

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

In the Matter of Application by            )  
  )  
XM Radio Inc.                                ) File No. SAT-MOD-\_\_\_\_\_  
  ) Call Sign S2786  
For Modification of the XM-5 License    )

**APPLICATION OF XM RADIO INC.**

XM Radio Inc. (“XM Radio”),<sup>1</sup> a satellite digital audio radio service (“SDARS”) licensee, hereby applies to modify the license for its XM-5 spacecraft, Call Sign S2786, to reassign the satellite from its current orbital position of 85.2° W.L. to 85.15° W.L. and allow operations there with a +/- 0.1 degree east-west stationkeeping tolerance. XM Radio requests an expanded stationkeeping volume to permit collocation of XM-5 with XM-3. XM Radio plans to fly XM-5, an in-orbit spare SDARS spacecraft, in formation with XM-3, one of XM Radio’s primary operational spacecraft, in order to facilitate the use of XM-5 to restore service.<sup>2</sup> Apart from the relocation and expanded stationkeeping volume, XM Radio proposes no other change in the operation of the XM-5 spacecraft.

A completed FCC Form 312 is attached, and XM Radio incorporates by reference the technical information previously provided in support of XM-5.<sup>3</sup> In addition, XM Radio is providing here technical information relating to the proposed modification to the XM-5 license in narrative form pursuant to Section 25.114 of the Commission’s Rules. Grant of the requested

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<sup>1</sup> XM Radio is a wholly-owned subsidiary of Sirius XM Radio Inc. (“Sirius XM”).

<sup>2</sup> XM Radio is separately seeking authority to reassign XM-3 to 85.15° W.L. +/- 0.1 degrees.

<sup>3</sup> See File No. SAT-LOA-20090217-00025, Call Sign S2786, grant-stamped Aug. 31, 2009.

authority will serve the public interest by facilitating safe and efficient operation of XM-5 in support of XM Radio's satellite radio network.

### **MODIFICATION**

XM-5 is a state-of-the art SDARS satellite that commenced operations at 85.2° W.L. earlier this year.<sup>4</sup> In connection with the launch of XM-5, XM Radio is reconfiguring its satellite fleet to optimize its ability to provide continuous service to Sirius XM's more than 40 million listeners.

XM-5 is currently positioned adjacent to XM-3, which is assigned to 85.083° W.L.,<sup>5</sup> and XM-1, which is assigned to 85.150° W.L.<sup>6</sup> Until recently, the XM-2 spacecraft was also positioned near 85.2° W.L., but XM-2 is now being drifted to 115.25° W.L.<sup>7</sup> XM Radio plans to collocate the XM-1 and XM-2 in-orbit spare satellites at 115.25° W.L. with XM-4.<sup>8</sup> Once both XM-1 and XM-2 have been drifted away from the vicinity of 85° W.L., XM Radio proposes to begin operating XM-3 and XM-5 in formation in order to enhance its ability to use XM-5 to provide restoration capacity without the need to repoint any ground antennas.

XM Radio requests authority to operate XM-5 at 85.15° W.L. with an east-west stationkeeping tolerance of +/- 0.1 degrees. The larger requested stationkeeping volume for XM-

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<sup>4</sup> *See id.*

<sup>5</sup> *See* File Nos. SAT-MOD-20070912-00125; SAT-AMD-20071113-00156; and SAT-AMD-20080129-00033, Call Sign S2617, all grant-stamped Feb. 14, 2008.

<sup>6</sup> *See* File Nos. SAT-MOD-20070912-00124; SAT-AMD-20071113-00157; and SAT-AMD-20080129-00031, Call Sign S2118, all grant-stamped Feb. 14, 2008.

<sup>7</sup> *See* File No. SAT-MOD-20101001-00205, Call Sign S2119, grant-stamped Nov. 9, 2010 (reassigning XM-2 from 85.217° W.L. to 115.25° W.L.).

<sup>8</sup> XM Radio is separately seeking modification of the XM-1 license to reassign the satellite to 115.25° W.L.

5 and XM-3 will facilitate safe joint operation of these spacecraft and conserve fuel, prolonging their useful life.

As demonstrated in the attached technical appendix, granting the request to reassign XM-5 and operate it with an increased stationkeeping volume should not adversely affect any other satellite operators. At its proposed orbital location of 85.15° W.L. +/- 0.1 degrees, XM-5's stationkeeping volume will not overlap with that of any other satellite except for the stationkeeping volume that is being proposed for XM-3.

Furthermore, the proposed reassignment of XM-5 should not cause harmful interference to any other satellite operators. Except for other satellites operated by XM Radio and its affiliates, no satellites using either the S-band or X-band frequencies assigned to XM-5 currently operate within two degrees of 85.15° W.L., nor is XM Radio aware of any such operations that are planned. XM Radio does not share S-band spectrum with other satellite systems, and the SDARS downlink frequencies are not subject to two degree spacing rules.

