ANALYSIS OF A NON-IONIZING RADIATION
FOR A 1.2 METER EARTH STATION SYSTEM

This report analysis the non-ionizing radiation levels for a 1.2-m earth station system. The analysis and calculations in this report comply with the methods described in the FCC Office of Engineering and Technology Bulletin, No.65. The radiation safety limits used in the analysis are in conformance with the FCC R&O 96-326. Bulletin No.65 and the FCC R&O specifies that there are two separate tiers of exposure limits that are dependent on the situation in which the exposure takes place and/or the status of the individuals who are subject to the exposure. The Maximum Permissible Exposure (MPE) limits for person in a General Population/Uncontrolled environment are shown in Table 1. MPE limits for persons in an Occupation/Controlled environment are shown in Table 2. The purpose of the analysis of this report is to determine the power flux density levels and to compare these levels to the specified MPEs.

Table 1 – Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	**Power Density (mW/cm2)**
30-300	0.2
300-1500	Frequency (MHz)* (0.8/1200)
1500-100,000	1.0

Table 2 – Limits for General Occupational/Controlled Exposure (MPE)

Frequency Range (MHz)	**Power Density (mW/cm2**
30-300	1.0
300-1500	Frequency (MHz)*(0.8/1200)
1500-100,000	5.0

Table 3 – Formulas and Parameters Used for Determining Power Flux Densities

Antenna Diameter	1.2	meters
Antenna Surface Area	1.13097336	meter sq.
Feed Flange Diameter	12	cm
Area of Feed Flange	113.097336	cm sq.
Frequency	14250	MHz
Wavelength	0.02105263	m
Transmit Power	20	W
Antenna Gain	43.20	dBi
Antenna Gain Factor	20892.96	
Pi	3.14159265	
Antenna Efficiency	0.65155419	

1 – Far Field Distance Calculation
The distance to the beginning of the far field **(Rff)** and the on-axis power density **(Sff)** are calculated as below

Rff = 41.040 m
Sff = 1.974 mW/cm2

2 – Near Field Distance Calculation
The distance to the end of the Near Field **(Rnf)** and the maximum power density in the Near Field **(Snf)** are calculated as below

Rnf = 17.100 m
Snf = 4.609 mW/cm2

3 – Transition Region Calculation
The Transit Region is located between Near Field and Far Field Regions. The maximum power density in the Transit Region will not exceed that calculated for the Near Field region. The power density in the Transit Region **(St)** at a distance Rt is calculated as below

St = 4.609 mW/cm2 ,

4- Region between the Main Reflector and Subrefletor
Not applicable

5- Main Reflector Region
Power density at the Main reflector Surface Ssurface (Ssurface) is calculated as below

Ssurface = 7.074 mW/cm2

6- Region Between the main reflector and the Ground
Power density between the Main Reflector and the Ground (Sg) is calculated as below

Sg = 1.768 mW/cm2

7- SUMMARY OF CALCULATIONS
Table 4. Summary of expected Radiation Levels for **Uncontrolled Environment**

	Distance (m)	Density (mW/cm2)	Uncontrolled
Far Field	41.04	1.974	Potential Hazard
Near Field	17.1	4.609	Potential Hazard
Transition Region		4.609	Potential Hazard
feed assembley and Antenna Ref		707.96	Potential Hazard
Main Reflector		7.074	Potential Hazard

Between Main Reflector & Ground		1.768	Potential Hazard

Table 5. Summary of Expected Ration Levels for **Controlled Environment**

	Distance (m)	Density (mW/cm2)	Controlled
Far Field	41.04	1.974	Satisfies FCC MPE
Near Field	17.1	4.609	Satisfies FCC MPE
Transition Region		4.609	Satisfies FCC MPE
feed assembley and Antenna Ref		707.96	Potential Hazard
Main Reflector		7.074	Potential Hazard
Between Main Reflector & Ground		1.768	Satisfies FCC MPE

8. CONCLUSION

Based upon the above analysis it's concluded that FCC RF Guidelines have been exceeded in the specific region(s) of Table 4. The applicant proposes to comply with MPE limits of Uncontrolled and Controlled areas.

The antenna will be installed on top of the applicant's truck. The applicant will mark the earth station with the standard radiation hazard warnings. Since one diameter removed from the center of the main beam the levels are down at least 20 dB, or by a factor of 100, these potential hazards do not exist for either the public, or for earth station personnel. The applicant will ensure that the main beam of the antenna will be pointed at least one diameter away from any buildings or other obstacles in those areas that exceed the MPE levels.

Finally the earth station's operation personnel will not have access to areas that exceeds the MPE levels, while the earth station is in operation. The transmitter will be turned off during the periods of maintenance, so that MPE standards will be complied with for those regions in close proximity to the main reflector, which could be occupied by operating personnel.