithstanding the case-by-case comparison of the situations which could develop at New Boston and Buckley, while the MSTV/NAB analysis finds a strong potential for interference via receiver overload, it describes mitigation and sharing measures which could be taken to ensure successful coordination. These include limiting earth station power to less than 10,000 watts, or to only that level needed to communicate with the satellite; limiting vertical elevation of the earth station antenna to values above 5 degrees; siting the earth station within the military base so as to take advantage of natural terrain blockage toward ENG RO antennas; installing RF shielding or increasing earth station antenna sidelobe suppression; or limiting or disciplining hours of high power operation to avoid peak busy hours of ENG operations. *See* MSTV/NAB Comments, Exhibit B at 8. These measures appear wholly within the array of potential mitigation and sharing measures identified by the Commission, as described above; MSTV/NAB's Comments further reinforce our conclusion that the selection of specific mitigation and sharing techniques must be made on a case-by-case basis at the time of coordination of a particular DOD earth station. *See supra* ¶ 16.

[46] The coordination distances or contours for FSS earth stations can vary from 100 km to 500 km, depending on terrain and various technical criteria. Our rules (47 C.F.R. §§ 101.21(f), 101.103(d), 25.203, and 25.251) generally rely on the International Telecommunication Union ("ITU") Appendix 7 technical definitions and techniques for performing the coordination. *See* International Telecommunication Union, Radio Regulations (2001), Appendix 7 (WRC-2000), Methods for the determination of the coordination area around an earth station in the frequency bands between 100 MHz and 105 GHz ("ITU Appendix 7"). ITU Appendix 7 addresses Non-Geostationary Satellite Orbit ("NGSO") as well as Geostationary Satellite Orbit ("GSO') earth stations, which could characterize a TT&C earth station, and mobile as well as fixed terrestrial services.

[47] *See supra* n. 37.

for on-going BAS TVPU ENG deployment, we observe that the need for, and extent of, such coordination can be determined at the time of the initial coordination of the earth station. At that time, the flexibility of both DOD earth station and on-going BAS ENG operations and antenna pointing may be considered, especially where the earth station site is close to a major TV market, as both services will at times need to operate in a manner not anticipated that could result in interference to BAS operations.[48] It will therefore be in the interests of both to reach a mutually agreeable solution concerning coordination of on-going operations. In this connection, NTIA has agreed that the DOD earth station point of contact for coordination, as required by the *AWS Seventh Report and Order* for the coordination of future BAS stations, would also be available for the coordination of on-going BAS TVPU ENG operations, should such a requirement be determined by DOD, in concert with the local BAS coordinator(s) and licensees.[49] Engagement of the earth station's point of contact for coordination, particularly in concert with the local BAS frequency coordinator(s), where available, will address MSTV/NAB's concern that some BAS TVPU ENG operations may face uncertainty regarding protection from DOD earth station transmissions. In view of the above, we disagree with MSTV/NAB's contention that the Commission acted in an arbitrary and capricious manner with respect to its evaluation of the studies MSTV/NAB reference in their petition.[50]

19. We also deny SBE's request that we adopt specific sidelobe suppression criteria that would require the use of "pie plate" shrouds on all DOD TT&C earth station antennas.[51] In the *AWS Seventh Report and Order*, the Commission declined a request by Gannett to impose certain conditions that would restrict DOD's options at the Buckley site, such as relocation of the DOD earth station away from Denver, limiting power or vertical elevation of its antenna, or increasing its antenna sidelobe suppression through the use of a "pie plate" shroud.[52] The Commission found that maintaining flexibility on specific mitigation requirements, while requiring coordination to protect incumbent BAS operations, will allow the spectrum sharing situation to be customized for each site to meet the requirements when DOD needs to use the 2 GHz band.[53] In this connection, we expect that the relationship between each DOD earth station and incumbent BAS stations need not be one of strict frequency re-use, as suggested by SBE.[54] Rather, it should be one of frequency sharing, incorporating coordination of on-going operations where appropriate to accommodate the varying needs of both earth station and local ENG RO operations and antenna pointing, so that both services can operate at the same time in the same area, whether on the same or adjacent frequencies, to the maximum extent practicable.

