RF RADIATION HAZARD ANALYSIS
Exhibit #1

Antenna Dia. (D)=2.4 Meters 7.874 Feet
Antenna Surface Area (SA)=4.523893 sq meters
Subreflector Dia. (DS)=51.435 cm 20.25 inches
Subreflector Surface Area (AS)=2077.817 sq cm
KU Wavelength at 14.250 GHz (LAMBDA)=.0211 meters
Power at output of HPA flange=25.441 dB
Path Loss to OMT (IL)=.6 dB
Power at OMT Flange (P)=304.837 watts
Antenna Gain at 14.250 GHz (G)=49.4 dBi
Antenna Gain given in Power Ratio (GES)=.87096E+05
Antenna Aperture Efficiency (N)=.679

Region	Radiation Level	Hazard Assessment
Far Field (RF) 163.79 m 537.368 ft	7.875 mW/cm sq	Potential Hazard
Near Field (WF) 68.24m 223.917 ft	18.301 mW/cm sq	Potential Hazard
Transition Region (RT)	equal to or less than	Potential Hazard
Ru<Rt<Rf	18.301 mW/cm sq	Potential Hazard
Between Main Reflector and Subreflector (WS)	293.421 mW/cm sq	Potential Hazard
Main Reflector Region (WM)	13.477 mW/cm sq	Potential Hazard
Power Density Between Reflector and Ground	6.738 mW/cm sq	Potential Hazard
Power Density 2.4 meters off axis from center of beam	2.808 mW/cm sq	No Hazard

Conclusion: Based on the above analysis, harmful areas of Radiation do exist in areas around the antenna and in the path of the antenna toward the satellite that it is pointed at, but safe when 2.4 meters off axis from the antenna look angle. The Area occupied by the general public will not exceed the ANSI limit of 5 mW cm sq. because the antenna is mounted on top of the truck, which is at least 9 feet above the ground, and safety increases with look angles used by the Satellites in the United States on Dom. Sat. arch. The SNG will be marked with the standard radiation hazard warnings, and on the antenna itself. The warning signs will warn personnel to avoid the area around and in front of the reflector when the transmitter is operating. To ensure compliance with safety limits, the earth station transmitter will be turned off and marked to remain off whenever maintenance and repair personnel are required to work in the areas of potential hazard as defined in the above study. Additionally the earth station personnel will be trained to insure that the antenna path is clear at all times while the transmitter is in operation. The only access to the roof of the truck, is a stored ladder which will only be used when the transmitter is off and not accessible by the general public.

Note: See Exhibit #2 for how the above calculations were made.

Analysis of Non-Ionizing Radiation Exhibit

Antenna Diameter, (D)=................................ $D = 2.4$ meters $D \cdot 3.281 = 7.874$ Feet

Antenna Surface Area, (Sa)= .... $Sa = \pi \cdot \frac{D \cdot D}{4}$ $Sa = 4.524$ sq meters

Subreflector Diameter, (Ds)=......................... $Ds = 51.435$ cm $Ds \cdot .3937 = 20.25$ Inch's

Area of Subreflector, (As)=........................... $As = \pi \cdot \frac{Ds \cdot Ds}{4}$ $As = 2.078 \cdot 10^{3}$ sq cm

Center Frequency, (Cf)=............................... $CF = 14.250$ GHz
Wavelenght at (Cf), (Lambda)=...................... $Lambda = .0211$ meters
C-Band=.049 Ku-Band=.0211

Transmit Power at HPA or VPC Flange, (P1)=.. $P1 = 350$ watts $P2 = \log(P1) \cdot 10$ $P2 = 25.441$ dB
Path Loss from HPA or VPC to OMT, (Loss)=.. $Loss = .6$ dB

Power at OMT, (P)=.................................... $P3 = P2 - Loss$ $P3 = 24.841$ OMT Pwr in dB

$P = 10^{\frac{P3}{10}}$ $P = 304.837$ OMT Pwr in watts

Antenna Gain at (Cf), (Gain)=......................... $Gain = 49.4$ dBi

Antenna Gain Converted to Power Ratio, (Ges). $Ges = 10^{\frac{Gain}{10}}$ $Ges = 8.71 \cdot 10^{4}$ Ratio

Antenna Aperture Efficiency, (n)=.................... $n = .679$

Far Field (Rf)= $Rf = \frac{.60 \cdot (D \cdot D)}{Lambda}$ $Rf = 163.791$ meters $Rf \cdot 3.281 = 537.4$ Feet

Far Field Pwr Density (Wf)= $Wf = \frac{Ges \cdot P}{4 \cdot \pi \cdot (Rf \cdot Rf)} \cdot .1$ $Wf = 7.875$ mw sq cm

Near Field (Rn)= $Rn = \frac{D \cdot D}{4 \cdot Lambda}$ $Rn = 68.246$ meters $Rn \cdot 3.281 = 223.917$ Feet

Near Field Pwr Density (Wn)= $Wn = \frac{16 \cdot n \cdot P}{\pi \cdot (D \cdot D)} \cdot .1$ $Wn = 18.301$ mw sq cm

Transition Region (Rt)= $Rt = Wn \cdot 1$ $Rt = 18.301$ mw sq cm (Equal to or less then)

Pwr Density at Sub Reflector (Ws)= $Ws = \frac{2 \cdot P}{As} \cdot 1000$ $Ws = 293.421$ mw sq cm

Main Reflector Region Pwr Density (Wm)= $Wm = \frac{2 \cdot P}{Sa} \cdot .1$ $Wm = 13.477$ mw sq cm

Pwr Density between main reflector and ground (Wg)= $Wg = \frac{P}{Sa} \cdot .1$ $Wg = 6.738$ mw sq cm

Pwr Density between reflector edge and ground (Wl)= $Wl = \frac{Wg}{D}$ $Wl = 2.808$ mw sq cm