**Exhibit B**

**Intelsat License LLC**
**Hagerstown, Maryland**
**VERTEX/RSI 13.1 Meter Earth Station**
**Call Sign: E140121**

**Compliance with FCC Report & Order (FCC96-377) for the 13.75 - 14.0 GHz Band**
**Analysis and Calculations**

## 1. Background

This Exhibit is presented to demonstrate the extent to which the Intelsat License LLC ("Intelsat") satellite earth station in Hagerstown, Maryland is in compliance with Federal Communications Commission ("FCC") Report and Order 96-377. The potential interference from the earth station to U.S. Navy shipboard radiolocation operations ("RADAR") and the National Aeronautics and Space Administration ("NASA") space research activities in the 13.75 - 14.0 GHz Band is addressed in this exhibit. The parameters for the earth station are:

**Table 1. Earth Station Characteristics**

| | |
|---|---|
| • Coordinates (NAD83): | 39° 35' 53.1" N, 77° 45' 22.3" W |
| • Satellite Location for Earth Station: | G-23 at 121.0°W<br>IS-30 at 95.05°W<br>G3C at 95.05° W<br>IS-31 at 95.0°W<br>IS-16 at 58.1°W<br>IS-21 at 58.0°W<br>IS-11 at 43.0°W |
| • Frequency Band: | 13.75-14.0 GHz for uplink |
| • Polarizations: | Circular, Linear |
| • Emissions: | 750KF2D at 13995.5, 13997.5 MHz<br>850KF2D at 13750.5, 13753.0, 13995.0 MHz<br>1M00G9D at 13994.5, 13998.5 MHz |
| • Modulation: | FM, Digital |
| • Maximum Aggregate Uplink EIRP: | 85.0 dBW for all Carriers |
| • *Transmit Antenna Characteristics* | |
| Antenna Size: | 13.1 meter in Diameter |
| Antenna Type/Model: | Vertex/RSI |
| Gain: | 63.7 dBi at 13.875GHz |
| • RF power into Antenna Flange: | 21.3 dBW or -1.4 dBW/ 4 kHz (Maximum) |
| • Minimum Elevation Angle: | 31.89° @ 132.57° Az, Hagerstown, MD |
| • Side Lobe Antenna Gain: | 29 - 25*log(θ) |

Because the above uplink spectrum is shared with the Federal Government, coordination in this band requires resolution data pertaining to potential interference between the earth stations and both Navy Department and NASA systems. Potential interference from the earth station could impact with the Navy and/or NASA systems in two areas. These areas are noted in FCC Report and Order 96-377 dated September 1996, and consist of (1) Radiolocation and radio navigation, (2) Data Relay Satellites.

Summary of Coordination Issues:

1) Potential Impact to Government Radiolocation (Shipboard Radar)
2) Potential Impact to NASA Data Relay Satellite Systems (TDRSS)

## 2. Potential Impact to Government Radiolocation (Shipboard Radar)

RADAR) may occur anywhere in the 13.4 - 14 GHz frequency band aboard ocean going U.S. Navy ships. FCC order 96-377 allocates the top 250 MHz of this 600 MHz band to the Fixed Satellite Service ("FSS") on a co-primary basis with the radiolocation operations and provides for an interference protection level of -167 dBW/$m^2$/4 kHz.

The closest distance to the shoreline from the Hagerstown, Maryland earth station is approximately 131 km southeast toward the Atlantic Ocean. The calculation of the power spectral density at this distance is given by:

1. Clear Sky EIRP: 85.00 dBW
2. Carrier Bandwidth: 750 kHz
3. PD at antenna input: -1.4 dBW/4kHz
4. Transmit Antenna Gain: 63.7 dBi
5. Antenna Gain Horizon: FCC Reference Pattern
6. Antenna Elevation Angles: 31.89°

The earth station will radiate interference toward the ocean according to its off-axis side-lobe performance. A conservative analysis, using the FCC standard reference pattern, results in off-axis antenna gains of -10.0 dBi towards the Atlantic Ocean.

The signal density at the shoreline, through free space is:

PFD = Antenna Feed Power density (dBW/4kHz) + Antenna Off-Axis Gain (dBi) – Spread Loss (dbW-$m^2$)
= -1.4 dBW/4kHz + (-10.0) dBi – 10*log[4π*(131000m)$^2$)
= -124.8 dBW/ $m^2$/4 kHz – Additional Path Losses (~69.0 dB)
= -193.8 dBW/ m2/4 kHz

Our calculations indicate additional path loss of approximately 69.0 dB including absorption loss and earth diffraction loss for the actual path profiles from the earth station to the nearest shoreline.

The calculated PFD, including additional path losses to the closest shoreline, is -193.8 dbW/ $m^2$/4 kHz. This is 26.8 dB below the -167 dBW/ $m^2$/4 kHz interference criteria of the R&O 96-377. Therefore, there should be no interference to the US Navy RADAR from the Hagerstown earth station due to the distance and the terrain blockage between the site and the shore.

## 3. Potential Impact to NASA's Tracking and Data Relay Satellite System

The geographic location of the Intelsat License LLC earth station in Hagerstown, Maryland is outside the 390 km radius coordination contour surrounding NASA's White Sands, New Mexico ground station complex. Therefore, the TDRSS space-to-earth link will not be impacted by the Intelsat License LLC earth station in Hagerstown, Maryland.

The TDRSS space-to-space link in the 13.772 to 13.778 GHz band is assumed to be protected if an earth station produces an EIRP less than 71 dBW/6 MHz in this band. The 13.1 meter earth station antenna will not transmit in the band 13.772 to 13.778 GHz and therefore not cause harmful interference to the TDRSS space-to-space link).

## 4. Coordination Issue Result Summary and Conclusions

The results of the analysis and calculations performed in this exhibit indicate that compatible operation between the earth station at the Hagerstown, Maryland facility and the U.S. Navy and NASA TDRSS space-to-earth link are possible. These analyses have been based on the assumption of 750 kHz, 850 kHz, 1.0 MHz and 1.6 MHz bandwidth carriers. Operations in 13772.0 to 13778.0 MHz NASA systems space-to-space link band will not be permitted.

No interference to U.S. Navy RADAR operations from the Hagerstown, Maryland site earth station will occur.