20. Although MSTV/NAB are concerned that the coordination efforts we describe could be wasteful of BAS or DOD resources, we believe the alternative approach – establishing rigid sharing criteria and imposing particular mitigation measures that must be employed in every situation – would be more likely to waste valuable resources.[55] By setting forth a plan to allow for sharing in this band, we take a significant and substantial step to allow for the development of AWS spectrum in the 1710-1755 MHz and 2110-2155 MHz bands, which furthers one of the primary goals of this proceeding and, in turn,

[48] For example, an earth station may need to operate temporarily at higher power to regain control of a malfunctioning satellite, or a TVPU may need to operate in very close proximity to an earth station to cover a late-breaking news event. Either case could result in interference to BAS operations.

[49] *See supra* ¶ 15.

[50] *See supra* ¶ 9; MSTV/NAB Petition at 6-8.

[51] *See* SBE Petition at 1 and 2.

[52] *See* Gannett Comments to the *AWS Fourth NPRM* at 3.

[53] *See AWS Seventh Report and Order*, 19 FCC Rcd at 21361 and 21366, ¶¶ 22 and 32.

[54] *See* SBE Petition at 3.

[55] *See* MSTV/NAB Petition at 8.

promotes the public interest.[56] Although MSTV/NAB claim that our approach "threatens to divert time and effort from spectrum allocation strategies that could more effectively accomplish the Commission's goals in this proceeding," it is unclear what these alternate strategies are, and the primary solution offered by the Petitioners – additional studies of BAS-DOD sharing – would likely hinder the quick and efficient deployment of AWS in the reallocated bands.[57] However, as discussed above, we have ample record to provide for shared use of the band; while the specifics of how DOD facilities will accomplish such sharing in individual cases can and should be determined closer to the time such facilities are deployed, we would interject considerable uncertainty into the ability of AWS to enter the 1710-1755 MHz band if we eliminated the provisions the Commission made in the *AWS Seventh Report and Order* for DOD to move its facilities into the spectrum at 2025-2110 MHz. Similarly, MSTV/NAB's concerns that difficulties associated with coordination could prove wasteful of BAS or DOD resources or deprive consumers of new or enhanced services that would be facilitated by BAS are, at best, speculative and do not outweigh the expected new and enhanced services and consumer benefits that the rapid deployment of the AWS spectrum is widely anticipated to provide.[58] Finally we note that, as a practical matter, only the party initiating coordination (*i.e.*, DOD) would be in a position to make the unlikely determination that further coordination of a particular DOD earth station may not be productive – or wasteful as suggested by MSTV/NAB – and only at the time of coordination, when specific BAS-earth station sharing parameters can be established.

21. We agree with MSTV/NAB's assessment that the successful coordination of a DOD TT&C earth station could inhibit the operation of some new BAS stations in an area. As the Commission observed in the *AWS Seventh Report and Order*, once a DOD TT&C uplink earth station has begun coordination, new BAS stations for which coordination begins later must accept interference from the DOD earth station, as is normally the case for new stations sharing spectrum on a co-primary basis.[59] However, given the existing proliferation of BAS facilities, particularly TVPU stations, in the 2 GHz band, we believe it likely that many new BAS stations would in effect be protected indirectly through the earth station's protection of existing incumbents.

22. While we are denying the Petitions and affirming our decision that the BAS and other incumbent services will share the 2025-2110 MHz band with relocated DOD facilities, several matters the parties have raised warrant additional clarification.[60] We confirm, as requested by SBE, that in coordinating a

[56] *See, e.g., AWS Second Report and Order*, 17 FCC Rcd at 23193 and 23194, ¶ 1.

[57] *See* MSTV/NAB Petition at 8. *See also* MSTV/NAB Petition at 9 (arguing that the Commission has ample time before DOD facilities are deployed in the band, and therefore should conduct further analysis before requiring shared use of the band).

