

**Exhibit A**  
**Intelsat North America LLC**  
**Earth Station KA258**  
**Clarksburg, MD**

**Compliance with FCC Report & Order (96-377) for operations  
in the 13.75 - 14.0 GHz Band**

**1. Background**

This Exhibit is presented to demonstrate the extent to which the Intelsat North America LLC's satellite earth station at Clarksburg, MD is in compliance with FCC Report & Order 96-377. The potential interference from the earth station to US 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 provided in Table 1 below.

**Table 1. Earth Station Characteristics**

- Coordinates (NAD83): 39° 13' 06.6" N, 77° 16' 15.3" W.L.
- Satellite Location for Earth Station: Intelsat IS-25 at 31.5° W.L.
- Frequency Band: 13.75-14.5 GHz for uplink
- Polarizations: Circular / Linear Switchable
- Emissions: NON
- Modulation: No Modulation
- Maximum Uplink EIRP: 78.5 dBW for all Carriers operating in the 13.75-13.77 GHz and 13.78-14 GHz bands  
71 dBW for all Carriers operating in the 13.77-13.78 GHz band
- Transmit Antenna Characteristics
  - Antenna Size: 14.2 meter in Diameter
  - Antenna Type/Model: TIW
  - Gain: 64.7 dBi
- RF power into Antenna Flange: 13.8 dBW or 13.8 dBW/ MHz  
or 13.8 dBW/4 kHz (Maximum)
- Minimum Elevation Angle:

Clarksburg, Md.

24.8° @ 121.6° Az (Intelsat IS-25)

- Side Lobe Antenna Gain: 32 - 25\*log( $\theta$ )

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 the Navy and/or NASA systems in two areas. These areas are noted in FCC Order 96-377, 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 United States 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  $-167 \text{ dBW/m}^2/4 \text{ kHz}$ .

The closest distance to the shoreline from the Clarksburg, MD earth station is approximately 88 km southeast toward the Atlantic Ocean. The calculation of the power spectral density at this distance is provided below:

- |                             |                       |
|-----------------------------|-----------------------|
| 1. Clear Sky EIRP:          | 78.5 dBW              |
| 2. Carrier Bandwidth:       | NON                   |
| 3. PD at antenna input:     | 13.8 dBW/4 kHz        |
| 4. Transmit Antenna Gain:   | 64.7 dBi              |
| 5. Antenna Gain Horizon:    | FCC Reference Pattern |
| 6. Antenna Elevation Angle: | 24.8°                 |

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 -2.9 dBi towards the Atlantic Ocean.

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

$$\begin{aligned} \text{PFD} &= \text{Antenna Feed Power density (dBW/4 kHz)} + \text{Antenna Off-Axis Gain (dBi)} - \text{Spread Loss} \\ & \text{(dBW-m}^2\text{)} \\ &= 13.8 \text{ dBW/4 kHz} + (-2.9 \text{ dBi}) - 10 * \log[4\pi * (88000\text{m})^2] \\ &= -99 \text{ dBW/m}^2/4 \text{ kHz} + \text{Additional Path Losses (~68.0 dB)} \end{aligned}$$

Our calculations show additional path loss of approximately 68.0 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  $-167$  dBW/m<sup>2</sup>/4 kHz. This complies with the  $-167$  dBW/m<sup>2</sup>/4 kHz interference criteria of R&O 96-377. Therefore, there should be no interference to the US Navy RADAR from the Clarksburg, MD 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 Clarksburg, MD earth station is outside the 390 km radius coordination contour surrounding NASA's White Sands, NM ground station complex. Therefore, the TDRSS space-to-earth link will not be impacted by Clarksburg, MD earth station.

The TDRSS space-to-space link in the 13.77 to 13.78 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.

In order to meet the 71 dBW/6 MHz interference criteria, the earth station the Clarksburg, MD earth station will radiate an EIRP of 71 dBW or less in the 13.77 to 13.78 GHz Band.

### **4. 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 Clarksburg, MD facility and the US Navy and NASA systems space-to-earth link will occur.

Operations in frequencies used for NASA systems space-to-space link (13772.0 to 13778.0 MHz) will occur at a lower EIRP value of 71 dBW. As such there will be no interference to NASA TDRSS systems. Similarly, there will be no interference to US Navy RADAR operations from the Clarksburg, MD earth station.