RADIATION HAZARD EVALUATION

EXHIBIT A

For 2.4 Meter Earth Station

This Radiation Hazard Evaluation is based upon information provided by the satellite transmit antenna and modulator manufacturers and is calculated I.A.W. FCC OET Bulletin 65, Section 2 (Aperture Antennas).

Formulas used in calculating the power density for each "Region" of concern are from Section 2 of the OET Bulletin.

The proposed facility is within the required ANSI Maximum Power Density Limits for such installation.

REGION **OET FORMULA FROM THIS SECTION USED**

Antenna Surface *(11)* $S_{surface} = 4P/A$ **24/20.43 = 1.17**

Surface power density is 1.17

P = power fed to antenna (6 watts)

A = physical area of the aperture antenna (2.4m)

Near-Field Region *(12)* $R_{nf} = D^2/4\lambda$ **5.76/.0844 = 68.246m**

Extent of Near-Field is $\leq$ 68.246

(13) $S_{nf} = 16\eta P/\pi D^2$ **96/18.09 = 5.31**

(using 100% aperture efficiency for Worst-Case scenario)

Near-Field power density = 5.31

R_{nf} = extent of near field

S_{nf} = maximum near-field power density

D = maximum dimension of antenna (2.4m)

λ = wavelength (at 14.25GHz = .0211m)

P = power fed to the antenna (6 watts)

η = aperture efficiency (actual for this antenna 0.6)

Transition Region *(16)* $R_{ff} = 0.6\ D^2/\lambda$ **3.456/.0211 = 163.79m**

Any point of interest which falls between R_{nf} and R_{ff} is located within the Transition Region

The Transition Region is $\geq$ 68.246 and $\leq$ 163.79.

To determine the power density of any location within the Transition Region, use of the following formula should be used.

$$(17)\ S_t = S_{nf}\ R_{nf}/R$$

R_{ff} = distance to beginning of far-field

D = antenna diameter (2.4m)

λ = wavelength (at 14.25GHz = .0211m)

St = power density in the transition region

S_{nf} = maximum power density for near-field (formula 13)

R_{nf} = extent of near-field (formula 12)

R = distance to point of interest

Far-Field Region

$$(18)\ S_{ff} = PG/4\pi R^2$$

(using the beginning of the R_{ff} (163.79))

$$6x49.2/4x3.14x163.79^2 \text{ or } 295.2/336,949.18 = 0.00088$$

S_{ff} = power density (on axis)

P = power fed to antenna (6 watts)

G = power gain of antenna in direction of interest (49.2)

R = distance to the point of interest