[58] *Id.* at 8 and 9.

[59] *See AWS Seventh Report and Order*, 19 FCC Rcd at 21363, ¶ 27.

[60] In its petition, SBE also asserts that the Commission, in paragraph 31 of the *AWS Seventh Report and Order*, misstated SBE's position as to whether the 11 DOD TT&C earth stations could successfully share the 2 GHz band with BAS operations converted to digital, by omitting the improvement in earth station side-lobe suppression which SBE believes is also required, and asks that we issue a Memorandum Opinion and Order in correction. We observe that the statement in question characterized SBE's position only on the effect of digital modulation on the D/U ratio and sharing: "As noted by SBE, use of digital technology by BAS licensees may permit the BAS D/U ratio to be relaxed by several orders of magnitude in some cases." The Commission also stated that "SBE asserts that, once broadcasters have converted to digital ENG, the D/U ratio can probably be relaxed from 60 dB to 30 dB and, for some of the 11 TT&C sites that are not in the vicinity of major TV markets with extensive ENG operations, co-channel sharing may become feasible." *See AWS Seventh Report and Order*, 19 FCC Rcd at 21360 and 21366, ¶¶ 20 and 31. SBE's Comments to the *AWS Fourth NPRM* at page 5 characterized its position: "Once broadcasters have converted to digital ENG, the D/U protection ratio can probably be relaxed by three orders of magnitude (*i.e.*, from 60 dB to 30 dB), and, for *some* of the 11 DoD sites, that are not in the "back yard" of major TV markets with extensive ENG operations, such sharing *may* become feasible." *See* SBE Comments to the *AWS Fourth NPRM* at 5 (continued....)

DOD earth station, DOD must demonstrate protection not only to fixed BAS point-to-point facilities such as STL stations, TV relay stations, and TV translator relay stations, but also to fixed RO antennas used in conjunction with BAS TVPU ENG operations.[61] We believe that DOD can protect the point-to-point and fixed RO facilities through coordination with licensees or with the assistance of a local BAS frequency coordinator. Further, we recognize, as we did in the *AWS Seventh Report and Order*, and as noted by SBE, that protecting these ENG RO antennas will be challenging, as they must be able to receive, and thus point, in all directions – and in the case of omni-directional antennas, without any sidelobe suppression to reduce interference – to maximize coverage. We also clarify, at SBE's request, for those rare situations where no reasonable coordination can be negotiated, and the parties raise the issue with the Commission or NTIA for their joint arbitration, that the Commission will act expeditiously in concert with NTIA to consider the needs of both incumbent BAS stations and the DOD earth station.[62] In such situations, the protection of BAS TVPU ENG RO sites, as well as fixed BAS sites, must be demonstrated. However, joint arbitration, if needed, must necessarily consider the flexibilities inherent to both earth station and local ENG RO operations and antenna pointing, and any arbitration will be binding on both parties. In this connection, we expect that both DOD and BAS interests will act in good faith to exercise flexibility, where feasible, in negotiating a reasonable accommodation and coordination, and thus obviate the need for arbitration.

C. Other Matters

23. As requested by NTIA in a letter of September 22, 2005, we are also adopting minor editorial changes and corrections to footnotes G122, G123, and US276 to the United States Table of Frequency Allocations in Section 2.106 – Table of Frequency Allocations.[63] Specifically, we merge footnotes G122 and G123 into a single footnote G122, deleting the historical cite to OBRA-93 in G123 and slightly modifying the language regarding Federal operations. We also modify the last sentence of footnote US276 to replace language describing other mobile telemetering uses as "secondary to the above uses" – which may lead to confusion as to those uses' underlying primary allocation status – with language stating that such uses "shall not cause interference to, or claim protection from, the above uses."[64] The revised footnotes read as follows:

> G122 In the bands 2300-2310 MHz, 2395-2400 MHz, 2400-2417 MHz, and 4940-4990 MHz, Federal operations are on a non-interference basis to authorized non-Federal operations and shall not constrain the implementation of any non-Federal operation.
>
> US276 Except as otherwise provided for herein, use of the band 2360-2395 MHz by the mobile service is limited to aeronautical telemetering and associated telecommand operations for flight testing of aircraft,

(...continued from previous page)
(emphasis added in original). We believe that, for purposes of this proceeding, it is significant that SBE has described situations in which interference mitigation measures can be used to promote sharing of the band. To the extent that we were unclear as to what those techniques and situations were, we believe that this discussion affords the clarification necessary to address SBE's concerns.

