

**Exhibit For
Globecomm Systems, Inc
Laurel, Maryland
Andrew Corporation 5.6 Meter Earth Station
Call Sign: E020288**

**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 North America, LLC satellite earth station in Laurel, Maryland 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° 06' 47.0" N, 76° 49' 53.0" W
- Satellite Location for Earth Station: Telstar 11N (37.5° W)
- Frequency Band: 13.75-14.0 GHz for uplink
- Polarizations: Linear
- Emissions: 578KG7D, 615KG2D, 3M00G2D, and 36M0G7W
- Modulation: Digital
- Maximum Aggregate Uplink EIRP: 60.2 dBW for the 578 kHz Carriers
60.5 dBW for the 615 kHz Carriers
67.4 dBW for the 3 MHz Carriers
78.1 dBW for the 36 MHz Carriers
- Transmit Antenna Characteristics
 - Antenna Size: 5.6 meters in Diameter
 - Antenna Type/Model: Andrew Corporation
 - Gain: 57.1 dBi
- RF power into Antenna Flange: 578 kHz
3.1 dBW
or -18.5 dBW/4 kHz (Maximum)

- RF power into Antenna Flange (Continued)
 - 615 kHz
 - 3.4 dBW
 - or -18.5 dBW/4 kHz (Maximum)

 - 3 MHz
 - 10.3 dBW or 4.8 dBW/ MHz
 - or -18.5 dBW/4 kHz (Maximum)

 - 36 MHz
 - 21.0 dBW or 5.5 dBW/ MHz
 - or -18.5 dBW/4 kHz (Maximum)

- Minimum Elevation Angles: Laurel, Md.
 - 29.3° @ 127.6° Az. (Telstar 11N) at 37.5° 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 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 dBW/m²/4 kHz.

The closest distance to the shoreline from the Laurel earth station is approximately 35.59 km Southeast toward the Chesapeake Bay. The calculation of the power spectral density at this distance is given by:

	<u>578 kHz</u>	<u>615 kHz</u>	<u>3 MHz</u>	<u>36.0 MHz</u>
1. Clear Sky EIRP:	60.2 dBW	60.5 dBW	67.4 dBW	78.1 dBW
2. Carrier Bandwidth:	578 kHz	615 kHz	3.0 MHz	36.0 MHz
3. PD at antenna input:		-18.5 dBW/4 kHz		
4. Transmit Antenna Gain:		57.1 dBi		
5. Antenna Gain Horizon:		FCC Reference Pattern		
6. Antenna Elevation Angles:		29.3°		

The proposed earth station will radiate interference toward the Bay according to its off-axis side-lobe performance. A conservative analysis, using FCC standard reference pattern, results in off-axis antenna gains of -4.5 dBi toward the Chesapeake Bay.

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

PF_D = Antenna Feed Power density (dBW/4 kHz) + Antenna Off-Axis Gain (dBi) – Spread Loss (dBw-m²).

$$= -18.5 \text{ dBw/4 kHz} + (-4.5 \text{ dBi}) - 10 \cdot \log[4\pi \cdot (35590\text{m})^2]$$

$$= -125.0 \text{ dBW/m}^2/4 \text{ kHz} + \text{Additional Path Losses } (\sim 42.2 \text{ dB})$$

Our calculations show additional path loss of approximately 42.2 dB including absorption loss and earth diffraction loss for the actual path profiles from the proposed earth station to the nearest shoreline.

The calculated PF_D including additional path losses to the closest shoreline location is -167.2 dBW/m²/4 kHz. This is 0.2 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 Laurel 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 North America earth station in Laurel, 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 North America earth station in Laurel, 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 5.6 meter earth station dish will have an EIRP less than 71 dBW/6 MHz for all of the 578 and 615 kHz carriers as well as the 3 and 36 MHz carriers in this band. The total EIRP for the 578 kHz, 615 kHz, and 3 MHz carriers are 60.2, 60.5, and 67.4 dBW respectively. Their equivalent EIRP per 6 MHz segment will remain at 60.2, 60.5, and 67.4 dBW/6 MHz. For 36 MHz carriers, the total EIRP of 78.1 dBW, equates to an EIRP per 6 MHz of 70.3 dBW/6 MHz, which is also below the 71.0 dBW/6 MHz threshold. Therefore, there should not be interference to the TDRSS space-to-space link (Table 1).

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 Laurel facility and the US Navy and NASA systems space-to-earth link are possible. These analyses have been based on the assumption of 578 kHz, 615 kHz, 3 MHz, and 36 MHz bandwidth carriers. Operations in NASA systems space-to-space link (13772.0 to 13778.0 MHz) will also be permitted.

No interference to US Navy RADAR operations from the Laurel, Maryland earth station will occur.