RADIO FREQUENCY RADIATION STUDY

TECHNICAL STATEMENT OF RYAN WILHOUR OF THE FIRM OF
KESSLER AND GEHMAN ASSOCIATES, INC., CONSULTING ENGINEERS
IN CONNECTION WITH AN APPLICATION FOR A MOBILE TRUCK
1.4 METER TEMPORARY FIXED Ku-BAND SATELLITE EARTH STATION

ANALYSIS OF NON-IONIZING RADIATION

PREFACE

This report analyzes the non-ionizing radiation levels for a 1.4 meter temporary fixed Ku-Band earth station dish mounted on the roof of a mobile truck. The Office of Science and Technology Bulletin, No. 65, August 1997, specifies that the maximum level of non-ionizing radiation that a person may be exposed to over a six-minute period is an average power density equal to 5 mW/cm^2 (five milliwatts per square centimeter). It is the purpose of this report to determine the power flux densities of the earth station in the far field, near field, transition region between the feed and reflector surface, at the reflector surface, and between the antenna edge and the ground.

RFR ANALYSIS

The following parameters were used to calculate the various power flux densities for this earth station:

Effective Antenna diameter:	1.4 meters
Antenna surface area:	1.54 $meters^2$
Feed flange size:	4.0 centimeters
Area of feed flange:	12.57 $centimeters^2$
Wavelength at 14.0 GHz:	2.1 centimeters
Transmit power at flange:	40 Watts
Antenna gain:	44.5 dBi at 14.125 GHz
Antenna aperture efficiency:	0.68

1. Far Field Calculations - The distance to the beginning of the far field region is 54.9 meters. The maximum main beam power density in the far field is 2.98 mW/cm^2 which is 59.54% of the maximum allowable exposure level.

2. Near Field Calculations - The distance to the end of the near field is 22.87 meters. The maximum power density in the near field is 7.07 mW/cm^2 which is 141.36% of the maximum allowable exposure level.

3. Transition Region Calculations - The maximum power density in the transition region will not exceed that calculated for the near field region. The power density in the near field region, as

shown above, will not exceed 7.07 mW/cm^2 which is 141.36% of the maximum allowable exposure level.

4. Main Reflector Region - The power density in the main reflector region is 5.2 mW/cm^2 which is 103.94% of the maximum allowable exposure level.

5. Region between Reflector and Ground - The power density between the reflector and ground is 2.60 mW/cm^2 which is 51.97% of the maximum allowable exposure level.

CONCLUSION

Based on the calculations above, it is concluded that harmful levels of radiation will exist in the near field, transition region, and main reflector region. However, the following facts exist, and the operational specifications below will be observed by the applicant during operation to ensure that the potential for human exposure to harmful radiation levels will be mitigated:

- The proposed earth station dish will be located on the roof of a mobile truck such that the bottom of the antenna will be greater than six feet above the ground level.
- The applicant will purchase and operate an RF radiation meter in order to determine a safe temporary boundary in order to keep the general public away from harmful levels of radiation. Ropes and signs, at a minimum, will be used to warn persons of the existence of the radiation within the measured safety boundary.
- Access to the satellite truck roof will be restricted while the earth station is in operation.
- Radiation hazard signs will be posted around the base of the vehicle.
- The transmitter will be turned off during antenna maintenance.

It is understood that the applicant's responsibility to ensure that the public and operating personal are not exposed to harmful levels of radiation.

CERTIFICATION

The foregoing statement and the report regarding the aforementioned engineering work are true and correct to the best of my knowledge. Executed on January 17, 2012.

KGA

Sincerely,

Ryan Wilhour
Consulting Engineer