

Attachment 1

Description of Amendment to Application for Modification of License

1.0 INTRODUCTION

This application seeks to amend the pending application to modify the existing Row 44, Inc. (“Row 44”) Ku-band Earth Stations Aboard Aircraft license to add two additional points of communication – Telesat’s Telstar 14R (“T14R”) at 63° W.L. and Satmex 8 at 116.8° W.L. – in addition to Intelsat 19 (“IS-19”) at 166° E.L., which was requested in the initial application filed in October 2012 (*See* File No. SES-MOD-20121023-00963). At the same time, Row 44 is removing from its pending request the Intelsat 27 satellite, which was intended for operation at 55.5° W.L., but did not survive its launch attempt on January 31, 2013. Consistent with discussions with FCC Staff on September 19, 2013, no Form 312, Schedule B is submitted with this amendment because the only changes requested herein are the removal of IS-27 as a point of communication and the addition of T14R and Satmex 8. Both of these satellites fall within the orbital arc already specified in the pending modification application and will operate within the scope of the technical parameters specified therein. Accordingly, no other change in the technical information contained in the pending application is required.

Addition of the three satellites, including IS-19, 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, as well as on domestic routes in North America. 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 more of these satellites during the fourth 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

Row 44’s U.S. operations will satisfy FCC requirements identified in Section 25.209 for antenna performance in azimuth and Section 25.227(a) & (b) 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) operating in the 11/12/14 GHz frequency bands covering essential requirements under article 3.2 of the Radio &

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

Telecommunications Terminal Equipment Directive.” These operations are consistent with the coordination certifications signed by the target operators. *See* Section 3.0, *infra*.

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. Transmission to all satellites now the subject of this modification request will occur in the 14.05-14.47 GHz band, as presently authorized. The proposed coverage and downlink frequency use for all three satellites are summarized in Table 1, below:

Table 1: Downlink Use by Region

Satellite & Call Sign	Orbital Location	Downlink Frequencies	Coverage Areas/ ITU Regions (R1, R2, R3)
Intelsat 19 (S2850)	166° E.L	12.25-12.75 GHz	Pacific Ocean (Primarily R3, also R2)
Satmex 8	116.8° W.L.	11.7-12.2 GHz	North America and Caribbean (R2)
Telesat T14R	63 ° W.L.	11.7-12.2 GHz	North Atlantic Ocean, Canada and Caribbean (R1 & R2)

Both Satmex 8 and Telesat T14R have previously been authorized for communications with U.S.-licensed earth stations. Satmex 8 has been added to the FCC’s Ku-band permitted list as the result of favorable action on a Petition for Declaratory Ruling. *See* FCC File No. SAT-PPL-20120823-00140 (granted Dec. 6, 2012). Telesat T14R has previously been approved for addition as a point of communication for provision of ESAA service. *See* FCC File No. SES-AFS-20130220-00189 (granted July 24, 2013) (identifying T14R satellite by its Brazilian designation, Estrela do Sul 2). Accordingly, no additional showing pursuant to Section 25.137 of the Commission’s Rules is required. *See* 47 C.F.R. § 25.137(b).

The TECOM transmitting antenna uses an independent linear polarized array. The data rates for operation with Satmex 8 and T14R are unchanged from the currently licensed operation, with the RF signal bandwidth the same as is proposed for IS-19 (512 kbps), and other operating parameters within the scope of those previously authorized for U.S. operations. In particular, the EIRP density on boresite remains at 14.8 dBW/4 kHz or less. The input power and maximum EIRP for the modified operations 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 25.227(a)(1)(ii) & (iii) of the FCC’s Rules and ITU-R M.1643, Annex 1, Part A, Section 2. Specifically, 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

25.227(a)(1)(iii)(A) of the Commission’s Rules, requiring that transmissions cease in the event this angle exceeds $\pm 0.5^\circ$; 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 ESAA 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 the new points of communication, Row 44 asks that operations on all 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. Row 44 also 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 also takes this opportunity to note that its existing, licensed operation is compliant with all aspects of the ESAA rules that became effective earlier this year, after the filing of its pending modification application. Row 44’s authorization specifically mandates that it “operate in compliance with any rule requirements subsequently adopted by the Commission,”³ and the conditions imposed on Row 44 in that authorization, based on showings provided in its initial application, as amended (File No. SES-LIC-20080508-00579 *et al.*), are congruent with the rules that were adopted in IB Docket No. 12-376, as shown in Table 2 below.

Table 2: Correspondence of ESAA Rules with Row 44 License Conditions

Brief Rule Description	New C.F.R. Section (ESAA Rules)	Corresponding ¶ of Row 44 License
Antenna Pointing	§§ 25.227(a)(1)(ii)(A) & (b)(1)(iii)(A)	¶ 35(k) & ¶ 6
Cessation of Emissions	§§ 25.227(a)(1)(iii)(A) & (b)(1)(iii)(B)	¶ 35(k) & ¶ 6
Point of Contact	§ 25.227(a)(5)	¶ 35(f)
Data Logging	§ 25.227(a)(6)	¶ 35(m)
Antenna Tracking	§ 25.227(a)(9)	¶ 35(g)
Network Control & Monitoring	§ 25.227 (a)(10)	¶ 35(h)
Remote Self-Monitoring	§ 25.227(a)(11)	¶ 35(g)
RF Exposure Mitigation	§ 25.227(b)(8)	¶ 35(n)
FSS Coordination	§ 25.227(b)(2)	¶¶ 35(c) & (l)
NASA TDRSS Coordination	§ 25.227(c)	¶ 35(l)
NSF RAS Coordination	§ 25.227(d)	¶ 35(l)

² There is no change in the authority requested for the previously authorized Aerosat Avionics antenna. Currently, no Aerosat antennas are operational as part of the Row 44 AMSS network.

³ *Row 44, Inc.*, 24 FCC Rcd 10223, 10238-39 (¶ 35(a)) (IB/OET 2009).

3.0 EIRP SPECTRAL DENSITY; COORDINATION

Row 44's TECOM antenna is compliant with the off-axis antenna gain envelope established in Sections 25.209(a)(1) and 25.227(b)(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. However, Row 44 has coordinated its non-conforming use with all adjacent satellite operators pursuant to Sections 25.209(f) and 25.227(b) of the Commission's Rules. Row 44's intended operations with the additional satellites subject to this amendment are within the scope of operations that Satmex and Telesat have 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 using T14R and Satmex 8 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 25.227(a)(1) & (b)(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 25.227(a) 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 outside of U.S. airspace, 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 each requested satellite 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 REQUEST FOR WAIVER WITH RESPECT TO USE OF EXTENDED KU-BAND DOWNLINK BAND ON IS-19

The operations in the extended Ku-band for IS-19 indicated in Table 1, above, are subject to a Request for Waiver contained in the initial modification application. *See* FCC File No. SES-MOD-20121023-00963, at Section 4.0.

5.0 LINK BUDGET AND PREDICTED COVERAGE AREA

Exhibit B provides the link budget and coverage predictions for both Satmex 8 and T14R. *See* 47 C.F.R. § 25.227(b)(4).

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. *See* 47 C.F.R. § 25.227(b)(8).