

**June 2015**  
**KTWN-FM Channel 242C3**  
**Edina, MN**  
**Auxiliary Antenna RF Exposure Study**

**Facilities Constructed**

The KTWN-FM auxiliary has been constructed on Channel 242C3 (96.3 MHz) with an effective radiated power of 0.430 kilowatts. Operation is with a 2-element circularly-polarized omni-directional 0.85 wavelength-spaced antenna. The antenna is mounted on a support structure atop the IDS Center in Minneapolis. The FCC Antenna Structure Registration Number for the structure is 129018.

**RF Exposure Calculations**

The power density calculations shown below were made using the techniques outlined in OET Bulletin No. 65. "Ground level" calculations in this report have been made at a reference height of 2 meters above ground to provide a worst-case estimate of exposure for persons standing on the ground in the vicinity of the tower. The equation shown below was used to calculate the ground level power density figures from each antenna.

$$S(\mu W / cm^2) = \frac{33.40981 \times AdjERP(Watts)}{D^2}$$

Where: *AdjERP(Watts)* is the maximum lobe effective radiated power times the element pattern factor times the array pattern factor.

*D* is the distance in meters from the center of radiation to the calculation point.

Ground level power densities have been calculated for locations extending from the base of the tower to a distance of 1000 meters. Values past this point are increasingly negligible.

Calculations of the ground-level power density produced by the antenna system assume a Type 6 element pattern, which is the element pattern for the Shively 6812B-2 antenna installed for use. The highest calculated ground level power density occurs at a distance of 137 meters from the base of the antenna support structure. At this point the power density is calculated to be 0.03  $\mu W/cm^2$ , which is just 0.015% of 200  $\mu W/cm^2$  (the FCC standard for uncontrolled environments).

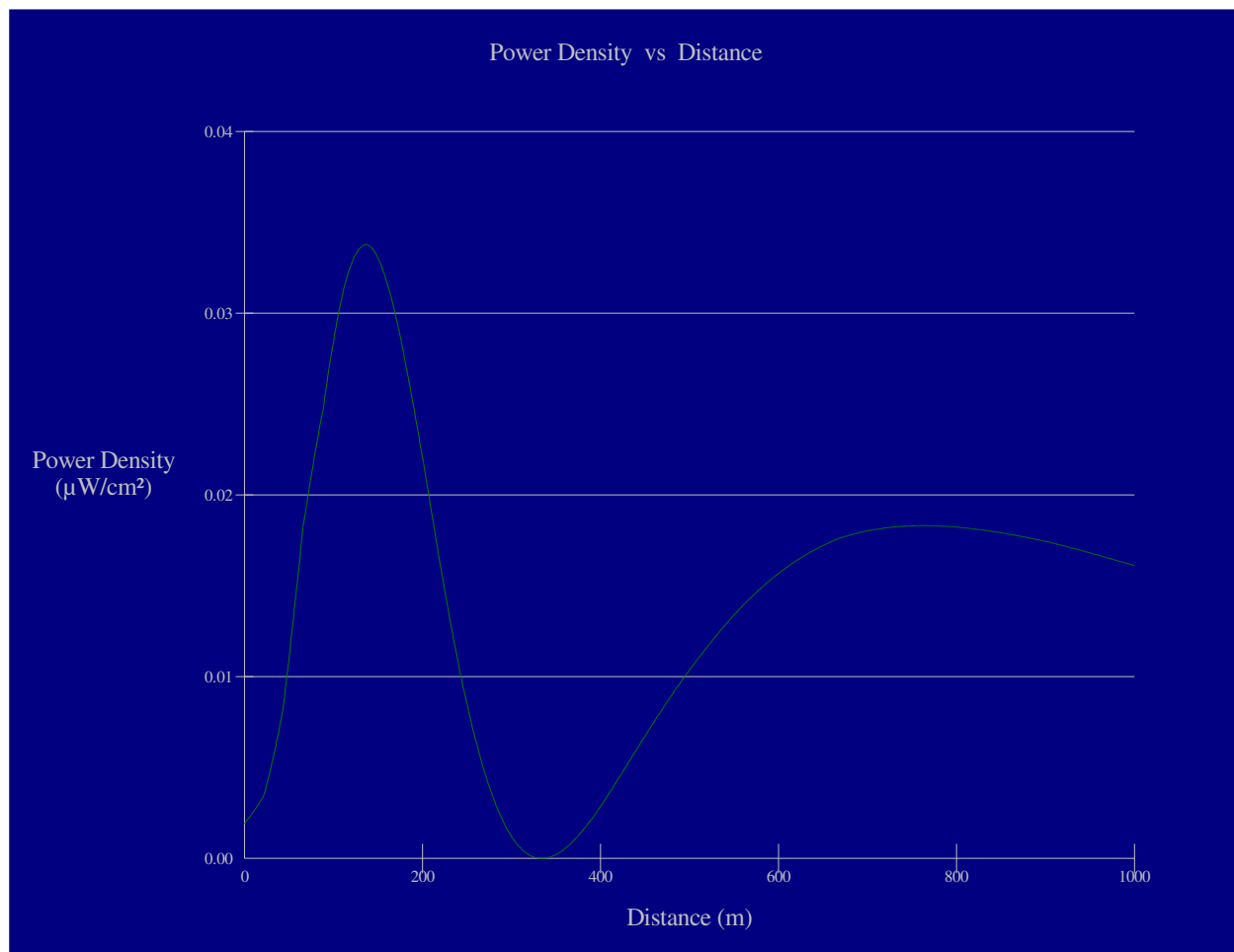
The antenna is installed 9 meters above the building rooftop, which is a controlled environment. The highest calculated rooftop level power density occurs at a distance of 4 meters from the base of the antenna support structure. At this point the power density is calculated to be  $40.7 \mu\text{W}/\text{cm}^2$ , which is 4.1% of  $1000 \mu\text{W}/\text{cm}^2$  (the FCC standard for controlled environments).