The Commission has generally afforded satellite operators the flexibility to design and modify their networks in response to customer requirements, absent compelling countervailing public interest considerations.<sup>9</sup> In addition, the Commission has consistently recognized that ensuring continuity of service is an important public interest objective.<sup>10</sup> The

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<sup>9</sup> See, e.g. *AMSC Subsidiary Corporation*, 13 FCC Rcd 12316 at ¶ 8 (IB 1998) (the Commission generally leaves space station design decisions to the licensee “because the licensee is in a better position to determine how to tailor its system to meet the particular needs of its customers.”) (footnote omitted).

<sup>10</sup> See, e.g., *DIRECTV Enterprises, LLC, Request for Special Temporary Authority to Conduct Telemetry, Tracking and Control During the Relocation of DIRECTV 1 to the 72.5° W.L. Orbital Location*, Order and Authorization, DA 05-1890 (Sat. Div. rel. July 14, 2005) at ¶ 18 (granting STA to relocate spacecraft to a location where it will replace a satellite with failing solar panels “will enable DIRECTV to maintain continuity of DBS service to its customers”); *DIRECTV Enterprises, LLC, Application for Authorization to Operate DIRECTV 5, a Direct Broadcast Satellite, at the 109.8° W.L. Orbital Location*, Order and Authorization, DA 05-2654 (Sat. Div.

requested modification will allow XM Radio to operate XM-5 in formation with XM-3 in the stationkeeping volume bounded by 85.05° W.L. and 85.25° W.L. and will serve the public interest by permitting XM Radio to optimize use of its satellite assets to help ensure service reliability.

### **WAIVER REQUEST**

XM Radio requests a limited waiver of Section 25.210(j) of the Commission's rules in connection with the requested XM-5 license modification. Grant of this waiver is consistent with Commission policy:

The Commission may waive a rule for good cause shown. Waiver is appropriate if special circumstances warrant a deviation from the general rule and such deviation would better serve the public interest than would strict adherence to the general rule. Generally, the Commission may grant a waiver of its rules in a particular case if the relief requested would not undermine the policy objective of the rule in question and would otherwise serve the public interest.<sup>11</sup>

Section 25.210(j) specifies that geostationary space stations "must be maintained within 0.05° of their assigned orbital longitude in the east/west direction, unless specifically authorized by the Commission to operate with a different longitudinal tolerance." 47 C.F.R. § 25.210(j). The Commission has previously waived this rule based on a finding that allowing an increased stationkeeping volume would "not adversely affect the operations of other spacecraft, and would conserve fuel for future operations."<sup>12</sup> In addition, the Commission has

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rel. Oct. 5, 2005) at ¶ 8 ("DIRECTV's proposal to provide DBS service from this location will serve the public interest, convenience and necessity in that it will ensure continuity of service to DIRECTV subscribers").

<sup>11</sup> *PanAmSat Licensee Corp.*, 17 FCC Rcd 10483, 10492 (Sat. Div. 2002) (footnotes omitted).

<sup>12</sup> *SES Americom, Inc. Application for Modification of Satcom SN-4 Fixed Satellite Space Station License*, 20 FCC Rcd 11542, 11545 (Sat. Div. 2005).

waived the rule to allow multiple space stations to operate in formation within a combined stationkeeping volume.<sup>13</sup>

The facts here fit squarely within this precedent. As discussed above, allowing XM-5 to operate within an increased stationkeeping volume will not harm other operators. The only satellite with which XM-5's stationkeeping volume will overlap is XM-3. XM Radio will ensure that the satellites' flight is closely controlled for safe joint operation. Furthermore, the proposed operations will not affect the interference environment.

Finally, allowing XM-5 to be flown in formation with XM-3 in an east-west stationkeeping volume of +/-0.1 degrees will result in fuel savings for both spacecraft. This will prolong the useful life of XM-3 as well as the time during which XM-5 will be available to provide any needed back-up capacity for XM-3. Under these circumstances, grant of any necessary waiver of Section 25.210(j) will serve the public interest.

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<sup>13</sup> See *SES Americom, Inc.*, File No. SAT-MOD-20080314-00072, Call Sign S2135, grant-stamped May 19, 2008 at ¶ 1 (“We agree with SES Americom that increasing the station-keeping volume of the AMC-4 spacecraft will not adversely affect the operations of other spacecraft, will conserve fuel for future operations and will facilitate coordinated operation of AMC-4 and AMC-2 in the same station-keeping range.”); see also File No. SAT-MOD-20100722-00165, Call Sign S2616, grant-stamped Oct. 14, 2010 (granting authority for XM-4 to be operated with +/-0.1 degree east-west stationkeeping tolerance to facilitate flying spacecraft in formation with XM-1 and XM-2).

## CONCLUSION

For the foregoing reasons, XM Radio hereby respectfully requests that the Commission modify the license for XM-5 to reassign the satellite to 85.15° W.L. and to permit operations there with a +/- 0.1 degree east-west stationkeeping tolerance.

Respectfully submitted,

XM Radio Inc.

