Attachment

Description of Modification

1.0 INTRODUCTION

This application requests modification of the existing Row 44, Inc. ("Row 44") Ku-band aeronautical mobile-satellite service ("AMSS") blanket Earth station license to add two additional points of communication – Intelsat 19 ("IS-19") at 166° E.L. and Intelsat 27 ("IS-27") at 55.5° W.L. Addition of these two satellites to Row 44's existing authority will provide new coverage in both the Pacific and Atlantic Ocean regions, allowing service to international flights on trans-oceanic routes. IS-19 and IS-27 are both licensed to Intelsat by the FCC under Call Signs S2850 and S2827, respectively. Except as specifically set forth herein, Row 44 seeks these modifications subject to all terms and conditions set forth in its current license (Call Sign E080100).[1] Row 44 is seeking to implement service on one or both of these satellites during the first quarter of 2013, and respectfully requests that its application be placed on public notice expeditiously to allow processing consistent with this projected implementation schedule.

2.0 TECHNICAL OVERVIEW

Consistent with its current authorization for use of the T11N satellite for Atlantic Ocean Region operations, Row 44 seeks authority to use the 11.45-11.7 GHz portion of the Ku-band downlink band on IS-27. In addition, Row 44 seeks to use the 12.25-12.75 GHz portion of the extended Ku-band downlink on both IS-19 and IS-27. Both of these requests are further described below. Row 44 does not seek any increase in the total number of aeronautical Earth stations ("AESs") authorized for operation with its system, but would utilize the TECOM antenna subsystem up to a maximum of 1,000 units, as previously authorized.[2]

Row 44's U.S. operations will satisfy FCC requirements identified in Section 25.134 for power density, Section 25.209 for antenna performance in azimuth and Section 25.222 for EIRP off-axis co-polarization spectral density, off-axis cross-polarization spectral density and pointing accuracy requirements in conformance with two degree satellite spacing, and consistent with the conditions on its existing license. Outside the continental United States, Row 44 will operate at higher skew angles to maximize coverage, operating in conformity with European Telecommunications Standards Institute European Standard (EN) 302 186, "Satellite Earth Stations and Systems (SES); Harmonized EN for satellite mobile Aircraft Earth Stations (AESs)

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[1] *See* Row 44 Inc., Radio Station Authorization, Call Sign E080100, File No. SES-MFS-20100715-00903, at 3-6 (granted Dec. 23, 2012).

[2] There is no change in the authority requested for the previously authorized Aerosat Avionics antenna. Parameters for this antenna are restated in Schedule B of Form 312, but no modification is being requested for this equipment. Currently, no Aerosat antennas are operational as part of the Row 44 AMSS network.

operating in the 11/12/14 GHz frequency bands covering essential requirements under article 3.2 of the Radio & Telecommunications Terminal Equipment Directive."

The modified Row 44 system will operate similarly to the current configuration supporting an elevation range from 90˚ to 0˚ of continuous coverage with an azimuth coverage that is continuous over 360˚ and with ±55 degrees skew for Atlantic Ocean region operations with IS-27 and with ±65 degrees skew for Pacific Ocean region operations with IS-19. Reception from IS-27 will occur in the 11.45-12.75 GHz band and reception from IS-19 will occur exclusively in the 12.25-12.75 GHz band. Transmission to both satellites will occur in the 14.05-14.47 GHz band, as presently authorized. The transmitting antenna uses an independent linear polarized array. The data rates are unchanged with the RF signal bandwidth doubled and transmit power delivered to the antenna increased by 3 dB. The EIRP density on boresite remains at 14.8 dBW/4 kHz. The input power and maximum EIRP for operations with IS-19 and IS-27 will be below the maximum values currently specified in Row 44's authorization. *See* FCC File No. SES-MFS-20100715-00903.