[61] *See* SBE Petition at 2. Because we provide requested clarification on this and other matters, we grant SBE's petition to this limited extent.

[62] *Id.* at 3 and 4.

[63] *See* Letter to Bruce A. Franca, Acting Chief, Office of Engineering and Technology, Federal Communications Commission, from Fredrick R. Wentland, Associate Administrator, Office of Spectrum Management, National Telecommunications and Information Administration, United States Department of Commerce (dated Sep. 22, 2005).

[64] This language is consistent with the description of secondary service in Section 2.104(d)(3)(i) and (ii), and thus retains the intent of the current language of the footnote without using the word "secondary." *See* 47 C.F.R. § 2.104(d)(3)(i) and (ii).

> missiles or major components thereof. The following three frequencies are shared on a co-equal basis by Federal and non-Federal stations for telemetering and associated telecommand operations of expendable and reusable launch vehicles, whether or not such operations involve flight testing: 2364.5 MHz, 2370.5 MHz, and 2382.5 MHz. All other mobile telemetering uses shall not cause harmful interference to, or claim protection from interference from, the above uses.

We also adopt minor editorial changes to Section 87.303(d)(1) to align the language of that section with footnotes US78 and US276.[65]

IV. PROCEDURAL MATTERS

A. Regulatory Flexibility Act

24. *Final Regulatory Flexibility Certification*: The Regulatory Flexibility Act of 1980, as amended (RFA)[66] requires that a regulatory flexibility analysis be prepared for rulemaking proceedings, unless the agency certifies that "the rule will not have a significant economic impact on a substantial number of small entities."[67] The RFA generally defines "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction."[68] In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act.[69] A small business concern is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the Small Business Administration (SBA).[70]

25. This Fourth Memorandum Opinion and Order makes only minor editorial changes and corrections to the Rules adopted by the *Seventh Report and Order* in ET Docket No. 00-258. We find

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[65] *See infra* Appendix A, Final Rules. The changes also restore modifications previously made to the frequency bands in Section 87.303(d)(1) by the *Report and Order* in ET Docket No. 02-305, RM-10331, 68 FR 74322 (Dec. 23, 2003), but inadvertently reversed by the *AWS Seventh Report and Order*. The changes in Appendix A also restore a modification to Section 1.9005(n) which was previously incorporated, as a modification to Section 1.9005(p), into the *AWS Seventh Report and Order* as published in the Federal Register. *See* 69 FR 77938 (Dec. 29, 2004). That change was inadvertently reversed by the publication, in the Federal Register, of the *Second Report and Order* in WT Docket No. 00-230, 69 FR 77521 (Dec. 27, 2004), whose Feb. 25, 2005, effective date had enveloped the Jan. 28, 2005, effective date of the *AWS Seventh Report and Order*. The modification to Section 1.9005(n) must therefore be published again as a final rule in the Federal Register, and is included in Appendix A. Additionally, certain changes to Part 27 were also previously incorporated into the *AWS Seventh Report and Order* as published in the Federal Register, but not in the FCC Record. Although they need not be published again as final rules in the Federal Register, we are including them in Appendix B of this Fourth Memorandum Opinion and Order, for informational purposes only, and to provide for their publication in the FCC Record. *See infra*, Appendix B.

[66] The RFA, *see* 5 U.S.C. §§ 601-612, has been amended by the Contract With America Advancement Act of 1996, Pub. L. No. 104-121, 110 Stat. 847 (1996) (CWAAA). Title II of the CWAAA is the Small Business Regulatory Enforcement Fairness Act (SBREFA).

