

REQUEST FOR EXTENSION AND MODIFICATION OF STA

XM Radio LLC (“XM Radio”) respectfully requests extension and modification of the special temporary authority (“STA”) it was granted in File No. SAT-STA-20140321-00033,¹ which extended the satellite’s license term and authorized relocation of XM-1 to 27° W.L. in preparation for its removal to a disposal orbit. Specifically, XM Radio seeks a further 180-day extension of the XM-1 license and authority to drift the satellite eastward, but to a different location than currently authorized. Based on knowledge gained with a similar drift of the XM-2 satellite, XM Radio now proposes to position XM-1 at 39° W.L, rather than 27° W.L., before beginning orbit raising maneuvers. Grant of the requested authority will serve the public interest by facilitating the orderly retirement of XM-1.

Background

XM-1 is currently positioned at 115.25° W.L. with a +/- 0.1 degree east-west stationkeeping tolerance, where it had been serving as an in-orbit spare.² XM Radio began the process of retiring both XM-1 and XM-2 last year, working closely with Boeing Satellite Systems (“BSS”), the satellites’ manufacturer. As XM Radio has explained, the planning process has been especially complex because these are the first satellites in the XM Radio fleet and the first spacecraft in the BSS 702 product line to be removed to a disposal orbit.³

Furthermore, ground resources that are equipped to communicate with the satellites in the XM

¹ See *XM Radio LLC*, Call Sign S2118, File No. SAT-STA-20140321-00033 (the “XM-1 Retirement STA”), grant-stamped Apr. 30, 2014.

² See *XM Radio LLC*, Call Sign S2118, File No. SAT-MOD-20101216-00262 (the “XM-1 Modification”), grant-stamped Mar. 8, 2011 (the “XM-1 Modification Grant”).

³ XM-1 Retirement STA, Narrative at 2.

Radio fleet and have the tracking capabilities needed to support the satellite orbit raising and decommissioning process are extremely limited.⁴

XM Radio proposed to drift both XM-1 and XM-2 significantly eastward before beginning orbit-raising maneuvers in order to keep the satellites within range of its earth station network for a longer period during the decommissioning process. XM Radio advised the Commission that it would perform the necessary maneuvers for XM-2 first, and would start the drift of XM-1 eastward only after it had completed the orbit raising process for XM-2.⁵ XM Radio explained that this sequencing would allow XM Radio to make any appropriate adjustments to the XM-1 plan based on the results of the XM-2 satellite decommissioning and would permit use of the same ground facilities to support the maneuvers of both satellites.⁶

Pursuant to Commission authority,⁷ XM-2 was relocated to 27° W.L. and held there during venting of onboard propellant, and the satellite is now being raised to a disposal orbit. XM Radio had originally planned to drift XM-1 to 27° W.L. as well, and it specified that location in the XM-1 Retirement STA. However, lessons learned from the XM-2 drift have led XM Radio to revise its plans for XM-1. In particular, communicating with XM-2 at the 27° W.L. location required operating ground stations at a low elevation angle which created technical difficulties given the co-frequency operation of XM Radio's terrestrial repeater network. Although these issues were successfully managed in the case of XM-2, XM Radio can

⁴ *Id.* at 2-3.

⁵ *Id.* at 3.

⁶ *Id.*

⁷ *See XM Radio LLC*, Call Sign S2119, File Nos. SAT-STA-20140204-00018, grant-stamped Mar. 28, 2014 & SAT-STA-20140922-00103, grant-stamped Sept. 26, 2014.

avoid them with XM-1's drift by using 39° W.L., rather than 27° W.L., as the location at which XM-1 will be prepared for orbit raising.

Request for Continued Operating Authority

XM Radio requests STA to extend the XM-1 license authority for a further 180-day period. Grant of the requested extension will allow XM Radio to complete the decommissioning of XM-2, finalize its plans for XM-1's retirement, and implement the eastward drift of XM-1 necessary in preparation for raising the satellite to a disposal orbit.

Revised Relocation Request

XM Radio also seeks authority to relocate XM-1 to 39° W.L. instead of 27° W.L. in preparation for retirement. The current schedule is to begin in mid-April 2015⁸ to drift XM-1 from 115.25° W.L. to 39° W.L., maintain the satellite there with an east-west stationkeeping of +/- 0.1 degrees⁹ while venting excess propellant, and begin orbit-raising maneuvers in November 2015 following the autumn eclipse season.

The same public interest factors underlying the Commission's decision to allow relocation to 27° W.L. in the XM-1 Retirement STA support the revised request for relocation to 39° W.L. Specifically, grant of authority to move XM-1 to 39° W.L. will allow XM Radio to maintain ground contact with XM-1 during orbit-raising maneuvers, and no other operations will be adversely affected. XM Radio will conduct the eastward drift of the spacecraft consistent with industry practice, providing advance notification of the relocation to operators of satellites

⁸ XM Radio had previously anticipated beginning XM-1's eastward drift of XM-1 in November 2014 (*see* XM-1 Retirement STA, Narrative at 5), but the timing of the XM-2 decommissioning and constraints on availability of the necessary ground station resources have pushed back the XM-1 retirement schedule.

⁹ XM Radio does not plan to perform north-south stationkeeping maneuvers while XM-1 is positioned at 39° W.L.

that XM-1 will pass during its relocation and ensuring adequate separation between XM-1 and other spacecraft.¹⁰ Because the 39° W.L. location is unoccupied, XM-1 will not be collocated with any other spacecraft while it remains at this position prior to commencing orbit raising maneuvers. XM Radio has not changed its plan to raise XM-1 to a disposal orbit at least 313 km above the geostationary arc, which is the altitude derived by application of the IADC standard.¹¹

XM Radio seeks any waiver of Section 25.210(j) of the Commission's rules necessary to permit XM-1 to be maintained at 39° W.L. with a +/-0.1 degree east-west stationkeeping tolerance. Grant of this waiver is consistent with Commission precedent.¹² The requested stationkeeping volume for XM-1 will not overlap with that of any other satellite.

For the foregoing reasons, XM Radio respectfully requests special temporary authority for a period of 180 days commencing on November 27, 2014, to extend the XM-1 license term and permit relocation of the satellite to 39° W.L. in preparation for retirement. Grant of the requested authority will serve the public interest by facilitating the orderly removal of XM-1 to a disposal orbit.

¹⁰ See XM-1 Modification, Technical Appendix at 5 (describing measures to ensure safe operation during satellite relocation).

¹¹ See File No. SAT-AMD-20080129-00031 (Call Sign S2118), Attachment 1 at 3, grant-stamped Feb. 14, 2008. Although no change to the disposal orbit altitude is proposed at this time, XM Radio anticipates seeking Commission authority for changes to the XM-1 orbital debris mitigation plan. In particular, as with XM-2, the residual xenon projected to remain in XM-1's xenon ion propulsion system at end of life will need to be revised. XM Radio will seek authority for such changes in a subsequent request once decisions regarding the XM-1 retirement plan have been finalized.

¹² See XM-1 Modification Grant at 1-2, ¶ 5 (granting waiver of Section 25.210(j) to permit XM-1 to be operated with an east-west stationkeeping tolerance of +/- 0.1 degrees at the 115.25° W.L. orbital location).