RF RADIATION HAZARD ANALYSIS
Exhibit #B

Antenna Diameter, (D) = 4.6 meters / 15.093 Feet
Antenna Surface Area, (Sa) = 16.619 sq meters
Subreflector Diameter, (Ds) = 22 centimeters
KU Wavelength at 14.5 GHz (LAMBDA) = 0.0211 meters
Power at output of VPC flange = 28.189 dB
Path Loss to OMT (IL) = 0.6 dB
Power at OMT, (P) = 573.97 Watts
Antenna Gain at 14.250 GHz, (G)= 54.4 dBi (2 port antenna gain)
Antenna Gain given in Power Ratio, (Ges) = 2.773E+05
Antenna Aperture Efficiency (N) = 0.698

Region	Radiation Level	Hazard Assessment
Far Field, (Rf) = 601.706 meters / 1974.198 Feet	3.499 mW/cm sq	Potential Hazard
Near Field, (Wf) = 250.711 meters / 822.582 Feet	9.645 mW/cm sq	Potential Hazard
Transition Region (Rt) Ru<Rt<Rf	equal to or less than 9.645 mW/cm sq	Potential Hazard
Between Main Reflector and Subreflector (Ws)	3019.814 mW/cm sq	Potential Hazard
Main Reflector Region (Wm)	6.907 mW/cm sq	Potential Hazard
Power Density Between Reflector and Ground	3.454 mW/cm sq	Potential Hazard
Far Field Off Axis (WF)	0.035 mW/cm sq	Meets ANSI Requirements
Near Field Off Axis (WN)	0.096 mW/cm sq	Meets ANSI Requirements

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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 target satellite. The Area occupied by the general public will not exceed the ANSI limit of 1 mW cm sq. when the minimum safe distance is observed. The minimum safe distance in front of the antenna is calculated at 12.9meters when the antenna is operated at a minimum elevation angle of 15 degrees, assuming a height of 2 meters for an average person. The safety margin increases with look angles used by the Satellites in the United States on Dom. Sat. arch. The areas to the sides and behind the antenna are 100 times less power (20dB) 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 and trailer will be marked with the standard radiation hazard warnings. The warning signs will warn personnel to avoid the area around and in front of the reflector when the transmitter is operating. Additionally a barrier fence that extends 4.5 meters on each side and 13 meters in front of the dish is strongly recommended in order to establish a controlled access perimeter around the hazardous area. 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, in accordance with industry standard lockout/tagout procedures. 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 be used only when the transmitter is off and not accessible by the general public.

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

Exhibit Ba Analysis of Non-Ionizing Radiation

Antenna Diameter, (D) =	$D :=$ 4.6 meters	$D \cdot 3.281 =$	15.093 Feet
Antenna Surface Area, (Sa) =	$Sa := \pi \cdot \frac{D \cdot D}{4}$	$Sa =$	16.619 sq meters
Subreflector Diameter, (Ds) =	$Ds :=$ 22 cm	$Ds \cdot .3937 =$	8.661 Inches
Area of Subreflector, (As) =	$As := \pi \cdot \frac{Ds \cdot Ds}{4}$	$As =$	380.133 sq cm
Center Frequency, (Cf) =	$Cf :=$ 14.500 GHz		
Wavelength at (Cf), $(Lambda)$ =	$Lambda :=$ 0.0211 meters C-Band = .049 Ku-Band = .0211		
Transmit Power at HPA or VPC Flange, (P1) =	P1 := 659.00 watts	$P2 := \log(P1) \cdot 10$	P2 = 28.189 dB
Path Loss from HPA or VPC to OMT, (IL) =	Loss := 0.6 dB		
Power at OMT, (P)=	P3 := P2 - Loss	P3 =	27.589 OMT Pwr in dB
	$P := 10^{\frac{P3}{10}}$	$P =$	573.97 OMT Pwr in watts
Antenna Gain at (Cf), (Gain)=	Gain := 54.43 dBi		
Antenna Gain Converted to Power Ratio, (Ges)=	$Ges := 10^{\frac{Gain}{10}}$	Ges =	2.773E+05 Ratio
Antenna Aperture Efficiency, (n)=	n := 0.6982		

Far Field (Rf)=	$Rf := \frac{.60 \cdot (D \cdot D)}{Lambda}$	$Rf =$ $Rf \cdot 3.281 =$	601.706 meters 1974.20 feet
Far Field Power Density (Wf)=	$Wf := \frac{Ges \cdot P}{4 \cdot \pi \cdot (Rf \cdot Rf)} \cdot .1$	$Wf =$	3.499 mw sq cm
Near Field (Rn) =	$Rn := \frac{(D \cdot D)}{4 \cdot Lambda}$	$Rn =$ $Rf \cdot 3.281 =$	250.711 meters 822.582 feet
Near Field Power Density (Wn)=	$Wn := \frac{16 \cdot n \cdot P}{\pi \cdot (D \cdot D)} \cdot .1$	$Wn =$	9.645 mw sq cm
Transition Region (Rt)=	$Rt := Wn \cdot 1$	$Rt =$	9.645 mw sq cm (Equal to or less than)
Pwr Density at Sub Reflector (Ws)=	$Ws := \frac{2 \cdot P}{As} \cdot 1000$	$Wm =$	3019.814 mw sq cm
Main Reflector Region Pwr Density (Wm)=	$Wm := \frac{2 \cdot P}{Sa} \cdot .1$	$Wm =$	6.907 mw sq cm
Pwr Density between main reflector and ground (Wg)=	$Wg := \frac{P}{Sa} \cdot .1$	$Wg =$	3.454 mw sq cm
Far Field Off Axis (WF)=	$WF := Wf \cdot .01$	$WF =$	0.035 mw sq cm
Near Field Off Axis (WN)=	$WN := Wn \cdot .01$	$WN =$	0.096 mw sq cm