[67] 5 U.S.C. § 605(b).

[68] 5 U.S.C. § 601(6).

[69] 5 U.S.C. § 601(3) (incorporating by reference the definition of "small business concern" in Small Business Act, 15 U.S.C. § 632). Pursuant to 5 U.S.C. § 601(3), the statutory definition of a small business applies "unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register."

[70] Small Business Act, 15 U.S.C. § 632.

that these changes are insignificant.[71] We thus conclude that these changes will have only a minor effect on the incumbent Television Broadcast Auxiliary Service ("BAS") under Part 74, Cable Television Relay Service ("CARS"), under Part 78, and Local Television Transmission Service ("LTTS") under Part 101, in the band 2025-2110 MHz, and on the Aviation Services under Part 87 and Amateur Radio Service under Part 97, in the band 2360-2400 MHz, and hence a minimal economic impact on licensees.[72] Therefore, we certify that the requirements of this Fourth Memorandum Opinion and Order will not have a significant economic impact on a substantial number of small entities. The Commission will send a copy of this Fourth Memorandum Opinion and Order, including a copy of this final certification, in a report to Congress and the Government Accountability Office pursuant to the Congressional Review Act, *see* 5 U.S.C. § 801(a)(1)(A). In addition, this Fourth Memorandum Opinion and Order and this certification will be sent to the Chief Counsel for Advocacy of the Small Business Administration, and will be published in the Federal Register. *See* 5 U.S.C. § 605(b).

B. Paperwork Reduction Act

26. This document does not contain new or modified information collection requirements subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104-13. In addition, therefore, it does not contain any new or modified "information collection burden for small business concerns with fewer than 25 employees," pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107-198, *see* 44 U.S.C. § 3506(c)(4).

C. Congressional Review Act

27. The Commission will send a copy of this Fourth Memorandum Opinion and Order in a report to be sent to Congress and the Government Accountability Office pursuant to the Congressional Review Act, *see* 5 U.S.C. § 801(a)(1)(A).

V. ORDERING CLAUSES

28. Accordingly, IT IS ORDERED that, pursuant to Sections 1, 4(i), 7(a), 302, 303(f), 303(g), and 405 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 151, 154(i), 157(a), 302a, 303(f), 303(g), and 405, and Section 1.429 of the Commission's Rules, 47 C.F.R. § 1.429, this Fourth Memorandum Opinion and Order IS ADOPTED.

29. IT IS FURTHER ORDERED that Parts 1, 2 and 87 of the Commission's Rules ARE AMENDED as specified in Appendix A, effective 30 days after publication in the Federal Register. This action is taken pursuant to Sections 1, 4(i), 7(a), 302, 303(f), and 303(g) of the Communications Act of 1934, as amended, 47 U.S.C. §§ 151, 154(i), 157(a), 302a, 303(f), and 303(g).

30. IT IS FURTHER ORDERED that the petition for reconsideration of the *AWS Seventh Report and Order* in this proceeding filed by the Association for Maximum Service Television and National Association of Broadcasters (together, "MSTV/NAB") IS DENIED as described herein, and the petition for reconsideration filed by the Society of Broadcast Engineers, Inc. ("SBE"), IS GRANTED IN PART AND DENIED IN PART to the extent described herein. These actions are taken pursuant to Section 405 of the Communications Act of 1934, as amended, 47 U.S.C. § 405, and Section 1.429 of the Commission's Rules, 47 C.F.R. § 1.429.

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[71] See ¶ 22 (clarifications) and ¶ 23 (minor editorial changes), *supra*.

[72] *See* 47 C.F.R. Part 74, Subpart F – Television Broadcast Auxiliary Stations; 47 C.F.R. Part 78 – Cable Television Relay Service; 47 C.F.R. Part 101, Subpart J – Local Television Transmission Service; 47 C.F.R. Part 87 – Aviation Services, and 47 C.F.R. Part 97 – Amateur Radio Service.

