

ENGINEERING STATEMENT  
RADIO FREQUENCY EXPOSURE EVALUATION  
TEMPORARY FIXED EARTH STATION

This Engineering Statement was prepared on behalf of WDBJ Television, Inc., in support of an evaluation of the radio frequency (RF) environment in the vicinity of the antenna of a temporary fixed earth station to be employed for satellite news gathering (SNG). This statement details compliance with Section 1.1307(b) of the FCC Rules concerning human exposure RF energy. This statement also details the RF safety work rules for the safe operation of the proposed SNG facility.

Background

The proposed facility is will transmit in the Ku Band with a maximum EIRP of 73.7 dBW. The facility employs an SATCOM Technologies model 240KV 2.4-meter aperture antenna, which is mounted on the rear roof of a large SNG vehicle. When operational, the antenna center of radiation is located 4.6 m above ground. The vehicle itself is 3 m in height above ground.

Calculated RF Exposure Levels

Calculations of RF exposure were conducted pursuant to the FCC's OET Bulletin No. 65, *Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields*. Personnel in proximity of the transmitting antenna will be located inside the vehicle or around the outside of the vehicle at ground level. Work rules, further detailed below, prohibit personnel to be on or near the roof of the vehicle when the antenna is operational.

All areas near the antenna, inside the vehicle, or about the vehicle at ground level, are within the near field region of the antenna. Using Equation 13 of OET Bulletin 65, the maximum near field, on-axis, power density level in the main beam of the antenna is calculated as follows:

$$S_{nf} = \frac{16\eta P}{\pi D^2}$$

where,

$\eta$ = aperture efficiency	= 0.60
P = power fed to antenna	= 300,000 mW
D = diameter of antenna	= 240 cm

and, therefore,

$$S_{nf} = 15.9 \text{ mW/cm}^2.$$

At one antenna diameter distance (2.4 m) off-axis from the antenna main beam, the power density level would be at least a factor of 20 dB less than the equivalent value calculated in the main beam.\* This gives an RF energy level of less than 0.2 mW/cm<sup>2</sup> at 2 m above ground around the vehicle. Furthermore, RF energy levels at locations within the vehicle will be well attenuated below this level by the metallic skin of the vehicle. While electromagnetic wave diffraction will occur off the edges of the vehicle the diffraction levels will be attenuated significantly below the incident RF levels.

---

\* See ¶2 on Page 31 of OET Bulletin No. 65.

The FCC maximum permissible exposure (MPE) levels for the 14,000-14,500 MHz (Ku Band) are 5 mW/cm<sup>2</sup> for occupational/controlled environments and 1 mW/cm<sup>2</sup> for general population/uncontrolled exposure. Thus, RF energy levels within and about the SNG vehicle at ground level will be well below the FCC MPE for general population / uncontrolled environments. Therefore, the proposed facility meets the requirements of Section 1.1307(b) concerning human exposure to RF energy.

Work Rules for Control of RF Exposure

All personnel must adhere to the following work rules for compliance with the FCC guidelines for human exposure RF energy during the operation of the SNG vehicle.

1. No personnel shall be on the roof of the SNG vehicle during the operation of the transmitting antenna.
2. All personnel shall remain inside the SNG vehicle or at ground level around the vehicle during the operation of the transmitting antenna.
3. No human beings shall be located within a forward distance of 1,400 feet (430 m) on the axis of the main beam of the transmitting antenna during its operation.



Louis Robert du Treil, Jr., P.E.

du Treil, Lundin & Rackley, Inc.  
201 Fletcher Ave.  
Sarasota, Florida 34237  
(941)329-6000

February 22, 2005