

**Exhibit For  
NBC Telemundo License, LLC  
Washington, DC  
Andrew Corporation 5.6 Meter Earth Station**

**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 NBC Telemundo License, LLC satellite earth station, which is being coordinated in Washington, DC, 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): 38° 56' 27.2" N, 77° 04' 54.7" W
- Satellite Location for Earth Station: From 15.0° W to 139.0° W  
Telstar-12 (15.0° W)
- Frequency Band: 13.75-14.0 GHz for uplink
- Polarizations: Linear
- Emissions: 500KG7D  
36M0G7D
- Modulation: Digital
- Maximum Aggregate Uplink EIRP: 64.0 dBW for the 500 kHz Carriers  
82.5 dBW for the 36 MHz Carriers
- Transmit Antenna Characteristics
  - Antenna Size: 5.6 meters in Diameter
  - Antenna Type/Model: Andrew Corporation
  - Gain: 57.0 dBi
- RF power into Antenna Flange: 500 kHz  
7.0 dBW  
or -14.0 dBW/4 kHz (Maximum)



The proposed earth station will radiate interference toward the Chesapeake Bay 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 Chesapeake Bay.

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

500 kHz Carriers

PF<sub>D</sub> = Antenna Feed Power density (dBW/4 kHz) + Antenna Off-Axis Gain (dBi) – Spread Loss (dBw-m<sup>2</sup>).

$$\begin{aligned} &= -14.0 \text{ dBw/4 kHz} + (-2.9) \text{ dBi} - 10*\log[4\pi*(149000\text{m})^2] \\ &= -122.8 \text{ dBW/m}^2/4 \text{ kHz} + \text{Additional Path Losses } (\sim 59.3 \text{ dB}) \\ &= -182.1 \text{ dBW/m}^2/4 \text{ kHz} \end{aligned}$$

36 MHz Carriers

PF<sub>D</sub> = Antenna Feed Power density (dBW/4 kHz) + Antenna Off-Axis Gain (dBi) – Spread Loss (dBw-m<sup>2</sup>).

$$\begin{aligned} &= -14.0 \text{ dBw/4 kHz} + (-2.9) \text{ dBi} - 10*\log[4\pi*(149000\text{m})^2] \\ &= -122.8 \text{ dBW/m}^2/4 \text{ kHz} + \text{Additional Path Losses } (\sim 59.3 \text{ dB}) \\ &= -182.1 \text{ dBW/m}^2/4 \text{ kHz} \end{aligned}$$

Our calculations show additional path loss of approximately 59.3 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<sub>D</sub> including additional path losses to the closest shoreline location is –182.1 dBW/m<sup>2</sup>/4 kHz for both the 500 kHz carriers and the 36 MHz carriers. This is 15.1 dB below the –167 dBW/m<sup>2</sup>/4 kHz interference criteria of R&O 96-377 for both sets of carriers. Therefore, there should be no interference to the US Navy RADAR from the Washington 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 NBC Telemundo License, LLC earth station in Washington, DC 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 NBC Telemundo License, LLC earth station in Washington, DC.

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 antenna will have an EIRP less than 71 dBW/6 MHz for the 500 kHz carriers in this band. The total EIRP for the 500 kHz carriers is 64.0 dBW. The equivalent EIRP per 6 MHz segment will remain at 64.0 dBW/6 MHz. Therefore, there should not be interference to the TDRSS space-to-space link for the 500 kHz carriers. For the 36 MHz carriers, the total EIRP of 82.5 dBW, will equate to an EIRP per 6 MHz of 76.5 dBW/6 MHz. Since this level will be above the 71.0 dBW/6 MHz threshold, there will be interference to the TDRSS space-to-space link from the 36 MHz carriers.

In order for the 36 MHz carriers to meet the less than 71 dBW/6 MHz interference criteria, the earth station would have to be limited to an RF power density 5.6 dB lower than the maximum of -14.0 dBW/4kHz or -19.6 dBW/4kHz for an EIRP of 76.9 dBW. If this operational condition cannot be met, then the Washington, DC earth station may not be tuned to operate their 36 MHz carriers on 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 operations between the earth station at the Washington facility and the US Navy and NASA systems space-to-earth link and NASA systems space-to-space link (13772.0 to 13778.0 MHz) will be permitted for the 500 kHz carriers.

For the 36 MHz carriers, the results of the analysis and calculations performed in this exhibit indicate that compatible operation between the earth station at the Washington facility and the US Navy and NASA systems space-to-earth link are possible. However, operations in NASA systems space-to-space link (13772.0 to 13778.0 MHz) will be not be permitted. Frequencies from 13770 to 13780 MHz will need to be avoided for the 36 MHz carriers.