S2118 SAT-STA-20141017-00110 IB2014002063
XM Radio LLC
XM-1

GRANTED*
International Bureau
*with conditions

File # SAT-STA-20141017-00110
Call Sign S2118 Grant Date 11/26/14
(or other identifier)
Term Dates period of
From 11/27/14 To: 180 days
Approved: Stephen J. Duall
Chief, Satellite Policy Branch

Approved by OMB
3060–0678

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File Number: SAT–STA–20141017–00110
Callsign:

FEDERAL COMMUNICATIONS COMMISSION
APPLICATION FOR SPACE STATION SPECIAL TEMPORARY AUTHORITY

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APPLICANT INFORMATION

Enter a description of this application to identify it on the main menu:
XM–1 (S2118) Retirement STA Extension and Modification Oct 2014

1. Applicant

Name:	XM Radio LLC	**Phone Number:**	202–380–1383
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Country:	USA	**Zipcode:**	10020 –
Attention:	James S. Blitz		

XM Radio LLC
IBFS File No. SAT-STA-20141017-00110
Call Sign S2118

The application of XM Radio LLC (XM Radio) for special temporary authority, IBFS File No. SAT-STA-20141017-00110, is granted. Specifically, XM Radio is authorized, for a period of 180 days, commencing on November 27, 2014, to conduct Telemetry, Tracking, and Command (TT&C) operations necessary to drift its Satellite Digital Audio Radio Service (SDARS) space station, XM-1 (Call Sign S2118), from its current orbital location of 115.25° W.L. to the 39.0° W.L. orbital location and to maintain it at that location with an east-west stationkeeping tolerance of +/- 0.1 degrees. XM Radio is authorized to conduct such TT&C operations using the following center frequencies: 2339.2 MHz, 2339.7 MHz, 2344.0 MHz, and 2344.5 MHz (space-to-Earth); 7049.0 MHz and 7074.0 MHz (Earth-to-space). Additionally, we grant XM Radio's request to operate beyond the current license term for the XM-1 space station during this 180-day period to allow XM Radio sufficient time to complete its planned maneuvers for XM-1 in preparation for the space station's removal to a disposal orbit.[1] All operations of the XM-1 space station must be in accordance with the technical specifications set forth in its application, XM-1's current authorization, the Commission's rules, and the conditions set forth below.

1. All operations under this grant of special temporary authority must be on an unprotected and non-harmful interference basis, i.e., XM Radio shall not cause harmful interference to, and must not claim protection from interference caused to it by, any other lawfully operating radiocommunication system.

2. In the event of any harmful interference as a result of the operations under this grant of special temporary authority, XM Radio must cease operations immediately upon notification of such interference and shall immediately inform the Commission, in writing, of such an event.

3. XM Radio must coordinate the operations of XM-1 with existing geostationary space stations to ensure that no unacceptable interference results from its operations during drift to the 39.0° W.L. orbital location.

4. XM Radio must operate only the TT&C frequencies on XM-1 during the space station's drift to and operations at the 39.0° W.L. orbital location.

5. We grant XM Radio's request for a waiver of Section 25.210(j) of the Commission's rules, 47 C.F.R. § 25.210, to allow operation of XM-1 at 39.0° W.L. with an east-west stationkeeping tolerance of +/- 0.1 degrees instead of the +/- 0.05 degree tolerance required by the rule. XM Radio was previously granted a waiver of Section 25.210(j) to permit XM-1 to operate with an east-west stationkeeping tolerance of +/- 0.1 degrees at 115.25° W.L. *See* IBFS File No. SAT-MOD-20101216-00262 (Call Sign S2118), grant-stamped Mar. 8, 2011. We grant this waiver for the same reasons as provided for the previous waiver at 115.25 W.L.

6. Any action taken or expense incurred as a result of operations pursuant to this grant

[1] XM-1's authorization expired on May 31, 2014.XM Radio was previously granted special temporary authority for 180 days to perform these same maneuvers by drifting XM-1 to the 27.0° W.L. orbital position. *See* IBFS File No. SAT–STA–20140321–00033, granted Apr. 30, 2014. However, in light of the experience XM Radio gained while performing similar maneuvers for XM-1's companion space station, XM-2 (IBFS File No. SAT-STA-20140204-00018, granted Mar. 28, 2014), XM Radio now proposes to drift XM-1 to 39° W.L, rather than 27° W.L., prior to commencing of orbit raising maneuvers. Narrative at 1-3. XM Radio states that in order to deorbit XM-1 successfully, it must first drift the space station east to the 39.0° W.L. orbital location so that the westward drift of the space station that will occur during the planned orbit-raising maneuver will not take XM-1 out of the range of XM Radio's TT&C earth stations and thus lose control over the space station. *Id.*

of special temporary authority is at XM Radio's own risk.

7. This action is taken on delegated authority pursuant to 47 C.F.R. § 0.261 and is effective upon release. Petitions for reconsideration under 47 C.F.R. § 1.106 or applications for review under 47 C.F.R. § 1.115 may be filed within 30 days of the date of the Public Notice announcing this action.

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From 11/27/14 To: 180 days
Approved: Stephen J. Duall
Stephen J. Duall
Chief, Satellite Policy Branch

2. Contact

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Attention:		**Relationship:**	Legal Counsel

(If your application is related to an application filed with the Commission, enter either the file number or the IB Submission ID of the related application. Please enter only one.)

3. Reference File Number SATSTA2014032100033 or Submission ID

4a. Is a fee submitted with this application?

◉ If Yes, complete and attach FCC Form 159. If No, indicate reason for fee exemption (see 47 C.F.R.Section 1.1114).

○ Governmental Entity ○ Noncommercial educational licensee

○ Other(please explain):

4b. Fee Classification CRY − Space Station (Geostationary)

5. Type Request

○ Change Station Location ◉ Extend Expiration Date ○ Other

6. Temporary Orbit Location	7. Requested Extended Expiration Date
	2015−05−26 00:00:00.0

8. Description (If the complete description does not appear in this box, please go to the end of the form to view it in its entirety.)

XM Radio LLC requests extension and modification of the special temporary authority it was granted in File No. SAT-STA-20140321-00033 to further extend the license term for the XM-1 (S2118) space station and permit relocation of the satellite to 39 deg. W.L. +/- 0.1 deg. in preparation for its removal to a disposal orbit.

9. By checking Yes, the undersigned certifies that neither applicant nor any other party to the application is subject to a denial of Federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti–Drug Act of 1988, 21 U.S.C. Section 862, because of a conviction for possession or distribution of a controlled substance. See 47 CFR 1.2002(b) for the meaning of "party to the application" for these purposes.

(●) Yes ( ) No

10. Name of Person Signing	11. Title of Person Signing
James S. Blitz	Vice President, Regulatory Counsel

12. Please supply any need attachments.

Attachment 1: STA Narrative	Attachment 2:	Attachment 3:

WILLFUL FALSE STATEMENTS MADE ON THIS FORM ARE PUNISHABLE BY FINE AND / OR IMPRISONMENT (U.S. Code, Title 18, Section 1001), AND/OR REVOCATION OF ANY STATION AUTHORIZATION (U.S. Code, Title 47, Section 312(a)(1)), AND/OR FORFEITURE (U.S. Code, Title 47, Section 503).

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THE FOREGOING NOTICE IS REQUIRED BY THE PAPERWORK REDUCTION ACT OF 1995, PUBLIC LAW 104–13, OCTOBER 1, 1995, 44 U.S.C. SECTION 3507.

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

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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

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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 2015[8] 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 degrees[9] 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

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[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.

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[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).