In this requested modification, antenna control, pointing and accuracy remain the same as the existing implementation and in compliance with Section 25.222 of the FCC's Rules and ITU-R M.1643, Annex 1, Part A, Section 2. The Antenna Control Unit (ACU) ensures that the pointing error is less than 0.2° peak between the orbital location of the target satellite and the axis of the main lobe of the antenna. All emissions automatically cease within 100 milliseconds if the angle between the orbital location of the target satellite and the axis of the main lobe of the antenna is projected to exceed ±0.2°, thus conforming to Section 25.222(a)(7) requiring that transmissions cease in the event this angle exceeds ±0.5°; transmission will not be resumed until the angle is less than 0.2°.

Except for the added points of communication and related changes in the coordination arc and look angles, all other aspects of Row 44's AMSS system operation will remain unaltered from those described in its current license. Consistent with the existing scope of Row 44's authority, and with the specific purpose of adding IS-19 and IS-27 as new points of communication, Row 44 asks that operations on these satellites be subject to the condition of its current authorization permitting operations over international waters anywhere within the coverage footprint of the satellite, and that it be permitted to operate on both satellites over all U.S. offshore territories within each satellite's trans-oceanic coverage footprints, including Hawaii, Puerto Rico, and the U.S. Virgin Islands, subject to the non-protected, non-harmful interference basis condition of its current license.

3.0 EIRP SPECTRAL DENSITY; COORDINATION

Row 44's TECOM antenna is compliant with the off-axis antenna gain envelope established in Section 25.209(a)(1) of the Commission's rules up to +/- 35 degrees of skew. Because the antenna is a small, aircraft mounted AES, however, Row 44 cannot meet the static elevation plane criteria under Section 25.209(a)(2). Moreover, because the antenna is less than 1.2 meters in diameter, it is not subject to routine processing under Section 25.212(c). However, Row 44 has coordinated its non-conforming use with all adjacent satellite operators pursuant to Sections 25.209(f) and 25.220 of the Commission's Rules. Row 44's intended operations are within the scope of operations that Intelsat has previously coordinated with the adjacent satellite operators,

and should not cause unacceptable interference into adjacent satellites operating in accordance with FCC's two-degree spacing policy. Copies of the coordination letters covering Row 44's proposed operations, countersigned by Intelsat and Row 44, are attached hereto in Exhibit C.

EIRP spectral density plots for co-polarized signals in the transmit bands at 14.05 GHz, 14.25 GHz, and 14.47 GHz are attached as Exhibit A and are in compliance with Section 25.222(a)(1) of the Commission's Rules. The patterns are provided in two orientations for each satellite:

1. Vertical and horizontal polarization as referenced to zero degrees. These patterns relate to EIRP spectral density versus azimuth angle and show full compliance with Section 25.222(a)(1) up to +/- 35 degrees skew;

2. Vertical and horizontal polarization as referenced to an off-axis elevation performance to show compliance in situations where the aircraft is not on the same longitude as the target satellite resulting in skew. When exceeding the +/- 35 degree skew value, the EIRP spectral density plots will be in full compliance with the requirements of ETSI standard EN 302 186. The vertical and horizontal polarization off-axis EIRP spectral density depict that the antenna can support up to ±55 degree effective off-axis angle in the Atlantic Ocean Region for operation with IS-27 and up to ±65 degree effective off-axis angle in the Pacific Ocean Region for operation with IS-19 and remain compliant with EN 302 186. The actual skew angle is constantly monitored by the ACU and the aircraft transmitter will be muted in the event that this skew angle is exceeded, consistent with Row 44's current authorization.

