

## Exhibit C

**PanAmSat Licensee Corp.  
Ellenwood, Georgia  
Vertex 7.2 Meter Earth Station  
Call Sign: E940532**

### **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 PanAmSat Licensee Corp. ("PanAmSat") satellite earth station in Ellenwood, Georgia 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): 33° 39' 50.4" N, 84° 16' 18.7" W
- Satellite Location for Earth Station: Intelsat IS-11 at 43.0° W
- Frequency Band: 13.75-14.0 GHz for uplink
- Polarizations: Linear and Circular
- Emissions: 750KF2D
- Modulation: Digital
- Maximum Aggregate Uplink EIRP: 78.6 dBW for all Carriers
- Transmit Antenna Characteristics
  - Antenna Size: 7.2 meters in Diameter
  - Antenna Type/Model: Vertex
  - Gain: 58.4 dBi
- RF power into Antenna Flange: 20.2 dBW / 750 kHz  
or -2.5 dBW/4 kHz (Maximum)
- Minimum Elevation Angle:  
Ellenwood, Ga. 31.3° @ 122.3° Az. (Intelsat IS-11)

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

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 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 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 United States Navy ships. The FCC's 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 interference protection level of  $-167 \text{ dBW/m}^2/4 \text{ kHz}$ .

The closest distance to the shoreline from the E940532 earth station is approximately 369 km Southeast toward the Atlantic Ocean. The calculation of the power spectral density at this distance is given by:

1. Clear Sky EIRP: 78.60 dBW
2. Carrier Bandwidth: 750 kHz
3. PD at antenna input:  $-2.5 \text{ dBW}/4 \text{ kHz}$
4. Transmit Antenna Gain: 58.4 dBi
5. Antenna Gain Horizon: FCC Reference Pattern
6. Antenna Elevation Angle:  $31.3^\circ$  Toward Intelsat IS-11 ( $122.3^\circ$  Az.)

The existing 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  $-5.0 \text{ dBi}$  towards the Atlantic Ocean.

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

$$\begin{aligned} \text{PFD} &= \text{Antenna Feed Power density (dBW/4 kHz)} + \text{Antenna Off-Axis Gain (dBi)} - \text{Spread Loss (dBw-m}^2\text{)} \\ &= -2.5 \text{ dBw}/4 \text{ kHz} + (-5.0 \text{ dBi}) - 10 \cdot \log[4\pi \cdot (369000\text{m})^2] \end{aligned}$$

$$= -129.8 \text{ dBW/m}^2/4 \text{ kHz} + \text{Additional Path Losses } (\sim 87.0 \text{ dB})$$

Our calculations show additional path loss of approximately 87.0 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  $-216.8 \text{ dBW/m}^2/4 \text{ kHz}$ . This is 49.8 dB below the  $-167 \text{ dBW/m}^2/4 \text{ kHz}$  interference criteria of Report & Order 96-377. Therefore, there should be no interference to the U.S. Navy radar from the Ellenwood 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 PanAmSat earth station in Ellenwood, Georgia 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 PanAmSat earth station in Ellenwood, Georgia.

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. In order to avoid interference into the TDRSS space-to-space operations, the earth station will not transmit in the 13.72-13.78 GHz frequencies.

Therefore, there will be no interference to any TDRSS operations within the frequency range from 13.72-13.78 GHz.

### **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 Ellenwood facility and the U.S. Navy and NASA systems space-to-earth link are possible. These analyses have been based on the assumption of 750 kHz bandwidth carriers.

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