RF RADIATION HAZARD ANALYSIS Exhibit #B

Antenna Diameter, (D) =	1.35 meters /	4.42935 Feet
Antenna Surface Area (Sa) =	1.4314 sq meters	
Subreflector Diameter (Ds) =	0.0000 centimeters	
Ku Wavelength at 14.250 GHz (LAMBDA) =	0.0211 meters	
Power output of VPC Flange=	23.010 dB	
Path Loss to OMT (IL) =	0.6 dB	
Power at OMT, (P) =	174.19 Watts	
Antenna Gain at 14.250GHz (G) =	44.10 dBi (2 port ar	itenna gain)
Antenna Gain given in Power Ration, (Ges) =	2.57E+04	
Antenna Aperture Efficiency (N) =	0.650	

				(controlled/uncontrolled
Region			Radition	Level	Hazard Assessment
Far Field, (Rf) =	51.825 meters /	170.04 Feet	13.266	mW/cm sq	Potential Hazard
Near Field, (Wf) =	21.594 meters /	70.849 Feet	31.641	mW/cm sq	Potential Hazard
Transition Region (Rt) Ru <rt<rf< td=""><td></td><td></td><td>equal to 31.641</td><td>or less than mW/cm sq</td><td>Potential Hazard</td></rt<rf<>			equal to 31.641	or less than mW/cm sq	Potential Hazard
Between Main Reflect and Subreflector (Ws)			N/A (no	subreflector)	
Main Reflector Regior	n (Wm)		24.339	mW/cm sq	Potential Hazard
Power Density Betwee and Ground	en Reflector		12.169	mW/cm sq	Potential Hazard
Far Field Off Axis (WF)			0.133	mW/cm sq	Meets ANSI Requirements
Near Field Off Axis (W	N)		0.316	mW/cm sq	Meets ANSI Requirements

Controlled /Uncontrolled

Conclusion: Based on the above analysis, harmful areas of Radiation do exist in the 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 1mW cm sq. becuase the antenna is mounted on top of the truck, which is at least 8 feet above the ground, and safety increases with look angles used by the Satellites in the United States on Dom. Sat. arch. The areas on the ground 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 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 ensure 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 ladder that will be protected by a padlocked cover, which will only be unlocked 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 on Non-Ionizing Radiation					
Antenna Diameter, (D) =	D: = 1.35 meters	D*3.281 =	4.429	Feet	
Antenna Surface Area, (Sa) =	Sa:= π* <u>D*D</u>	Sa =	1.431	sq meters	
Subreflector Diameter, (Ds) =	Ds: = 0 cm	Ds*.3937	0.000	Inches	
Area of Subreflector, (As) =	As:= $\pi^* \frac{\text{Ds*Ds}}{4}$	As=	0.000	sq meters	
Center Frequency, (Cf) =	Cf: = 14.250 GHz				
Wavelength at (Cf), (Lambda) =	Lambda = 0.021 meters C-Band = .049 Ku-Band = .0211				
Tansmit Power at HPA or VPC Flange, (P1) =	P1= 200.00 watts P2:=log(p1)*10	P2=	23.010	dB	
Path Loss from HPA or VPC to OMT, (IL) =	Loss: = 0.6 P3:= P2-Loss P:= 10 $\frac{P3}{10}$	P3= P=	22.410 174.193	OMT Pwr in dB OMT Pwr in watts	
Antenna Gain at (Cf), (Gain) = Antenna Gain Converted to Power Ratio (Ges)=	Gain: = 44.10 dBi Ges: = 10 Gain 10	Ges =	2.57E+04	Ratio	
Antenna Aperture Efficiency, (n) =	n: = 0.6500				

