ISAT US Inc.
FCC Form 312
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"), as amended by IBFS File No. SES-AMD-20140715-00601, filed July 14, 2014), 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 55º W.L. orbital location,[1] 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 Intellian Technologies, Inc. ("Intellian") model GX60 – employing an antenna with a 0.65 meter diameter, and (ii) the Intellian model GX100 – employing an antenna with a 1.03 meter diameter. Intellian is a global leader 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.

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

[1] *See* Inmarsat Hawaii, Inc., Application for Authority to Operate Gateway Earth Station with I5F2 Satellite at 55º W.L., File No. SES-LIC-20120426-00397-00397, Call Sign E120072 (filed Apr. 26, 2012), as amended ("Lino Lakes Application").

associated with a space station in the FSS in the bands listed in footnote 5.526 of the ITU Radio Regulation.[2] 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.[3]

In connection with this pending application, ISAT US has requested a waiver, to the extent necessary, of the U.S. Table of Frequency Allocations and the Commission's Ka-band plan to operate the proposed earth stations regardless whether they are located on U.S.-registered vessels, or instead are located on foreign-flagged ships in U.S. territorial waters. This amendment seeks to extend the same request to the Additional GX Terminals. Inmarsat recognizes that transmissions from a foreign-flagged ship "while the same is within the jurisdiction of the United States" are required to be "in accordance with such regulations designed to prevent interference as may be promulgated under the authority of this Act."[4] Inmarsat also recognizes that the Commission previously has considered such earth station operations in other parts of the Ka band on foreign-registered maritime vessels located in U.S. territorial waters as requiring a waiver of the U.S. Table of Frequency Allocations and the Commission's Ka-band plan. Additional GX Terminals on foreign-registered maritime vessels in U.S. territorial waters will operate using the 19.7-20.2 GHz and 29.5-30.0 GHz bands within the same network, under the same operational control, under the same technical parameters and otherwise subject to the same conditions designed to ensure non-interfering operations with the FSS as the proposed terminals that would be U.S.-licensed and operated on U.S.-registered maritime vessels. As demonstrated below, the Additional GX Terminals are capable of operating at 19.7-20.2 GHz and 29.5-30.0 GHz without causing harmful interference to FSS operations in those band segments.

3. Technical compatibility with other users in the bands

Sections 3.1 and 3.2 provide analysis and an operational description of the Intellian GX60 and Intellian GX100 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^2/MHz limit set forth in Section 25.138(a)(6).[5]

The description of the additional capabilities of the Intellian GX60 and Intellian GX100 regarding the antenna control mechanisms, pointing accuracy, shut-off capabilities and Network

[2] BR Circular Letter, ITU BR Letter CR/358.
[3] ITU-R Special Publication CR/C/2558 MOD-1.
[4] 47 U.S.C. § 306.
[5] Lino Lakes Application, Exhibit A at 7.

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. In addition, a declaration from the antenna manufacturer regarding the pointing accuracy of the Intellian GX60 and Intellian GX100 terminals is included herein as Exhibit F.

3.1 Intellian GX60 Earth Station

The Intellian GX 60 Earth station is a multi-axis stabilized Earth station employing a 0.65 meter diameter antenna. A pictorial of the Intellian GX60 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 B, the Intellian GX60 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.

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 B,

the Intellian GX60 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 Intellian GX100 Earth Station

The Intellian GX 100 Earth station is a multi-axis stabilized Earth station employing a 1.03 meter diameter antenna. Figure 2 provides a pictorial of the Intellian GX100 maritime Earth station consists of the stabilized 1.03m 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 Intellian GX100 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 Intellian GX100 Earth station meets the Section 25.209(a) and (b) antenna patterns at all off-axis angles.

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 Intellian GX60 antenna is 1.70 degrees at 19 GHz, and the half-power beam width of the antenna downlink of the Intellian GX100 antenna is 1.11 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.