Exhibit A
Intelsat License LLC
Hagerstown, Maryland
TIW 14.2 Meter Earth Station
Call Sign: KA258

Compliance with FCC Report & Order (FCC 96-377) 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 satellite earth station, which is being re-located from Clarksburg to Hagerstown, Maryland, is in compliance with FCC Report & Order 96-377. The potential interference from the earth station to U.S. Navy shipboard radiolocation operations (RADAR) and the 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' 54.0" N, 77° 45' 33.0" W
- Satellite Location for Earth Station: From 43.1° W to 58.0° W
  INTELSAT 11
  INTELSAT 1R
  INTELSAT 9 and INTELSAT 16
- Frequency Band: 13.75-14.0 GHz for uplink
- Polarizations: Circular and Linear
- Emissions: 850KF9D
- Modulation: Digital
- Maximum Aggregate Uplink EIRP: 87.0 dBW for all Carriers
- Transmit Antenna Characteristics
  - Antenna Size: 14.2 meters in Diameter
  - Antenna Type/Model: TIW
  - Gain: 65.1 dBi
- RF power into Antenna Flange: 21.9 dBW
  or -1.4 dBW/4 kHz (Maximum)

- Minimum Elevation Angles:
  Hagerstown, Md. 32.0° @ 132.7° Az. (Intelsat IS-11) at 43.1° W
  36.0° @ 140.5° Az. (Intelsat IS-1R) at 50.0° W
  39.8° @ 150.6° Az. (Intelsat IS- 9) at 58.0° W
  39.8° @ 150.6° Az. (Intelsat IS- 16) at 58.0° W

- Side Lobe Antenna Gain: 32 - 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 station 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)

Radiolocation operations (RADAR) may occur anywhere in the 13.4 - 14 GHz frequency band aboard ocean going U.S. Navy ships. The FCC Report & 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 inerference protection level of -167 dBW/m^2/4 kHz.

The closest distance to the shoreline from the Hagerstown 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: 87.00 dBW
2. Carrier Bandwidth: 850 kHz
3. PD at antenna input: -1.4 dBW/4 kHz
4. Transmit Antenna Gain: 65.1 dBi
5. Antenna Gain Horizon: FCC Reference Pattern
6. Antenna Elevation Angles: 32.0°, 36.0°, and 39.8°

The proposed earth station will radiate interference toward the ocean according to its off-axis side-lobe performance. A conservative analysis, using FCC standard reference pattern, results in off-axis antenna gains of 6.7 dBi towards the Atlantic Ocean.

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

PFD = Antenna Feed Power density (dBW/4 kHz) + Antenna Off-Axis Gain (dBi) – Spread Loss (dBw-m^2).

= -1.4 dBw/4 kHz + (6.7 dBi) – 10*log[4Π*(131000m)^2]

= -108.0 dBW/m^2/4 kHz + Additional Path Losses (~69.0 dB)

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

The calculated PFD including additional path losses to the closest shoreline location is –177.0 dBW/m^2/4 kHz. This is 10.0 dB below the –167 dBW/m2/4 kHz interference criteria of 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 Data Relay Satellite System (TDRSS)

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 14.2 meter earth station dish will have an EIRP greater than 71 dBW/6 MHz in this band. The total EIRP for all carriers is 87.0 dBW, and the equivalent EIRP per 6 MHz segment remains at 87.0 dBW/6 MHz. Therefore, there will be interference to the TDRSS space-to-space link (Table 1).

In order to meet the 71 dBW/6 MHz interference criteria, the earth station would have to be limited to an RF power density 16.0 dB lower than the maximum of -1.4 dBW/4kHz or -17.4 dBW/4kHz for an EIRP of 71.0 dBW. If this operational condition cannot be met, then the Hagerstown, Maryland earth station may not be tuned to operate at the frequencies in the 13.772 to 13.778 GHz Band.

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 facility and the U.S. Navy and NASA systems space-to-earth link are possible. These analyses have been based on the assumption of 850 kHz bandwidth carriers. Operations in NASA systems space-to-space link (13772.0 to 13778.0 MHz) will not be permitted.

Table 1

Excluded Frequency Range for Intelsat License LLC Earth Station

System	Frequency Restriction
TDRSS	13.772-13.778 GHz (see Note 1)

Note 1: In order to meet the 71 dBW/6 MHz interference criteri a, the earth station would have to be limited to a maximum total EIRP of 71.0 dBW.

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