Far Field (Rf) =Rf = $\begin{array}{c} .60 * (D * D) \\ Lambda \end{array}$ Rf =51.825 \\ Rf * 3.281 = 170.037 \end{array}meters feetFar Field Power Density (Wf) =Wf = $\begin{array}{c} \frac{Ges^*P}{\pi^+} \\ 4^* \end{array}$ $\begin{array}{c} .1 \\ Rf * Rf \\ \hline \end{array}$ $\begin{array}{c} Near Field (Rn) = \\ Rn = \end{array}$ Rn = $\begin{array}{c} \frac{Ges^*P}{\pi^+} \\ (Rf * Rf) \end{array}$ $\begin{array}{c} *.1 \\ Wf = \end{array}$ $\begin{array}{c} 13.266 \\ mw \ sq \ cm \end{array}$ Near Field (Rn) =Rn = $\begin{array}{c} (D^*D) \\ 4^*Lambda \end{array}$ Rn = $\begin{array}{c} 21.594 \\ Rf * 3.281 \end{array}$ meters \\ 70.849 \end{array}Mear Field Power Density (Wn) =Wn = $\begin{array}{c} 16^*n^*P \\ \pi^+ (D^*D) \end{array}$ $\begin{array}{c} *.1 \\ Wn = \end{array}$ $\begin{array}{c} 31.641 \\ (Equal to or less than) \end{array}$ Transition Region (Rt) =Rt =Wn *1 \\ As \end{array}Rt = $\begin{array}{c} 31.641 \\ (Equal to or less than) \end{array}$ Pwr Density at Sub Reflector (Ws) =Ws = $\begin{array}{c} 2^*P \\ Sa \end{array}$ $\begin{array}{c} *.1000 \\ Ws = \end{array}$ Ws =N/A \end{array}Pwr Density between main reflector and ground (Wg) =Wg = $\begin{array}{c} -P \\ Sa \end{array}$ $\begin{array}{c} *.1 \\ Wg = \end{array}$ Wg =12.169 \\ \begin{array}{c} mw \ sq \ cm \end{array}							
LambdaRf*3.281=170.037feetFar Field Power Density (Wf) =Wf= $\frac{Ges*P}{\pi^{*}}$ (Rf*Rf)*.1Wf =13.266mw sq cmNear Field (Rn) =Rn= $\frac{(D*D)}{4^{*}Lambda}$ Rn=21.594metersNear Field (Rn) =Rn= $\frac{(D*D)}{4^{*}Lambda}$ Rf*3.281=70.849feetNear Field Power Density (Wn) =Wn= $\frac{16^{*}n^{*}P}{\pi^{*}}$ *.1Wn =31.641mw sq cmTransition Region (Rt) =Rt =Wn*1Rt=31.641mw sq cmMwr Density at Sub Reflector (Ws) =Ws= $\frac{2^{*}P}{As}$ *1000Ws =N/AMain Reflector Region Pwr Density (Wm) =Wm= $\frac{2^{*}P}{Sa}$ *.1Wm =24.339mw sq cmPwr Density between main reflectorand ground (Wg) =Wg= $\frac{P}{Sa}$ *.1Wg =12.169mw sq cm	For Field (Pf) -	Rf=	.60 * (D*D)		Rf =	51.825	meters
Far Heid Power Density (Wr) =Wr = $\frac{1}{4^*}$ $\frac{\pi}{\pi}$ (Rf^*Rf) *.1Wr =13.266mw sq cmNear Field (Rn) =Rn = $\frac{(D^*D)}{4^*Lambda}$ Rn =21.594metersNear Field Power Density (Wn) =Wn = $\frac{16^*n^*P}{\pi^*}$ *.1Wn =31.641mw sq cmTransition Region (Rt) =Rt =Wn*1Rt =31.641mw sq cmPwr Density at Sub Reflector (Ws) =Ws = $\frac{2^*P}{As}$ *1000Ws =N/AMain Reflector Region Pwr Density (Wm) =Wm = $\frac{2^*P}{Sa}$ *.1Wm =24.339mw sq cmPwr Density between main reflectorand ground (Wg) =Wg = $\frac{P}{Sa}$ *.1Wg =12.169mw sq cm	rai rielu (Ki) =		Lambda		Rf*3.281=	170.037	feet