4.0 USE OF EXTENDED KU-BAND DOWNLINK BAND AND REQUEST FOR WAIVER

As indicated above, Row 44 is seeking expanded authority for its AES terminals to receive transmissions in the 11.45-11.7 GHz portion of the Ku-band downlink spectrum, in which it is currently authorized to receive transmissions from T11N, and which spectrum is also utilized on IS-27, as well as in the upper extended Ku-band downlink at 12.25-12.75 GHz used on both IS-19 and IS-27. The U.S. table of Frequency Allocations does not include a domestic allocation for AMSS in these bands, and there is no allocation for geostationary ("GSO") FSS in the 12.25-12.75 GHz band. Accordingly, Row 44 requests that its current waiver of Section 2.106 of the FCC's Rules allowing operation in the 11.45-12.2 GHz portion of the band on a non-conforming, non-interference basis, be extended to cover the entirety of the downlink spectrum bands used by both IS-19 and IS-27. *See Row 44 License Order*, 24 FCC Rcd 10223, 10237-38 (¶ 33) (IB/OET 2009); Row 44 Modification Application, FCC File No. SES-MFS-20100715-00903, granted Dec. 23, 2010. In particular, Row 44 requests authority to use the 11.45-11.7 GHz band on IS-27 and the 12.25-12.75 GHz band on both IS-19 and IS-27.

The 11.45-11.7 GHz portion of the extended Ku-band downlink is limited to international operations.[3] Transmissions from IS-27 to Row 44 AESs will serve aircraft flying primarily over the international waters of the Atlantic Ocean and Canada, during flights between Europe and North America. Similarly, transmissions from IS-19 will serve aircraft flying primarily over the

[3] *See* 47 C.F.R. § 2.106, NG104.

international waters of the Pacific Ocean, during flights from Asia and Australia to the United States. These operations will allow passengers to access information anywhere on the Internet and to send international communications. As these operations will take place mostly over open ocean waters, they will not pose an interference risk either to users of terrestrial fixed service facilities that may be operating in this band or to Row 44's own operations.[4]

The 12.25-12.75 GHz portion of the extended Ku-band downlink is not allocated to the FSS in ITU Region 2 (the Americas), but is allocated for such service in the space-to-Earth direction in both Region 1 (Europe/Africa) and Region 3 (South Asia/Pacific). Because Row 44's operations will occur largely in these areas and not over the continental U.S., these operations are consistent with the global spectrum allocation specified for this band. In this connection, the Commission has previously recognized that other MSS applications in FSS bands are free to operate in the extended Ku-band "in ITU Regions 1 and 3 in accordance with the rules of the administrations whose waters they operate in."[5]

Row 44's proposed operations in these bands are covered in the coordination letters attached in Exhibit C. Moreover, because the Row 44 terminals will be receiving only in these spectrum bands the signals of already operating GSO FSS satellites, Row 44's operations will pose no significant interference risk to current spectrum users, and Row 44 will accept any interference from such users. Row 44 will cease operation in the unlikely event that any interference is caused to existing primary service users in the requested bands.

5.0 LINK BUDGET AND PREDICTED COVERAGE AREA

Exhibit B provides the link budget and coverage predictions for IS-19 and IS-27.

6.0 RADIATION HAZARD ANALYSIS

There is no change in uplink power or EIRP, and the Radiation Hazard Analysis submitted for the TECOM antenna in FCC File No. SES-MFS-20100715-00903 remains valid.

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[4] *Compare* 47 C.F.R. § 2.106, NG182 ("In the bands 10.95-11.2 GHz and 11.45-11.7 GHz, earth stations on vessels (ESVs) may be authorized to communicate with U.S. earth stations through space stations of the fixed-satellite service but must accept interference from terrestrial systems operating in accordance with Commission Rules").

[5] *Procedures to Govern the Use of Satellite Earth Stations on Board Vessels in the 5925-6425 MHz/3700-4200 MHz Bands and 14.0-14.5 GHz/11.7-12.2 GHz Bands*, 20 FCC Rcd 674, 711 n.224 ("Though the Commission's rules do not have extraterritorial application, we acknowledge that the Ku-band is not harmonized on a world-wide basis and thus, U.S.-licensed ESV operators are free to operate in the Ku-band in ITU Regions 1 and 3 in accordance with the rules of the administrations whose waters they operate in, including portions of the Ku-band not used by the United States").