

**Exhibit For  
Intelsat License LLC  
Castle Rock, Colorado  
NEC 12.5 Meter Earth Station  
Call Sign: KL92**

**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 satellite earth station in Castle Rock, Colorado 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:

**Table 1. Earth Station Characteristics**

- Coordinates (NAD83): 39° 16' 38.0" N, 104° 48' 25.0" W
- Satellite Location for Earth Station: From 33.0° W to 177.0° W  
AMOS-4 Satellite
- Frequency Band: 13.75-14.5 GHz for uplink
- Polarizations: Linear and Circular
- Emissions: 816KF2D
- Modulation: Digital
- Maximum Aggregate Uplink EIRP: 92.0 dBW for all Carriers
- Transmit Antenna Characteristics
  - Antenna Size: 12.5 meter in Diameter
  - Antenna Type/Model: NEC
  - Gain: 64.0 dBi
- RF power into Antenna Flange: 28.0 dBW  
or 4.9 dBW/4 kHz (Maximum)
- Minimum Elevation Angle: 5.3° @ 101.8° Az. at 33.0 W  
Castle Rock, Co. 5.0° @ 258.5° Az. at 177.0 W.

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

Because the above uplink spectrum is shared with the Federal Government, coordination in this band require 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)**

Radiolocation operations (RADAR) may occur anywhere in the 13.4 - 14 GHz frequency band aboard ocean going United States Navy ships. The Federal Communication Commission (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 Castle Rock earth station is approximately 1350 km Southwest toward the Pacific Ocean.

Therefore, there should be no interference to the US Navy RADAR from the Castle Rock Colorado due to distance and 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 Castle Rock, Colorado 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 Castle Rock, Colorado.

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 12.5 meter earth station antenna will have an EIRP greater than 71 dBW/6 MHz in this band. The total EIRP for all carriers is 92.0 dBW, and the equivalent EIRP per 6 MHz segment remains at 92.0 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 21.1 dB lower than the maximum of 4.9 dBW/4kHz or -16.2 dBW/4kHz or an EIRP of 70.9 dBW. If this operational condition cannot be met, then the Castle Rock, Colorado earth station may not be tuned to operate at the frequencies in the 13.770 to 13.780 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 Castle Rock facility and the US Navy and NASA systems space-to-earth link are possible. These analyses have been based on the assumption of 816 kHz bandwidth carriers. Operations in NASA systems space-to-space link (13770.0 to 13780.0 MHz) will not be permitted.

**Table 1**

##### **Excluded Frequency Range for Intelsat License LLC Earth Station**

<b>System</b>	<b>Frequency Restriction</b>
TDRSS	13.770-13.780 GHz (see Note 1)

**Note 1:** In order to meet the less than 71 dBW/6 MHz interference criteria, the earth station would have to be limited to a maximum total EIRP of 70.9 dBW.

No interference to US Navy RADAR operations from the Castle Rock, Colorado site earth station will occur.