<u>RF RADIATION HAZARD ANALYSIS</u>
<u>Exhibit #B</u>

Antenna Dia. (D)=2.4 Meters 7.874 Feet
Antenna Surface Area (SA)=4.524 sq meters
Subreflector Dia. (DS)=N/A (prime focus offset)
Subreflector Surface Area (AS)=N/A
KU Wavelength at 14.250 GHz (LAMBDA)=.0211 meters
Power at output of HPA flange=13.979 dB
Path Loss to OMT (IL)= .5 dB
Power at OMT Flange (P)=22.281 watts
Antenna Gain at 14.250 GHz (G)=47.6 dBi (2 port antenna gain)
Antenna Gain given in Power Ratio (GES)=5.754E+04
Antenna Aperture Efficiency (N)=.6484

Region	Radiation Level	Hazard Assessment
Far Field (Rf) 163.791 m 537.4 ft	0.38 mW/cm sq	Meets ANSI Requirements
Near Field (Wf) 68.246m 233.917 ft	1.277 mW/cm sq	Potential Hazard
Transition Region (Rt) Ru<Rt<Rf	equal to or less than 1.277 mW/cm sq	Potential Hazard
Between Main Reflector and Subreflector (Ws)	N/A (no subreflector)	
Main Reflector Region (Wm)	0.985 mW/cm sq	Meets ANSI Requirements
Power Density Between Reflector and Ground	0.493 mW/cm sq	Meets ANSI Requirements
Far Field Off Axis (WF)	0.004 mW/cm sq	Meets ANSI Requirements
Near Field Off Axis (WN)	0.013 mW/cm sq	Meets ANSI Requirements

<u>Conclusion:</u> 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. The Area occupied by the general public will not exceed the ANSI limit of 1 mW cm sq. because the antenna is mounted on top of building, which does have access by the general public. The areas on the ground and behind the antenna are 100 times less power (20 dB) when at a min. of the dia. of the reflector, this is reflected in the Off Axis figures as seen above (WF) & (WN). The antenna area 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.

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

Exhibit Ba Analysis of Non-Ionizing Radiation

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)=.......................... $Ds := 0$ cm $Ds \cdot .3937 = 0$ Inch's

Area of Subreflector, (As)=............................ $As := \pi \cdot \frac{Ds \cdot Ds}{4}$ $As = 0$ 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)=.. $P1 := 25$ watts $P2 := \log(P1) \cdot 10$ $P2 = 13.979$ dB

Path Loss from HPA or VPC to OMT, (Loss)=.. $Loss := .5$ dB

Power at OMT, (P)=...................................... $P3 := P2 - Loss$ $P3 = 13.479$ OMT Pwr in dB

$P := 10^{\frac{P3}{10}}$ $P = 22.281$ OMT Pwr in watts

Antenna Gain at (Cf), (Gain)=.......................... $Gain := 47.6$ dBi

Antenna Gain Converted to Power Ratio, (Ges). $Ges := 10^{\frac{Gain}{10}}$ $Ges = 5.754 \cdot 10^{4}$ Ratio

Antenna Aperture Efficiency, (n)=..................... $n := .6484$

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)= $Wf := \frac{Ges \cdot P}{4 \cdot \pi \cdot (Rf \cdot Rf)} \cdot .1$ $Wf = 0.38$ 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)= $Wn := \frac{16 \cdot n \cdot P}{\pi \cdot (D \cdot D)} \cdot .1$ $Wn = 1.277$ mw sq cm

Transition Region (Rt)= $Rt := Wn \cdot 1$ $Rt = 1.277$ mw sq cm (Equal to or less then)

Pwr Density at Sub Reflector (Ws)= (N/A No Sub Reflector)

Main Reflector Region Pwr Density (Wm)= $Wm := \frac{2 \cdot P}{Sa} \cdot .1$ $Wm = 0.985$ mw sq cm

Pwr Density between main reflector and ground (Wg)= $Wg := \frac{P}{Sa} \cdot .1$ $Wg = 0.493$ mw sq cm

Far Field Off Axis (WF)= $WF := Wf \cdot .01$ $WF = 0.004$ mw sq cm

Near Field Off Axis (WN)= $WN := Wn \cdot .01$ $WN = 0.013$ mw sq cm