ENGINEERING STATEMENT

OF

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RADIOFREQUENCY EXPOSURE STUDY

HEARST TELEVISION INC.

WASHINGTON D.C. NEWS BUREAU

Background

Hearst Television, Inc. (Hearst) is proposing a Ku-Band uplink for its Washington D.C. News Bureau. The proposed uplink transmit antenna will be located the roof of the Franklin Square North Building at 1100 13th Street NW, Washington, DC 20005. The coordinates for the transmit antenna are:

38° 54′ 15.12″ N. Latitude

77° 01′ 47.64″ W. Longitude (NAD83)

The site elevation is 25.9m AMSL. The antenna, a Prodelin Series 1244 2.4m circular dish will be mounted on a post near the edge of the southern side of the roof. The lower rim of the dish will be 1.26 meters above the roof. The overall height of the building is 39.6m AGL with the antenna radiation center of 37.5m AGL. The antenna will be mounted in such a fashion so as not to increase the building's overall height.

As a part of Hearst's application to the FCC for licensure of the facility, a study was completed, in accordance with the FCC guidelines outlined in OET 65, to evaluate the potential for human exposure to radiofrequency electromagnetic fields (RFR).

The study concludes that exposure to RFR from the proposed facility will not exceed the FCC maximum permissible exposure limit (MPE) to the general public, however there is the potential for excessive exposure for occupational workers.

RFR Analysis

The study is based on the following data provided by the applicant and equipment manufacturers:

Antenna Manufacturer and Model:	Prodelin 1244
Center Frequency:	14.250 GHz
Wavelength at Center Frequency:	0.0210381 meters
Max Average Antenna Input Power:	89.5 Watts
Antenna Diameter, Gain:	2.4 meter, 49.2 dBi
Antenna Efficiency:	0.65
Waveguide Loss	1.45 dB
Antenna Center Above Ground	37.5 meters

The study was conducted under the procedures and guidelines provided in OET-65 for Aperature Antennas and follows the format presented therein.

Antenna Surface

$$S = \frac{4P}{A} = \frac{4(89.5W)}{\pi\left(\frac{2.4m}{2}\right)^2} = 79.14\ W/m^2 = 7.914 \text{mW/cm}^2$$

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Near Field Region

$$R_{NF} = Distance\ to\ limit\ of\ Near\ Field = \frac{D^2}{4\lambda} = \frac{2.4^2}{4(0.021)} = 68.57\ m$$

$$Max.\ s_{NF} = \frac{16(0.65)(89.5)W}{\pi(2.4)^2} = 51.44\ W/m^2 = 5.14\ mW/cm^2$$

Transition Region

$$R_{FF} = Distance\ to\ Region\ Limit = \frac{0.6(2.4)^2}{\lambda} = 164.6\ m$$

$$S = \frac{S_{NF} * R_{NF}}{R_{FF}} = 21.43\ W/m^2 = 2.143 mW/cm^2$$

Far Field Region RFR

$$S = \frac{PG}{4\pi R^2}\ W/m^2$$

If S = 10 W/m² for MPE,

Then the distance to the Limit of Public Exposure in Far Field conditions (R) is:

$$R = \sqrt{\frac{PG}{4\pi S}}\ m$$

$$R = \sqrt{\frac{89.5\ G}{4\pi S}}\ m = 243.4\ m$$

Utilization

The uplink antenna will have a center of radiation 37.5 meters above ground. Typical elevation angles (which are dependent on the satellite position in the orbital arc and the location of the uplink) will be greater than 20°; however, the worst case is estimated to be 9°.

OET-65 stipulates that, at a distance of one diameter (2.4m) from the edge of the cylinder formed by the "face" of the circular antenna, the field intensity (power flux density) will be reduced by a factor of 100 (20 dB). Thus, at a distance of 2.4m from the lower edge of the antenna (3.6m from the antenna centerline and approximately 33.9m above ground level) the field can be expected to be less than $0.514\ W/m^2$ or $0.0514\ mW/cm^2$ based on the above calculation of the near field maximum value.

The decrease in field with distance from the antenna projected cylinder beyond the 2.4 meter range is predicted to follow a similar decay.

The roof-top is not accessible to the public. Access is limited by a locked door with appropriate signage. The antenna is mounted near the edge of the roof but it still might be possible for a worker walk in front of the antenna aperture. The Near Field Maximum is calculated to be 5.144 mW/cm^2, which is slightly greater than the maximum allowable exposure for occupational worker scenarios (5 mW/cm^2).

Mitigation

The licensee will post signage on the entrance to the roof warning of the RF hazard that exists and will also post signage at various conspicuous locations near the antenna. Marking tape or yellow paint will be used to define the area where workers would be exposed to RFR above the occupational limit. Physical indicators, such as rope or chain, will be used to alert workers to the areas. Workers will be trained to recognize these areas and the potential for RFR exposure in excess of the limits within the defined areas. Mitigation will include mandatory shut-down for antenna maintenance or other maintenance that would necessitate working in the area in front of the antenna.

The licensee will conduct measurements with appropriate equipment to verify the conclusions drawn from the calculations herein and shall make a permanent record of that data. Should measured data indicate fields in excess of the values calculated herein, appropriate adjustments will be made in establishing the area in which public and worker access will be limited.

Conclusion

Based on the above analyses, it is concluded that the subject transportable earth station can be operated in accordance with the exposure limits established in Section 1.1310 of the Commission's Rules and Regulations as detailed in OET Bulletin OET-65 provided that the specified precautionary measure to protect members of the public and workers are adhered-to.

Certification

I hereby certify that the foregoing report or statement was prepared by me but may include work performed by others under my supervision or direction. The statements of fact contained therein are believed to be true and correct based on personal knowledge, information and belief unless otherwise stated; with respect to facts not known of my own personal knowledge, I believe them to be true and correct based on their origin from sources known to me to be generally reliable and accurate. I have prepared this document with due care and in accordance with applicable standards of professional practice.

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December 17, 2009
District of Columbia
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