**Access to the building rooftop is tightly controlled by building management, and only workers who follow posted procedures are allowed. There is no public access to the rooftop. There are two stairwells leading to the roof. On the inside of each door leading to the roof are posted signs warning of high RFR levels on the roof. Therefore, the rooftop is considered to be a controlled environment.**

These calculations show that the maximum calculated power density produced at two meters above ground level by the operation of the KTNW-FM auxiliary alone is less than 5% of the applicable FCC exposure limit at all locations between 1 and 1000 meters from the base of the antenna support structure. Section 1.1307(b)(3) of the Commission's Rules excludes applications for new facilities or modifications to existing facilities from the requirement of preparing an environmental assessment when the calculated emissions from the applicant's facility are predicted to be less than 5% of the applicable FCC exposure limit. Therefore, the facility is in compliance with Section 1.1301 *et seq* and no further analysis of RF exposure at this site is required in this application.

While the construction permit includes a condition requiring post-construction RF field strength measurements on the rooftop, it is believed that the preceding calculations and description are sufficient to satisfy the requirements of OET Bulletin No. 65 with regard to the FCC guidelines for human exposure to RF fields.

The permittee/licensee in coordination with other users of the site must reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency exposure in excess of FCC guidelines.



## Ground-Level RF Exposure

OET FMModel

### KTWN-FM Auxiliary Antenna

Antenna Type: Shively 6812B-2

No. of Elements: 2

Element Spacing: 0.85 wavelength

Distance: 1000 meters

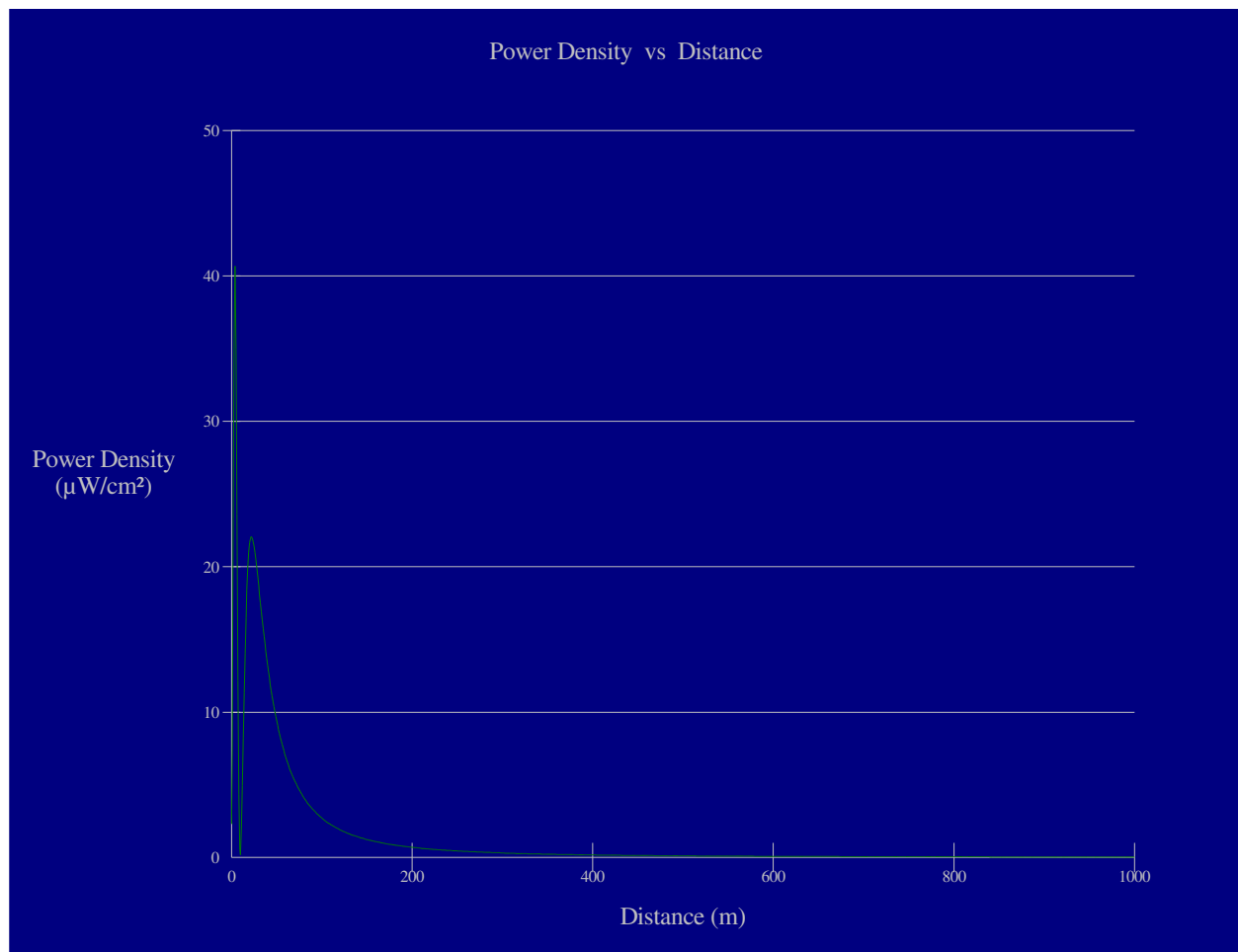
Horizontal ERP: 0.430 kW

Vertical ERP: 0.430 kW

Antenna Height: 245 meters AGL

Maximum Calculated Power Density is 0.03  $\mu\text{W}/\text{cm}^2$  at 137 meters from the antenna structure.

Hatfield & Dawson Consulting Engineers



### Rooftop-Level RF Exposure

OET FMModel

#### KTWN-FM Auxiliary Antenna

Antenna Type: Shively 6812B-2

No. of Elements: 2

Element Spacing: 0.85 wavelength

Distance: 1000 meters

Horizontal ERP: 0.430 kW

Vertical ERP: 0.430 kW

Antenna Height: 9 meters above rooftop

Maximum Calculated Power Density is  $40.7 \mu\text{W}/\text{cm}^2$  at 4 meters from the antenna structure.

Hatfield & Dawson Consulting Engineers