EXHIBIT NO. 1

RADIATION HAZARD ANALYSIS

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RADIATION HAZARD ANALYSIS

2.4 Meter Off Set Feed Earth Station Antenna

In compliance with FCC Rules §1.1307 this study predicts radiation levels around the proposed earth station. This report is developed in compliance with OST Bulletin No. 65 "Evaluating Compliance with FCC-Specified Guidelines for Human Exposure to Radiofrequency Radiation" October 1985. This specifies a maximum level of non-ionizing radiation to which employees may be exposed as a power density of 5-milliwatts-per-square centimeter (5 mW/cm^2) averaged over any 6-minute period, as derived from Standard C95.1 of the American National Standards Institute (ANSI). Following are calculations which provide the radiation levels of the proposed earth station antenna system.

Far-Field Region

Free-space power density is maximum on-axis and may be calculated from equation (1).

$$PFD_{ff} = \frac{GP_t}{4\pi R^2} \quad (1)$$

where PFD_{ff} = the power flux density on-axis in the far field,

G = the On-axis gain of the antenna which for a 2.44 meter antenna at 14.250 GHz will be 50.1 dBi,

P_t = the maximum transmitted power which will be 75 watts (18.8 dBW),

and R = the distance to the far field region and is found from equation (2).

$$R = \frac{0.6D^2}{\lambda} \qquad (2)$$

Where D = antenna diameter = 2.44 meters,

and λ = wavelength at 14.250 GHz = 21.0×10^{-3} meters.

From equation (2) it is found that the distance to the far field is 170 meters.

And, PFD_{ff} is found from equation (1) as follows:

$$PFD_{ff} = 2.12 \text{ mW/cm}^2$$

Near-Field Region

The geometrical limits of the radiated power in the near field approximate a cylindrical volume with a diameter equal to that of the antenna. In the near field, the power density is neither uniform nor does its value vary uniformly with distance from the antenna. For the purpose of considering radiation hazard, therefore, it is assumed that the on-axis flux density is at its maximum value throughout the length of this region. The length of this region, i.e., the distance from the antenna to the end of the near field, is given by the following:

$$L_{nf} = \frac{D^2}{4\lambda} \qquad (3)$$

where L_{nf} = length to end of the near field,

Substituting,

$$L_{nf} = \frac{(2.44)^2}{4 * 0.021} = 71 \text{ meters}$$

the maximum power flux density in the near field PFD_{nf} is given by:

$$PFD_{nf} = \frac{16P_e n}{\pi D^2} \qquad (4)$$

where n = Antenna Efficiency

where P_t is the maximum power transmitted by the antenna (75 Watts). From equation (4), we see that

$$PFD_{nf} = \frac{16*.77*75}{\pi D^2}$$

$$= 4.95\ mW/cm^2$$

Transition Region Calculations

The transition region is located between the near and far field regions. As stated above, the power density begins to decrease with distance in the transition region. While the power density decreases inversely with distance in the transition region, the power density decreases inversely with the square of the distance in the far field region. The maximum power density in the transition region will not exceed that calculated for the near field region. The power density in the near field region, as shown above, will not exceed 4.95 mW/cm².

Region Between Feed Flange and Reflector

Transmissions from the feed horn are directed toward the reflector surface, and are confined within a conical shape defined by the feed. The energy between the feed and reflector surface can be calculated by determining the power density at the feed flange. This can be accomplished as follows:

$$\text{Power Density at Feed Flange, (Wf)} = \frac{2(P)}{Fa}$$

Where Fa = Area of Feed Window

$$= \frac{\pi * D_f^2}{4}$$

Df	=	7 cm
Fa	=	38.5 cm^2
Wf	=	3,898 mW/cm^2

Main Reflector Region

The power density in the main reflector region is determined in the same manner as the power density at the feed flange, above, but the area is now the area of the reflector aperture:

Power Density at Reflector Surface, (Ws) = $\frac{2(P)}{Sa}$

Where Sa = Surface Area of Reflector = 4.68 m^2

Ws = 3.21 mW/cm^2

Region between Reflector and Ground

Assuming uniform illumination of the reflector surface, the power density between the antenna and ground can be calculated as follows:

Power Density between Reflector and Ground, (Wg) = $\frac{P}{Sa}$

Wg = 1.60 mW/cm^2

Summary of Expected Radiation Levels

Region	Calculated Maximum Radiation Level (mW/cm^2)	Hazard Assessment
1. Far Field, (Rf) = 170 m	2.12	SATISFIES ANSI
2. Near Field, (Rn) = 71 m	4.95	SATISFIES ANSI
3. Transition Region, (Rt) Rn <Rt < Rf	4.95	SATISFIES ANSI
4. Between Reflector and feed	3,898	POTENTIAL HAZARD
5. Reflector Surface	3.21	SATISFIES ANSI
6. Between Antenna and Ground	1.60	SATISFIES ANSI

Conclusions

Based on the above analysis it is concluded that harmful levels of radiation will not exist in regions normally occupied by the public or the earth station's operating personnel. The transmitter will be turned off during antenna maintenance so that the ANSI Standard of 5 mW/cm^2 will be complied with for those regions with close proximity to the reflector that exceed acceptable levels.

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