Exhibit A

Radiation Hazard Report

Analysis of Non-Ionizing Radiation for a 0.25 m Earth Station

This analysis provides the calculated non-ionizing radiation levels for a 0.25-meter earth station system.

The methods and calculations performed in this analysis are based on the FCC Office of Engineering and Technology Bulletin, No.65, October 1985 as revised in 1997 in Edition 97-01. The radiation safety limits used in the analysis are in conformance with the FCC R&O 96-326 (Summarized in Annex 1). There are separate exposure limits applicable to the General Population/Uncontrolled Environment and the Occupational/Controlled Environment. The Maximum Permissible Exposure (MPE) limits for persons in a General Population/Uncontrolled environment for the frequency band of this antenna, is 1 mW/cm2 for a 30 minute or lower time period as shown in Annex 1 (a). The MPE limit for persons in an Occupational/Controlled environment for the frequency band of this antenna is 5 mW/cm2 for a 6 minute time or lower period as shown in Annex 1 (b). The purpose of this analysis described is to determine the power flux density levels of the earth station at the main reflector surface, the near-field, transition region, far-field, between the sub-reflector or feed and, at the main reflector surface, and between the antenna edge and the ground and to compare these levels to the specified MPEs.

The parameters of the antenna that is the subject of this analysis are shown in Table 1.
Intermediate calculated values and constants are provided in Table 2.

Table 1. Input Parameters Used for Determining Power Flux Densities

Parameter	Symbol	Formula	Value	Units
Antenna Diameter	D	Input	0.25	m
Frequency	F	Input	14500	MHz
Transmit Power	P	Input	0.5	W
Antenna Gain (dBi)	G_{es}	Input	21	dBi

Table 2. Calculated Values and Constants

Parameter	Symbol	Formula	Value	Units
Antenna Surface Area	$A_{surface}$	$\pi D^2/4$	0.05	m^2
Wavelength	λ	300/F	0.020690	m
Antenna Gain (factor)	G	$10^{Ges/10}$	125.89	n/a
Pi	π	Constant	3.1415927	n/a
Antenna Efficiency	η	$G\lambda^2/(\pi^2 D^2)$	0.09	n/a

1. Antenna Main Reflector Surface

The power density in the main reflector is determined from the Power level and the area of the main reflector aperture. This is determined from the following equation:

Power Density at the Main Reflector Surface:

$$S_{surface} = 4P/A_{surface} \quad (1)$$

$$= 40.744 \quad W/m^2$$

$$= 4.074 \quad mW/cm^2$$

2. Near Field Calculation

Power Flux density is considered to be at a maximum value throughout the entire length of the defined Near Field region. The region is contained within a cylindrical volume having the same diameter as the antenna. Past the boundary of the Near Field region, the power density from the antenna decreases linearly with respect to increasing distance. The distance to the end of the Near Field is determined from the following equation:

Extent of the Near Field:

$$R_{nf} = D^2 / (4\lambda) \quad (2)$$

$$= 0.76 \quad m$$

The maximum power density in the Near Field is determined from the following equation:

Near Field Density:

$$S_{nf} = 16.0\ \eta\ P / (\pi\ D^2) \quad (3)$$

$$= 0.356 \quad mW/cm^2$$

3. Transition Region Calculation

The Transition Region is located between the Near and Far Field regions. The power density begins to decrease linearly with increasing distance in the Transition region. While the power density decreases inversely with distance in the Transition region, the power density decreases inversely with the square of the distance in the Far Field region. The power density calculated in Section 1 is the highest power density the antenna can produce in any of the regions away from the antenna. The power density at a distance R_t is determined from the following equation:

Transition Region Power Density:

$$S_t = S_{nf}\, R_{nf} / R_t \quad (4)$$

$$= 0.356 \quad mW/cm^2$$

4. Far Field Distance Calculation

The distance to the Far Field Region is calculated using the following equation:

Distance to Far Field Region:

$$R_{ff} = 0.6\ D^2 / \lambda \quad (5)$$

$$= 1.813 \text{ m}$$

The maximum main beam power density in the far field is determined from the following equation:

On-axis Power Density in the Far Field:

$$S_{ff} = G\ P / (4\ \pi\ R_{ff}^2) \quad (6)$$

$$= 0.152 \text{ mW/cm}^2$$

5. Region between the Main Reflector and the Ground

Assuming uniform illumination of the reflector surface, the power density between the antenna and the ground is determined from the following equation:

Power Density between Reflector and Ground:

$$S_g = P / A_{surface} \quad (7)$$

$$= 1.019 \text{ mW/cm}^2$$

7. Summary of Calculations

Table 3. Summary of Expected Radiation levels for Uncontrolled Environment

Region	Symbol	Calculated Maximum Radiation Power Density Level (mW/cm^2)	Hazard Assessment
1. Main Reflector	$S_{surface}$	4.074	Potential Hazard
2. Near Field (R_{nf} = 0.76 m)	S_{nf}	0.356	Satisfies FCC MPE
3. Transition Region ($R_{nf} < R_t < R_{ff}$)	S_t	0.356	Satisfies FCC MPE
4. Far Field (R_{ff} = 1.81 m)	S_{ff}	0.152	Satisfies FCC MPE
5. Between Main Reflector and Ground	S_g	1.019	Potential Hazard

Table 4. Summary of Expected Radiation levels for Controlled Environment

Region	Symbol	Calculated Maximum Radiation Power Density Level (mW/cm^2)	Hazard Assessment
1. Main Reflector	$S_{surface}$	4.074	Satisfies FCC MPE
2. Near Field (R_{nf} = 0.76 m)	S_{nf}	0.356	Satisfies FCC MPE
3. Transition Region ($R_{nf} < R_t < R_{ff}$)	S_t	0.356	Satisfies FCC MPE
4. Far Field (R_{ff} = 1.81 m)	S_{ff}	0.152	Satisfies FCC MPE
5. Between Main Reflector and Ground	S_g	1.019	Satisfies FCC MPE

It is the applicant’s responsibility to ensure that the public and operational personnel are not exposed to harmful levels of radiation.

8. Conclusion

The above analysis was based on the maximum transmit power capability of the terminal. The results show that there is no exceedance of the safe levels for controlled environment. For uncontrolled environment the limits are met except on the main reflector and between main reflector and ground (Table 3).

Thel terminals will be tested at Herndon VA and Puerto Rico. The earth stations will be marked with the standard radiation hazard warnings to inform anyone in close proximity to the terminal of potential RF radiation. Part of the operation will be fixed and part would be a drive test. Given that the terminal is vehicle mounted and in motion, prolonged exposure at the radiating surface will not occur.

Also, for the drive test, this antenna will be mounted on a vehicle and the main beam will be pointed toward the sky with a certain elevation angle, so no human exposure is possible in the main beam.

Finally, neither trained personnel nor general population will have access to the areas that exceed the MPE levels while the ESIM terminal is in operation. The transmitter will also be switched off during periods of maintenance while the operating personnel are in close proximity to the main reflector.

"The licensee shall take all necessary measures to ensure that the antenna does not create potential exposure of humans to radiofrequency radiation in excess of the FCC exposure limits defined in 47 CFR 1.1307(b) and 1.1310 wherever such exposures might occur. Measures must be taken to ensure compliance with limits for both occupational/controlled exposure and for general population/uncontrolled exposure, as defined in these rule sections. Compliance can be accomplished in most cases by appropriate restrictions such as fencing. Requirements for restrictions can be determined by predictions based on calculations, modeling or by field measurements. The FCC's OET Bulletin 65 (available on-line at www.fcc.gov/oet/rfsafety) provides information on predicting exposure levels and on methods for ensuring compliance, including the use of warning and alerting signs and protective equipment for workers."

ANNEX 1

(MPE Levels)

a) Limits for General Population/Uncontrolled Exposure (MPE)

Frequency Range (MHz)	Power Density (mW/cm^2)
30-300	0.2
300-1500	Frequency(MHz)*(4.0/1200)
1500-100,000	1

b) Limits for Occupational/Controlled Exposure (MPE)

Frequency Range (MHz)	Power Density (mW/cm^2)
30-300	1
300-1500	Frequency(MHz)*(4.0/1200)
1500-100,000	5