31. IT IS FURTHER ORDERED that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, SHALL SEND a copy of this Fourth Memorandum Opinion and Order, ET Docket No. 00-258 and WT Docket No. 02-8, including the Final Regulatory Flexibility Certification, to the Chief Counsel for Advocacy of the Small Business Administration.

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch

Marlene H. Dortch
Secretary

APPENDIX A: FINAL RULES

For the reasons discussed in the preamble, the Federal Communications Commission amends 47 C.F.R. Parts 1, 2, and 87 as follows:

PART 1 – PRACTICE AND PROCEDURE

1. The authority citation for part 1 continues to read as follows:

AUTHORITY: 47 U.S.C. 151, 154(i), 154(j), 155, 225, 303(r), 309, and 325(e) unless otherwise noted.

§ 1.9005 [Amended]

2. Section 1.9005 is amended by removing and reserving paragraph (n).

PART 2 – FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

3. The authority citation for part 2 continues to read as follows:

AUTHORITY: 47 U.S.C. 154, 302a, 303, and 336, unless otherwise noted.

4. Section 2.106, the Table of Frequency Allocations, is amended as follows:

a. Revise pages 35 and 36.

b. In the list of United States (US) footnotes, revise footnote US276.

c. In the list of Federal Government (G) footnotes, revise footnote G122 and remove footnote G123.

§ 2.106 Table of Frequency Allocations.

The revisions and additions read as follows:

* * * * *

International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
2200-2290 SPACE OPERATION (space-to-Earth) (space-to-space) EARTH EXPLORATION-SATELLITE (space-to-Earth) (space-to-space) FIXED MOBILE 5.391 SPACE RESEARCH (space-to-Earth) (space-to-space) 5.392			2200-2290 SPACE OPERATION (space-to-Earth) (space-to-space) EARTH EXPLORATION-SATELLITE (space-to-Earth) (space-to-space) FIXED (line-of-sight only) MOBILE (line-of-sight only including aeronautical telemetry, but excluding flight testing of manned aircraft) 5.391 SPACE RESEARCH (space-to-Earth) (space-to-space) 5.392 US303	2200-2290 US303	
2290-2300 FIXED MOBILE except aeronautical mobile SPACE RESEARCH (deep space) (space-to-Earth)			2290-2300 FIXED MOBILE except aeronautical mobile SPACE RESEARCH (deep space) (space-to-Earth)	2290-2300 SPACE RESEARCH (deep space) (space-to-Earth)	
2300-2450 FIXED MOBILE Amateur Radiolocation	2300-2450 FIXED MOBILE RADIOLOCATION Amateur		2300-2305 G122	2300-2305 Amateur	Amateur (97)
			2305-2310 US338 G122	2305-2310 FIXED MOBILE except aeronautical mobile RADIOLOCATION Amateur US338	Wireless Communications (27) Amateur (97)
			2310-2320 Fixed Mobile US339 Radiolocation G2 G120 US327	2310-2320 FIXED MOBILE US339 RADIOLOCATION BROADCASTING-SATELLITE 5.396 US327	Wireless Communications (27) Aviation (87)
			2320-2345 Fixed Radiolocation G2 G120 US327	2320-2345 BROADCASTING-SATELLITE 5.396 US327	Satellite Communications (25)
			2345-2360 Fixed Mobile US339 Radiolocation G2 G120 US327	2345-2360 FIXED MOBILE US339 RADIOLOCATION BROADCASTING-SATELLITE 5.396 US327	Wireless Communications (27) Aviation (87)
			2360-2390 MOBILE US276 RADIOLOCATION G2 G120 Fixed	2360-2390 MOBILE US276	Aviation (87)
			2390-2395 MOBILE US276	2390-2395 MOBILE US276 AMATEUR	Aviation (87) Amateur (97)

