Analysis of Non-ionizing Radiation
Sat-Lite Technologies 1.8 Meter Antenna

This report analyzes the non-ioninizing radiation levels for an earth station using the Sat-Lite Technologies antenna shown above. The equations used in these calculations are presented in the Office of Science and Technology Bulletin No. 65, Oct. 1985. The purpose of this analysis is to determine the power flux densities in the far field, near field, transition region, the main reflector surface, and between the antenna edges and ground. Per FCC R&O 96-326, the maximum level of non-ionizing radiation is limited to a power density of 5 milliwatts per square centimeter over any 6 minute time interval in a controlled environment. The maximum level of non-ionizing radiation is limited to a power density of 1 milliwatt per square centimeter over any 30 minute time interval in an un-controlled environment.

Antenna Diameter	**180**	cm
Frequency	**14.125**	GHz
Transmit Power at Flange	**400**	Watts
Antenna Gain (approximate)	**47.1**	dBi
Antenna Aperture Area	25447	cm^2
Wavelength	2.12	cm
Antenna Aperture Efficiency	0.72	

Far Field Calculations

Distance to the beginning of far field	9159	cm
On axis power density in the far field	19.46	mW/cm^2

Near Field Calculations

Distance to the end of near field	3816	cm
Near Field Power Density	45.43	mW/cm^2

Transition Region Calculation

The transition region is located between the near and far field regions. As stated previously, 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.

Main Reflector Region

Transmissions from the feed horn are directed toward the reflector surface. The energy density can be calculated by determining the power density at the reflector surface.

Power density at the main reflector edge	**31.44**	mW/cm^2

Region between Main Reflector and Ground

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

Power density between Reflector and Ground	**15.72**	mW/cm^2