

## **Exhibit A**

### **Legal Narrative and Response to Questions 35: Waiver of the Rules**

#### **1. Introduction and summary**

In this application, Inmarsat, through its subsidiary, ISAT US, Inc. (“ISAT US”), amends its pending application (IBFS File No. SES-LIC-20140224-00098; Call sign E140029, filed February 14, 2014) (“SeaTel Application”), to add two additional Earth station terminal types that will be mounted on ships to provide maritime communications (“Additional GX Terminals”) through the GX network. Like the antennas in the SeaTel Application, these Additional GX Terminals will communicate with the Inmarsat-5 F2 (“I5F2”) satellite that will operate at the 55° W.L. orbital location,<sup>1</sup> and will be part of the GX network and integrated global offerings. The area of operations of the Additional GX Terminals will be U.S. and international waters, including inland waterways within the coverage area of I5F2. The information in Section 1 of the SeaTel Application regarding the GX network and the global offerings applies equally to the Additional GX Terminals, and thus, are incorporated by reference in this amendment.

This amendment adds (i) the Japan Radio Company, Limited (“JRC”) model JUE 60GX – employing an antenna with a 0.65 meter diameter, and (ii) the Cobham SeaTel model Sailor 100 GX – employing an antenna with a 1.03 meter diameter. Both JRC and Cobham are global leaders in maritime communications equipment. The characteristics of these Earth stations are provided in the FCC Form 312 associated with this amendment application and in Section 3 below.

This amendment also corrects the half-power beam width provided for the GX Terminals in the SeaTel Application, as required by Section 25.130(f).

#### **2. U.S. Frequency Allocation and Waiver Request**

The Additional GX Terminals will operate on the same frequencies as the GX Terminals in the SeaTel Application: 19.7-20.2 GHz and 29.5-30.0 GHz. ISAT US seeks the same regulatory status for these additional earth station terminals as requested in the Section 2 of Exhibit A of the SeaTel Application, or alternatively, seeks a waiver of the U.S. Table of Frequency Allocations, 47 C.F.R. § 2.106. The justifications for granting primary status for mobile terminals in the FSS and the alternative waiver request are as stated in the SeaTel Application and apply to the Additional GX Terminals in this amendment.

Moreover, since filing the SeaTel Application, the ITU Radiocommunication Bureau has introduced a new class of Earth station in the Preface for Earth stations that operate while in motion associated with a space station in the FSS in the bands listed in footnote 5.526 of the ITU Radio

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<sup>1</sup> See Inmarsat Hawaii, Inc., Application for Authority to Operate Gateway Earth Station with I5F2 Satellite at 55° W.L., File No. SES-LIC-20120426-00397-00397, Call Sign E120072 (filed Apr. 26, 2012), as amended (“Lino Lakes Application”).

Regulation.<sup>2</sup> The associated ITU filing for the I5F2 satellite, INMARSAT-KA 55W, has received a favourable finding to operate such Earth stations in Region 2 in the 29.5-30.0 GHz and 19.7-20.2 GHz bands, for which authority is requested in the SeaTel Application and in this amendment.<sup>3</sup>

### **3. Technical compatibility with other users in the bands**

Sections 3.1 and 3.2 provide analysis and an operational description of the JRC JUE60GX and Cobham Sailor 100 GX Earth stations respectively, including compliance with the Commission's two-degree spacing policy for Ka-band GSO FSS systems and Section 25.138 of the Commission's rules. As discussed in more detail below, the transmissions from each of the mobile Earth station terminal types will be consistent with the off-axis EIRP spectral density levels set forth in Section 25.138. In addition, the power flux-density at the earth's surface produced by emissions from the I5F2 satellite when communicating with the GX Terminals will be within the -118 dBW/m<sup>2</sup>/MHz limit set forth in Section 25.138(a)(6).<sup>4</sup>

The description of the additional capabilities of the JRC JUE60GX and Cobham Sailor 100 GX regarding the antenna control mechanisms, pointing accuracy, shut-off capabilities and Network Operations Center are the same as for the GX Terminals described in Section 3.3 of the SeaTel Application and are incorporated by reference herein.

#### **3.1 JRC JUE60GX Earth Station**

The JRC JUE60GX Earth station is a multi-axis stabilized Earth station employing a 0.65 meter diameter antenna. A pictorial of JRC maritime Earth station that consists of the stabilized antenna and relevant electronics enclosed in a protective radome designed for operation on-board vessels is shown in Figure 1. For blanket licensing of transmitting Earth stations in the 29.5-30.0 GHz band, the Commission adopted off-axis EIRP spectral density levels contained in Section 25.138(a). As shown in Exhibit F, the JRC JUE60GX Earth stations will operate within these levels under clear sky conditions. Therefore, its transmissions will not cause any more interference than any other Earth stations that meet these levels.

