

HATFIELD & DAWSON

CONSULTING ELECTRICAL ENGINEERS

9500 GREENWOOD AVE. N.

SEATTLE, WASHINGTON 98103

JAMES B. HATFIELD, PE
BENJAMIN F. DAWSON III, PE
THOMAS M. ECKELS, PE
STEPHEN S. LOCKWOOD, PE
DAVID J. PINION, PE

PAUL W. LEONARD, PE
ERIK C. SWANSON, EIT
THOMAS S. GORTON, PE

TELEPHONE

(206) 783-9151

FACSIMILE

(206) 789-9834

E-MAIL

hatdaw@hatdaw.com

MAURY L. HATFIELD, PE

CONSULTANT

OAKHURST, NSW

AUSTRALIA

September 2005
FM Station RFR Analysis
KTCB(FM) Channel 208A Tillamook, OR

KTCB operates on Channel 208A (89.5 MHz) with an effective radiated power of 0.38 kilowatts. Operation is with a 2-element circularly-polarized omnidirectional antenna mounted on a tower located on Cape Meares.

There are several other broadcast users of this site. Precise calculations have been made with regard to the levels from all authorized stations. Calculations have been made using station technical data from the FCC's Consolidated Database System and from the station licensee.

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 power density produced by the KTCB antenna system assume a Type 6 element pattern, which is the element pattern for the Shively 6812-2 antenna used by that station. The highest calculated ground level power density occurs at a distance of 10 meters from the base of the antenna support structure. At this point the power density is calculated to be 14.8 $\mu W/cm^2$, which is 1.5% of 1000 $\mu W/cm^2$ (the FCC standard for controlled environments) and 7.4% of 200 $\mu W/cm^2$ (the FCC standard for uncontrolled environments).

Calculations of the maximum contribution from KTCB and each of the other stations at this site are summarized in the following table:

Facility	Power/ Antenna Height	Antenna Type/ Bay Spacing	Maximum Contribution/ Percent of Uncontrolled
KAIK 203A	0.06 kW (V only) 32 meters AGL	ring-stub assumed 1 bay	2.1 $\mu\text{W}/\text{cm}^2$ at 7 m 1.05%
KTCB 208A	0.38 kW (H+V) 17 meters AGL	Shively 6812-2 2 bay 1.0 wavelength	14.8 $\mu\text{W}/\text{cm}^2$ at 10 m 7.4%
KTMK 216A	0.14 kW (H+V) 22 meters AGL	Dielectric DCR-L2 2 bay ring-stub 1.0 wavelength	13.9 $\mu\text{W}/\text{cm}^2$ at 5 m 7.0%
KTIL 231C3	1.8 kW (H+V) 27 meters AGL	Antenna Concepts "double V" 4-bay 0.5 wavelength	5.2 $\mu\text{W}/\text{cm}^2$ at 93 m 2.6%
KIXT 240A	0.45 kW (H+V) 30 meters AGL	Armstrong FMA-707W-1 1 bay ring-stub assumed	23.1 $\mu\text{W}/\text{cm}^2$ at 8 m 11.55%
KDEP 288A	0.32 kW (H+V) 30 meters AGL	Armstrong FMA-707W-1 1 bay ring-stub assumed	16.4 $\mu\text{W}/\text{cm}^2$ at 8 m 8.2%
K26HS Ch26	14 kW (H only) 32 meters AGL	Andrew ALP16L2-HSP	6.3 $\mu\text{W}/\text{cm}^2$ at tower base 1.7%

(Maximum power density contribution from K26HS has been made assuming a relative field value of 0.142, which is the highest relative field value at angles more than 45 degrees below the horizontal according to the manufacturer's vertical plane pattern. 20% aural power was assumed as a worst-case value. The K26HS facility was therefore assumed to radiate 169 Watts straight down.)

FM translator K214DP is authorized for operation with an ERP of less than 100 Watts and is therefore categorically excluded from study, and is not included in the table above.

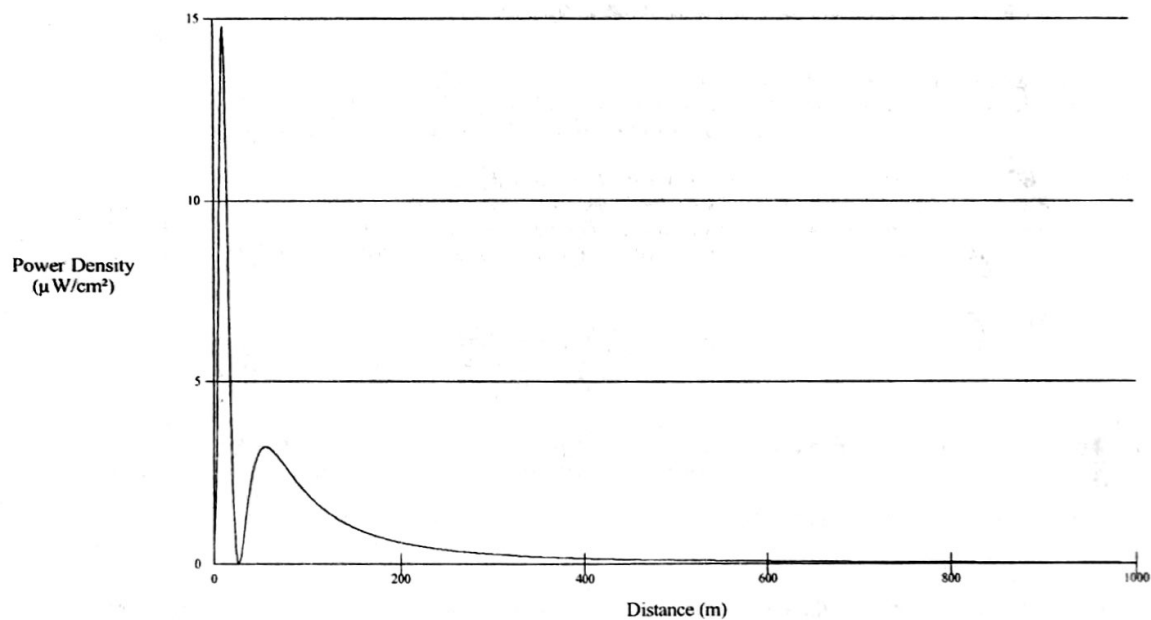
These calculations show that the maximum calculated power density produced at two meters above ground level by the combined operations of KTCB and the other stations authorized at this site (were their maxima to coincide, which they do not) is 39.5% of the FCC standard for uncontrolled areas.

Public access to the site is restricted and the antenna tower is posted with warning signs. Pursuant to OET Bulletin No. 65, all station personnel and contractors are required to follow appropriate safety procedures before any work is commenced on the antenna tower, including reduction in power or discontinuance of operation before any maintenance work is undertaken.



Erik C. Swanson
Technical Consultant

Power Density vs Distance



Ground-Level NIER Analysis

OET FMModel

KTCB 208A Tillamook
Antenna Type: Shively 6812-2
Number of Elements: 2
Element Spacing: 1.0 wavelength

Distance: 1000 meters
Horizontal ERP: 0.38 kW
Vertical ERP: 0.38 kW

Antenna Height: 17 meters AGL

Maximum Power Density is 14.8 µW/cm² at 10 meters from the antenna structure.