/s/ James S. Blitz

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December 16, 2010

## **TECHNICAL APPENDIX**

### **1. INTRODUCTION**

XM Radio submits this technical appendix in support of its application for a modification of the license of the XM-5 SDARS spacecraft. XM Radio seeks authority to relocate the satellite to 85.15° W.L. instead of 85.2° W.L. and authority to operate with a +/- 0.1 degree east-west stationkeeping tolerance. XM Radio incorporates by reference the technical information previously provided regarding operations of XM-5,<sup>1</sup> and provides here information that will change following Commission approval of the proposed modification.

### **2. GAIN CONTOURS**

XM Radio is not submitting new contour maps with this application. The proposed shift in orbital location from 85.2° W.L. to 85.15° W.L. will produce no visible change in the gain contours from the maps already on file.

### **3. LINK BUDGETS AND INTERFERENCE ANALYSIS**

Except for satellites operated by XM Radio, no satellites within two degrees of the 85.15° W.L. orbital location operate in either the S-band frequencies XM Radio uses for service links or the X-band frequencies XM Radio uses for feeder links. XM Radio does not share S-band spectrum with other satellite systems other than its affiliate Satellite CD Radio, and the SDARS downlink frequencies are not subject to two degree spacing rules.

The proposed modification will have no effect on the interference environment in the S-band or the X-band. The Commission previously authorized XM Radio to operate multiple

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<sup>1</sup> File No. SAT-LOA-20090217-00025, Call Sign S2786, grant-stamped Aug. 31, 2009.

satellites in contiguous adjacent stationkeeping volumes between 85.05° W.L. and 85.25° W.L.<sup>2</sup> The limits of the stationkeeping volume proposed herein for XM-5 coincide with this range. Thus, XM-5 will not operate beyond the bounds of what the Commission has previously authorized for XM Radio satellites at this nominal location. The only change will be that instead of operating multiple satellites in adjacent stationkeeping boxes, XM Radio will operate XM-5 in formation with XM-3 within a combined +/- 0.01 degree box centered at 85.15° W.L.

Given that the proposed modified operation of XM-5 will not change the interference environment with respect to XM-5 and existing or future adjacent satellites, no link budget analysis is provided herein. In the unlikely event that any future concerns arise with respect to operations of XM-5 at 85.15° W.L., XM Radio will coordinate as necessary with the adjacent operators in order to arrive at a mutually satisfactory solution.

#### **4. UPDATED ORBITAL DEBRIS MITIGATION STATEMENT**

Pursuant to Section 25.114(d)(14)(iii) of the Commission's rules, XM Radio hereby submits the following supplemented information regarding orbital debris mitigation:

***Safe Flight Profiles, 47 C.F.R. § 25.114(d)(14)(iii):*** XM Radio has assessed and limited the possibility of XM-5 becoming a source of debris by collisions with large debris or other operational space stations. Specifically, XM Radio has assessed the possibility of collision with satellites located at, or reasonably expected to be located at, the requested orbital locations or assigned in the vicinity of those locations.

The underlying application requests reassignment of XM-5 to 85.15° W.L. with a +/- 0.1 degree east-west stationkeeping tolerance to permit operation of XM-5 in formation with

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<sup>2</sup> Specifically, prior to the recent relocation of XM-2, XM Radio was authorized to operate three satellites in adjacent stationkeeping boxes between 85.05° W.L. and 85.25° W.L. – XM-3 at 85.083° W.L., XM-1 at 85.150° W.L., and XM-2 at 85.217° W.L.



XM-3. XM Radio is not aware of any other FCC- or non-FCC licensed spacecraft that are operational or planned to be deployed at 85.15° W.L. or to nearby orbital locations such that there would be an overlap with the proposed stationkeeping volume of XM-5.

During relocation, the moving spacecraft will be maneuvered such that it will be at least 10 km away from any nearby satellites when the drift begins or ends and at least 30 km away from the synchronous radius when the planned drift rate is achieved. Advance notification will be given to any other operators through whose stationkeeping volumes the spacecraft will pass. When de-orbit of a spacecraft is required, the initial phase will be treated as a satellite move, and the same precautions will be used to ensure collision avoidance.

## **5. SCHEDULE S**

As discussed above, the proposed modification of the XM-5 license will not result in any material changes to the spacecraft's operating characteristics or to the interference environment. As a result, the information requested in Schedule S duplicates information already on file with the Commission concerning the technical parameters of XM-5's operation. In similar cases involving requests for slight changes in a satellite's orbital position, the Satellite Division has not required the submission of a new Schedule S.<sup>3</sup> Accordingly, XM Radio is not filing a Schedule S with this application, but XM Radio will prepare and submit a Schedule S upon request of the Commission staff.

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<sup>3</sup> See, e.g., File No. SAT-MOD-20040405-00076 (PanAmSat request for authority to operate SBS-6 at 74.05° W.L. rather than 74.0° W.L.).

**Technical Certification**

I, Bridget Neville, Vice President and General Manager for Satellite Engineering and Operations of Sirius XM Radio Inc., hereby certify under penalty of perjury that:

I am the technically qualified person with overall responsibility for preparation of the technical information contained in this application. I am familiar with the technical requirements of Part 25 of the Commission’s rules, and the information contained in the application is complete and accurate to the best of my knowledge, information and belief.

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/s/  
Bridget Neville

Dated: December 16, 2010