Near Field (Rn) =Rn = $(2 - 5)^{-1}$ $4 + Lambda$ Rf*3.281 =70.849feetNear Field Power Density (Wn) =Wn = $16^{+}n^{+}P$ π^{+} (D*D)*.1Wn =31.641mw sq cmTransition Region (Rt) =Rt =Wn*1Rt =31.641mw sq cm (Equal to or less than)Pwr Density at Sub Reflector (Ws) =Ws = $\frac{2^{+}P}{As}$ *1000Ws =N/AMain Reflector Region Pwr Density (Wm) =Wm = $\frac{2^{+}P}{Sa}$ *.1Wm =24.339mw sq cmPwr Density between main reflectorand ground (Wg) =Wg = $\frac{P}{Sa}$ *.1Wg =12.169mw sq cm	Far Field Power Density (Wf) =	Wf=		*Rf) * .1	Wf =	13.266	mw sq cm
4*LambdaRf*3.281=70.849feetNear Field Power Density (Wn) = $Wn = \frac{16*n*P}{\pi^* (D*D)}$ *.1Wn =31.641mw sq cmTransition Region (Rt) =Rt =Wn*1Rt =31.641mw sq cmPwr Density at Sub Reflector (Ws) =Ws = $\frac{2*P}{As}$ *1000Ws =N/AMain Reflector Region Pwr Density (Wm) =Wm = $\frac{2*P}{Sa}$ *.1Wm =24.339mw sq cmPwr Density between main reflectorand ground (Wg) =Wg = $\frac{P}{Sa}$ *.1Wg =12.169mw sq cm	Near Field (Rn) =	Rn=	(D*D)		Rn=	21.594	meters
Near Field Power Density (Wn) =Wn = $\frac{1}{\pi^*}$ (D*D)*.1Wn = 31.641 mw sq cmTransition Region (Rt) =Rt =Wn*1Rt = 31.641 mw sq cmPwr Density at Sub Reflector (Ws) =Ws = $\frac{2*P}{As}$ *1000Ws =N/AMain Reflector Region Pwr Density (Wm) =Wm = $\frac{2*P}{Sa}$ *.1Wm =24.339mw sq cmPwr Density between main reflectorand ground (Wg) =Wg = $\frac{P}{Sa}$ *.1Wg =12.169mw sq cm			4*Lambda		Rf*3.281=	70.849	feet
Transition Region (Rt) = Rt = Wn*1 Rt = 31.641 (Equal to or less than) Pwr Density at Sub Reflector (Ws) = Ws = $\frac{2*P}{As}$ *1000 Ws = N/A Main Reflector Region Pwr Density (Wm) = Wm = $\frac{2*P}{Sa}$ *.1 Wm = 24.339 mw sq cm Pwr Density between main reflector and ground (Wg) = Wg = $\frac{P}{Sa}$ *.1 Wg = 12.169 mw sq cm	Near Field Power Density (Wn) =	Wn=		.1 * .1	Wn =	31.641	mw sq cm
Pwr Density at sub Reflector (Ws) = Ws = As N/A Main Reflector Region Pwr Density (Wm) = Wm = $\frac{2*P}{Sa}$ *.1 Wm = 24.339 mw sq cm Pwr Density between main reflector and $Wg =$ $\frac{P}{Sa}$ *.1 Wg = 12.169 mw sq cm	Transition Region (Rt) =	Rt =	Wn*1		Rt=	31.641	
Pwr Density between main reflector and ground (Wg) = Wg = $\frac{P}{Sa}$ *.1 Wg = 12.169 mw sq cm	Pwr Density at Sub Reflector (Ws) =	Ws=		*1000	Ws =	N/A	
$ground (Wg) = \frac{Wg}{Sa} + 1 \qquad Wg = 12.169 \qquad mw sq cm$	Main Reflector Region Pwr Density (Wm) =	Wm=		*.1	Wm =	24.339	mw sq cm
		Wg=		*.1	Wg =	12.169	mw sq cm
Far Field Off Axis (WF) = WF:= WT $^{\circ}$.01 WF = 0.133 mw sq cm	Far Field Off Axis (WF) =	WF:=	Wf*.01		WF =	0.133	mw sq cm
Near Field Off Axis (WN) = WN:= Wn*.01 WN = 0.316 mw sq cm	Near Field Off Axis (WN) =	WN:=	Wn*.01		WN =	0.316	mw sq cm