

REVISED STUDY OF COMPLIANCE WITH RADIOFREQUENCY RADIATION GUIDELINES

The constructed WFYI-DT antenna has been changed to an ERI Model ATW28H3-ETO-21S. The antenna is mounted with its center of radiation 253.3 meters above ground, making it 251.3 meters above an observer on the ground, who is assumed to be 2 meters tall. The new antenna uses elliptical polarization. The maximum horizontal effective radiated power (ERP) remains 225 kW (225,000 watts) and the additional maximum vertical ERP is 70 kW (70,000). Thus, the total ERP, horizontal and vertical, is now 295 kW (295,000 watts).

Equation 10 of OET Bulletin No. 65 can be used to predict the potential exposure to radiofrequency radiation for human observers on the ground as indicated by total power density expressed in units of $\mu\text{W}/\text{cm}^2$. This equation states:

$$S = \frac{33.4(F^2)ERP}{R^2}$$

where: S = Total Power Density in units of $\mu\text{W}/\text{cm}^2$
 F = Relative Field of Pattern
 ERP = Effective Radiated Power in Watts
 R = Distance in Meters

In the case of the instant application, a relative field value of 0.2 was used as a “worst case” scenario. This value is greater than any relative field shown on the manufacturer’s tabulation and plot of the vertical plane patterns throughout the depression angles that would place an observer near the base of the tower. The ERP was set equal to 295,000 watts, and a distance of 251.3 meters was used, which would be the antenna height above a 2 meter tall observer standing at the base of the tower. This is also the shortest possible distance from an observer on the ground to the antenna. Solving the above equation for S yields a total power density equal to $6.2408 \mu\text{W}/\text{cm}^2$.

At Channel 21, the FCC guideline for uncontrolled environments is found by dividing the center frequency of the channel, 515 MHz, by 1500. This gives a maximum allowable exposure of $0.3433 \text{ mW}/\text{cm}^2$, or $343.3 \mu\text{W}/\text{cm}^2$. Thus, the maximum predicted total power density from the constructed facility will be 1.82 % of the limit for uncontrolled environments. At this frequency, the limit for uncontrolled environments is one-fifth of the limit for controlled environments. Therefore, the predicted exposure level is 0.36 % of the limit for controlled environments.

Chapter 47 of the Code of Federal Regulations, §1.1307(b)(3) states: *“In general, when the guidelines specified in §1.1310 are exceeded in an accessible area due to the emissions from multiple fixed transmitters, actions necessary to bring the area into compliance are the shared responsibility of all licensees whose transmitters produce, at the area in question, power density levels that exceed 5% of the power density exposure limit applicable to their particular transmitter or field strength levels that, when squared, exceed 5% of the square of the electric or magnetic field strength limit applicable to their particular transmitter. Owners of transmitter sites are expected to allow applicants and licensees to take reasonable steps to comply with the requirements contained in §1.1307(b) and, where feasible, should encourage co-location of transmitters and common solutions for controlling access to areas where the RF exposure limits contained in §1.1310 might be exceeded.”* Should the level of radiofrequency radiation at the constructed site ever exceed the FCC guidelines, the authorized WFYI-DT facility is categorically exempt from responsibility for bringing the shared transmitter site into compliance because its contribution is less than 5.0% of the applicable limit.