			2395-2400 G122	2395-2400 AMATEUR	Amateur (97)
			2400-2417 5.150 G122	2400-2417 AMATEUR 5.150 5.282	ISM Equipment (18) Amateur (97)
5.150 5.282 5.395	5.150 5.282 5.393 5.394 5.396		2417-2450 Radiolocation G2 5.150 G124	2417-2450 Amateur 5.150 5.282	
2450-2483.5 FIXED MOBILE Radiolocation 5.150 5.397	2450-2483.5 FIXED MOBILE RADIOLOCATION 5.150 5.394		2450-2483.5 5.150 US41	2450-2483.5 FIXED MOBILE Radiolocation 5.150 US41	ISM Equipment (18) TV Auxiliary Broadcasting (74F) Private Land Mobile (90) Fixed Microwave (101)
2483.5-2500 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A Radiolocation 5.150 5.371 5.397 5.398 5.399 5.400 5.402	2483.5-2500 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A RADIOLOCATION RADIODETERMINATION-SATELLITE (space-to-Earth) 5.398 5.150 5.402	2483.5-2500 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A RADIOLOCATION Radiodetermination-satellite (space-to-Earth) 5.398 5.150 5.400 5.402	2483.5-2500 MOBILE-SATELLITE (space-to-Earth) US319 US380 US391 RADIODETERMINATION-SATELLITE (space-to-Earth) 5.398 5.150 5.402 US41	2483.5-2495 MOBILE-SATELLITE (space-to-Earth) US319 US380 RADIODETERMINATION-SATELLITE (space-to-Earth) 5.398 5.150 5.402 US41 NG147	ISM Equipment (18) Satellite Communications (25)
				2495-2500 FIXED MOBILE except aeronautical mobile MOBILE-SATELLITE (space-to-Earth) US319 US380 RADIODETERMINATION-SATELLITE (space-to-Earth) 5.398 5.150 5.402 US41 US391 NG147	ISM Equipment (18) Satellite Communications (25) Wireless Communications (27)
2500-2520 FIXED 5.409 5.410 5.411 MOBILE except aeronautical mobile 5.384A MOBILE-SATELLITE (space-to Earth) 5.351A 5.403 5.405 5.407 5.412 5.414	2500-2520 FIXED 5.409 5.411 FIXED-SATELLITE (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A MOBILE-SATELLITE (space-to-Earth) 5.351A 5.403 5.404 5.407 5.414 5.415A		2500-2655 5.339 US205	2500-2655 FIXED US205 MOBILE except aeronautical mobile 5.339	Wireless Communications (27)
2520-2655 FIXED 5.409 5.410 5.411 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416 5.339 5.403 5.405 5.412 5.417C 5.417D 5.418B 5.418C	2520-2655 FIXED 5.409 5.411 FIXED-SATELLITE (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416 5.339 5.403 5.417C 5.417D 5.418B 5.418C	2520-2535 FIXED 5.409 5.411 FIXED-SATELLITE (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416 5.403 5.415A 2535-2655 FIXED 5.409 5.411 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416 5.339 5.417A 5.417B 5.417C 5.417D 5.418 5.418A 5.418B 5.418C			

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UNITED STATES (US) FOOTNOTES

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US276 Except as otherwise provided for herein, use of the band 2360-2395 MHz by the mobile service is limited to aeronautical telemetering and associated telecommand operations for flight testing of aircraft, missiles or major components thereof. The following three frequencies are shared on a co-equal basis by Federal and non-Federal stations for telemetering and associated telecommand operations of expendable and reusable launch vehicles, whether or not such operations involve flight testing: 2364.5 MHz, 2370.5 MHz, and 2382.5 MHz. All other mobile telemetering uses shall not cause harmful interference to, or claim protection from interference from, the above uses.

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FEDERAL GOVERNMENT (G) FOOTNOTES

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G122 In the bands 2300-2310 MHz, 2395-2400 MHz, 2400-2417 MHz, and 4940-4990 MHz, Federal operations may be authorized on a non-interference basis to authorized non-Federal operations, and shall not constrain the implementation of any non-Federal operations.

