# EXHIBIT A



## RADIATION HAZARD STUDY

This radiation hazard study describes the R.F. radiation environment of the permanent fixed Ku-band uplink operated by Criswell College.
This fixed earth station uplink is located at a lattitude of 32d - 45m - 38s North & a longitude of 97d - 06m - 28s West, in Arlington, TX.

This study is done to comply with the requirements of Section 1.1307(b) of the rules of the Federal Communications Commission. All calculations conform to the proceedures presented in OET Bulletin No. 65 for aperature antennas.

Transmit antenna: Prodelin 2.4 meter KU-band

Antenna Diameter $D := 2.4 \cdot m$

Antenna Efficency $\eta := 67 \cdot \%$

Transmitter: 4 watt output flange SSPA, operated at 50% power

Transmit Power $P := 4 \cdot watt \cdot 50 \cdot \%$

$P = 2 \cdot watt$

$mw := \frac{watt}{1000}$

| | at 14.0 GHz | at 14.5 GHz |
|---|---|---|
| Antenna Gain | $G_1 := 49.10$ | $G_2 := 49.30$ |
| Wavelength | $\lambda_1 := 2.14285 \cdot cm$ | $\lambda_2 := 2.06896 \cdot cm$ |

## Calculations for the Near Field (Fresnel Region)

Extent of the Near Field

$$R_{n1} := \frac{D^2}{4 \cdot \lambda_1} \qquad R_{n2} := \frac{D^2}{4 \cdot \lambda_2}$$

$$R_{n1} = 67.2 \cdot m \qquad R_{n2} = 69.6 \cdot m$$

Maximum Near Field Power Density

$$S_n := \frac{16 \cdot \eta \cdot P}{\pi \cdot D^2}$$

$$S_n = 0.118 \cdot \frac{mw}{cm^2}$$

## Calculations for the Far Field (Fraunhofer Region)



| | at 14.0 GHz | at 14.5 GHz |
|---|---|---|
| Distance to Far Field | $R_{f1} := \frac{0.6 \cdot D^2}{\lambda_1}$ | $R_{f2} := \frac{0.6 \cdot D^2}{\lambda_2}$ |
| | $R_{f1} = 161.281 \cdot m$ | $R_{f2} = 167.04 \cdot m$ |
| Absolute Gain of Antenna | $G_{a1} := 10^{\frac{G_1}{10}}$ | $G_{a2} := 10^{\frac{G_2}{10}}$ |
| Maximum Far Field Power Density | $S_{f1} := \frac{P \cdot G_{a1}}{4 \cdot \pi \cdot R_{f1}^2}$ | $S_{f2} := \frac{P \cdot G_{a2}}{4 \cdot \pi \cdot R_{f2}^2}$ |
| | $S_{f1} = 0.05 \cdot \frac{mw}{cm^2}$ | $S_{f2} = 0.049 \cdot \frac{mw}{cm^2}$ |

## Calculations for the Transition Zone

The farthest point in the near field is the beginning of the transition zone -

$$R_{t1} := R_{n2}$$

$$R_{t1} = 69.6 \cdot m$$

The end of the Transition Zone is the beginning of the Far Field -

$$R_{t2} := R_{f2}$$

$$R_{t2} = 167.04 \cdot m$$

| | Beginning | End |
|---|---|---|
| Transition Zone Power Density | $S_{t1} := \frac{S_n \cdot R_{n2}}{R_{t1}}$ | $S_{t2} := \frac{S_n \cdot R_{n2}}{R_{t2}}$ |
| | $S_{t1} = 0.118 \cdot \frac{mw}{cm^2}$ | $S_{t2} = 0.049 \cdot \frac{mw}{cm^2}$ |

## Calculations at the Reflector Surface:



Area of Reflector

$$A := \pi \cdot \left(\frac{D}{2}\right)^2$$

$$A = 4.524 \cdot m^2$$

Power Density at the Reflector Surface

$$S_{ref} := \left(2 \cdot \frac{P}{A}\right)$$

$$S_{ref} = 0.088 \cdot \frac{mw}{cm^2}$$

## Calculations between the Antenna and the Ground:

Power Density between Antenna and Ground

$$S_{ga} := \frac{P}{A}$$

$$S_{ga} = 0.044 \cdot \frac{mw}{cm^2}$$

## Conclusions

The power densities in the Near Field, Far Field, Transition Zone, at the Surface of the Reflector, and between the Reflector and the Ground are all below the allowable limit. Nowhere do they exceed the level of 5 mw/cm$^2$ as listed in OET Bulletin No. 65. Thus, this transmit earth terminal meets FCC requirements for human exposure to radio frequency energy.

# EXHIBIT B



## ENVIRONMENTAL IMPACT STATEMENT

Transmit/Receive

In regard to Section 1.1307(a) of the Commission's rules:

This site is not in a designated wilderness area or wildlife preserve; it does not threaten endangered species or critical habitats; nor does it affect sites, structures, or habitats which are significant in American history, architecture, archeology, engineering or culture that are listed or are eligible for listing in the National Registry of Historic Places; it does not affect Indian religious sites or flood plains; nor does it cause significant change in wetland fill, deforestation, or water diversion.

In regard to section 1.1307(b) of the Commission's rules:

We have prepared the calculations of radio frequency radiation for this transmitter and antenna combination, under the operating conditions specified in this application, with these results:

| Region | Radiation level ($mw/cm^2$) | Hazard assessment |
|---|---|---|
| Near field | 0.118 | Complies with guidelines |
| Far field | 0.050 | Complies with guidelines |
| Transition zone | 0.118 | Complies with guidance |
| At reflector surface | 0.088 | Complies with guidance |
| Between the rim of the antenna and the ground | 0.044 | Complies with guidance |

Conclusions: Based on the study, which is summarized above, we conclude that in the regions of concern, the radiation level complies with the guidance; the level is less than 5 milliwatts per square centimeter.

Accordingly, this action does not have a significant environmental impact as described in the Commission's rules and does not require the preparation of an environmental assessment.

Michael Kirk
(name)

Satellite Engineer
(title or position)

12/06/05
(date)

# EXHIBIT C



## FAA INFORMATION

The proposed 2.4 meter Ku band R/T antenna, which is the subject of this application, is a fixed earth station that will be operated from the ground. The maximum height of this antenna will be about 5 meters above the ground. Therefore since the proposed antenna does ***not*** extend more than 6 meters above the ground, notice to the FAA is ***not*** required pursuant to Section 17.4 of the Commission's rules.