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<sup>2</sup> BR Circular Letter, ITU BR Letter CR/358.

<sup>3</sup> ITU-R Special Publication CR/C/2558 MOD-1.

<sup>4</sup> Lino Lakes Application, Exhibit A at 7.



FIGURE 1

The Commission adopted Section 25.138(e) for protection of receive earth stations in the 19.7-20.2 GHz band from adjacent satellite interference based on the pattern specified in Section 25.209(a) and (b) or the actual receiving earth station antenna performance. As shown in Exhibit F, the JRC JUE60GX Earth station does not meet the Section 25.209(a) and (b) antenna patterns at all off-axis angles. Inmarsat acknowledges the exceedances in the receive pattern and understands and agrees to accept interference by adjacent FSS satellite networks to the extent the receiving antenna performance requirements of Section 25.209 are exceeded.

### **3.2 Cobham Sailor 100 GX Earth Station**

The Cobham Sailor 100 GX Earth station is a multi-axis stabilized Earth station employing a 1.03 meter diameter antenna. Figure 2 provides a pictorial of the Cobham maritime Earth station that consists of the stabilized antenna and relevant electronics enclosed in a protective radome designed for operation on-board vessels.



FIGURE 2

For blanket licensing of transmitting Earth stations in the 29.5-30.0 GHz band, the Commission adopted off-axis EIRP spectral density levels contained in Section 25.138(a). As shown in Exhibit B, the Cobham Sailor 100 GX Earth stations will operate within these levels under clear sky conditions. Therefore, its transmissions will not cause any more interference than any other Earth stations that meet these levels.

The Commission adopted Section 25.138(e) for protection of receive earth stations in the 19.7-20.2 GHz band from adjacent satellite interference based on the pattern specified in Section 25.209(a) and (b) or the actual receiving earth station antenna performance. As shown in Exhibit B, the Cobham Sailor 100 GX Earth station does not meet the Section 25.209(a) and (b) antenna patterns at all off-axis angles. Inmarsat acknowledges the exceedances in the receive pattern and understands and agrees to accept interference by adjacent FSS satellite networks to the extent the receiving antenna performance requirements of Section 25.209 are exceeded.

Section 1.1.5 of Exhibit B provides measured cross-polarization elevation EIRP spectral density data for this terminal for 0 to 10 degrees, and the pattern meets the Commission's rule with a minimum margin of 0.9 dB. The Commission's rule Section 25.138(d)(1)(ii) requires measured cross-polarization data from -10 degrees to +10 degrees, therefore to the extent necessary, ISAT US seeks a waiver of Section 25.138(d)(1)(ii) to allow ISAT US to provide measured data only for 0 to 10 degrees. The Cobham Sailor 100 GX antenna is a symmetrical design and utilizes a feed located in the center of the reflector that results in relatively symmetrical antenna patterns around the boresight

of the antenna. This symmetry is demonstrated in the patterns provided in Exhibit B, and therefore it is expected that the cross-polarization elevation EIRP spectral density data for this terminal for -10 to 0 degree pattern will meet the Commission's rule consistent with the 0 to 10 degree pattern. Since the patterns for this earth station are relatively symmetrical and antenna measurements for the 0 to 10 degree pattern show that the Commission requirements in Section 25.138(a) will be met and thus adjacent operations will be adequately protected.

#### **4. National Security**

The Additional GX Terminals would be subject to the same national security requirements described in Section 4 of the SeaTel Application. That discussion is incorporated by reference herein.

#### **5. Government Coordination and Correction for GX Terminals**

Inmarsat has been and will continue to engage with the appropriate U.S. Government agencies and obtain the necessary coordination arrangements pursuant to applicable U.S. Table of Frequency Allocation footnotes. Specifically, Inmarsat will conduct US334 coordination with the applicable Federal users in advance of operation of the proposed Earth stations. In accordance with Section 25.130(f), the half-power beam width of the antenna downlink of the JUE-60GX antenna is 1.70 degrees at 19 GHz, and the half-power beam width of the antenna downlink of the Sailor 100 GX antenna is 1.07 at 19 GHz.

Inmarsat also amends the information provided in the SeaTel Application regarding the half-power beam width of the GX Terminals. The half-power beam width of the antenna downlink of the SeaTel 4012GX antenna is 1.11 degrees at 19 GHz, and the half-power beam width of the antenna downlink of the SeaTel GX60 antenna is 1.70 at 19 GHz.

#### **6. Conclusion**

The GX Terminals and the Additional GX Terminals will advance the Commission's goals of facilitating the expanded availability of wireless broadband service and increasing competition. ISAT US has shown that the maritime Earth stations in this amendment and in the SeaTel Application will provide appropriate interference protection for other services. Grant of ISAT US's application as amended, therefore, is in the public interest, and ISAT US urges the Commission to grant this application as soon as possible.