## RF RADIATION ANALYSIS
## Exhibit A

| | | | |
|---|---|---|---|
| Antenna Dia. (D) = | 1.2 | Meters | 3.9372 Feet |
| Antenna Surface Area (SA) = | 1.131 | sq meters | |
| Subreflector Dia. (DS) = | N/A | (prime focus offset) | |
| Subreflector Surface Area (AS) = | N/A | | |
| KU Wavelength at 14.250 GHz (Lambda) = | 0.0211 | meters | |
| Power at output of HPA flange = | 17.782 | dB | |
| Path Loss to OMT (IL) | 0.48 | dB | |
| Power at OMT Flange (P) = | 53.722 | watts | |
| Antenna Gain at 14.250 GHz (G) = | 43.2 | dBi | |
| Antenna Gain given in Power Ratio (GES)= | 2.089E+04 | | |
| Antenna Aperture Efficiency (N)= | 0.6874 | | |

| Region | | | Radiation Level | Hazard Assessment |
|---|---|---|---|---|
| Far Field (Rf) | 40.948 m | 134.35 ft | 5.327 mW/cm sq | Potential Hazard |
| Near Field (Wf) | 17.062 m | 55.979 ft | 13.061 mW/cm sq | Potential Hazard |
| Transition Region (Rt) Ru<Rt<Rf | | | equal to or less than 13.061 mW/cm sq | Potential Hazard |
| Between Main Reflector and Subreflector (Ws) | | | N/A (no subreflector) | |
| Main Reflector Region (Wm) | | | 9.5 mW/cm sq | Potential Hazard |
| Power Density Between Reflector and Ground | | | 4.75 mW/cm sq | Potential Hazard |
| Far Field Off Axis (WF) | | | 0.053 mW/cm sq | Meets ANSI Requirements |
| Near Field Off Axis (WN) | | | 0.131 mW/cm sq | Meets ANSI Requirements |

**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 at which it is pointed. 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 a building, which does not 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.

See Exhibit B for how the calculations were made

**ANALYSIS OF NON-IONIZING RADIATION**
**Exhibit B**

| | | | |
|---|---|---|---|
| Antenna Diameter (D) | D= 1.2 meters | 3.937 Feet | |
| Antenna Surface Area (Sa) | $Sa = \pi \cdot \frac{D \cdot D}{4}$ | Sa= 1.131 sq meters | |
| Subreflector diameter (Ds) | Ds=0 cm | Ds = 0 inches | |
| Area of Subreflector (As) | $As = \pi \cdot \frac{Ds \cdot Ds}{4}$ | As= 0 sq cm | |
| Center Frequency (Cf) | CF = 14.250 GHz | | |
| Wavelength at (Cf), (Lambda) | Lambda = 0.0211 meters | C band=0.049, Ku band=0.0211m | |
| Transmit Power at HPA or VPC Flange (P1) | P1= 60 watts | $P2 = \log(P1) \cdot 10$ | P2= 17.782 db |
| Path Loss from HPA or VPC to OMT (Loss) | Loss= 0.48 db | | |
| Power at OMT (P) | P3=P2-Loss | P3= 17.302 db | |
| Antenna Gain at (Cf), (Gain) | Gain= 43.2 dBi | | |
| Antenna Gain Converted to Power Ratio, (Ges). | $Ges = 10^{\frac{Gain}{10}}$ | Ges= 2.089E+04 | Ratio |
| Antenna Aperature Efficiency (n) | 0.6874 | | |
| Far Field (Rf) | $Rf = \frac{0.60 \cdot (D \cdot D)}{Lambda}$ | Rf= 40.948 meters | |
| Far Field Pwr Density (Wf) | $Wf = \frac{Ges \cdot P}{4 \cdot \pi \cdot (Rf \cdot Rf)} \cdot 0.1$ | Wf= 5.327 mw sq cm | |
| Near Field (Rn) | $Rn = \frac{D \cdot D}{4 \cdot Lambda}$ | Rn= 17.062 meters | |
| Near Field Pwd Density (Wn) | $Wn = \frac{16 \cdot n \cdot P}{\pi \cdot (D \cdot D)} \cdot 0.1$ | Wn= 13.061 mw sq cm | |
| Transition Region (Rt) | $Rt = Wn \cdot 1$ | Rt= 13.061 mw sq cm (equal to or less than) | |
| Pwr Density at Sub Reflector (Ws) | (N/A - No subreflector) | | |
| Main Reflector Region Pwr Density (Wm) | $Wm := \frac{2 \cdot P}{Sa} \cdot 0.1$ | Wm= 9.5 mw sq cm | |
| Pwr Density between main reflector and ground (Wg) | $Wg := \frac{P}{Sa} \cdot 0.1$ | Wg= 4.75 mw sq cm | |
| Far Field Off Axis (WF) | $WF := Wf \cdot 0.01$ | WF= 0.053 mw sq cm | |
| Near Field Off Axis (WN) | $WN := Wn \cdot 0.01$ | WN= 0.131 mw sq cm | |