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PART 87 – AVIATION SERVICES

6. The authority citation for Part 87 continues to read as follows:

AUTHORITY: 48 Stat. 1066, 1082, as amended; 47 U.S.C. 154, 303, 307(e) unless otherwise noted. Interpret or apply 48 Stat. 1064-1068, 1081-1105, as amended; 47 U.S.C. 151-156, 301-609.

7. Section 87.303 is amended by revising paragraph (d)(1) to read as follows:

§ 87.303 Frequencies.

* * * * *

(d)(1) Frequencies in the bands 1435-1525 MHz and 2360-2395 MHz are assigned in the mobile service primarily for aeronautical telemetry and associated telecommand operations for flight testing of aircraft and missiles, or their major components. The bands 2310-2320 MHz and 2345-2360 MHz are also available for these purposes on a secondary basis. Permissible uses of these bands include telemetry and associated telecommand operations associated with the launching and reentry into the Earth's atmosphere, as well as any incidental orbiting prior to reentry, of objects undergoing flight tests. In the band 1435-1525 MHz, the following frequencies are shared with flight telemetry mobile stations: 1444.5, 1453.5, 1501.5, 1515.5, and 1524.5 MHz. In the band 2360-2395 MHz, the following frequencies may be assigned for telemetry and associated telecommand operations of expendable and re-usable launch vehicles, whether or not such operations involve flight testing: 2364.5, 2370.5 and 2382.5 MHz. In the band 2360-2395 MHz, all other mobile telemetry uses shall not cause harmful interference to, or claim protection from interference from, the above uses.

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APPENDIX B

Rule Modifications previously published in conjunction with the Seventh Report and Order (for Information Purposes Only)

The following rule modifications were previously incorporated into the *AWS Seventh Report and Order* as published in the Federal Register, but not in the FCC Record.[73] These rules have already been modified but are being published in conjunction with appropriate amendatory language so that the rule modifications may be duly memorialized in the FCC Record. This Appendix is for informational purposes only.

(a) Revise the amendatory instruction and final rule in Appendix C: Final Rules, for Section 27.1, to read as follows:

§ 27.1 [Amended]

Section 27.1 is amended by removing and reserving paragraph (b)(7).

(b) Delete the amendatory instruction and final rule in Appendix C: Final Rules, for Section 27.4.

(c) Revise the amendatory instruction and final rule in Appendix C: Final Rules, for Section 27.5, to read as follows:

§ 27.5 [Amended]

Section 27.5 is amended by removing and reserving paragraph (g).

(d) Revise the amendatory instruction and final rule in Appendix C: Final Rules, for Section 27.6, to read as follows:

§ 27.6 [Amended]

Section 27.6 is amended by removing and reserving paragraph (g).

(e) Revise the amendatory instruction and final rule in Appendix C: Final Rules, for Section 27.11, to read as follows:

§ 27.11 [Amended]

Section 27.11 is amended by removing and reserving paragraph (h).

(f) Delete the amendatory instruction and final rule in Appendix C: Final Rules, for Section 27.12.

(g) Revise the amendatory instruction and final rule in Appendix C: Final Rules, for Section 27.13, to read as follows:

[73] *See* 69 FR 77938 (Dec. 29, 2004).

§ 27.13 [Amended]

Section 27.13 is amended by removing and reserving paragraph (f).

(h) Revise the amendatory instruction and final rule in Appendix C: Final Rules, for Section 27.50, to read as follows:

§ 27.50 [Amended]

Section 27.50 is amended by removing and reserving paragraph (g) and retaining paragraphs (h) and (i).

(i) Revise the amendatory instruction and final rule in Appendix C: Final Rules, for Section 27.53, to read as follows:

§ 27.53 [Amended]

Section 27.53 is amended by removing and reserving paragraph (k) and retaining paragraphs (l) and (m).

(k) Revise the amendatory instruction and final rule in Appendix C: Final Rules, for Part 27, Subpart K, to read as follows:

Subpart K—[Removed]

Subpart K is removed and reserved.