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ELECTROMAGNETIC FIELD MEASUREMENTS
FM TRANSMITTER SITES AT THE
KTVZ TOWER
AT AWBREY BUTTE
BEND, OREGON

14 MAY 2001

INTRODUCTION

On 13 May 2001 radiofrequency power density measurements were made around the KTYZ-TV tower atop Awbrey Butte in Bend, Oregon. KPXA and KQAK share an antenna on this tower. The measurements were made between the hours of 11 PM and 12 P.M. To my knowledge all relevant nearby FM and TV transmitters were operating at licensed power as the measurements were made.

MEASUREMENT PROCEDURES

Measurement procedures outlined in **OET BULLETIN 65, (EDITION 97-01)**, [OET 65] **“Evaluating Compliance With FCC-Specified Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields”**, **ANSI/IEEE Std C95.3-1991, IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields--RF and Microwave**, and **NCRP Report No. 119, “A Practical Guide to the Determination of Human Exposure to Radiofrequency Fields”** were used for the measurements taken at Awbrey Butte at areas within 100 feet of the towers. Spatially averaged measurements were made at the points where the highest fields were found.

According to the ANSI C95.3 guidelines (reaffirmed in OET 65), measurements to determine exposure compliance are to be made at distances 20 cm or greater from any object. This is to assure that the measurements are not contaminated by re-radiation from conductive objects.

METER AND PROBE

A NARDA Model 8718-10 Electromagnetic Radiation Survey Meter (S/N 01575) with a NARDA Model 8742 Isotropic Shaped Electric Field Probe (S/N 03013) was used to make the measurements. The meter was calibrated October 2000 by the manufacturer. The NARDA 8742

probe provides an output proportional to **CFR 47 §1.1310 Radiofrequency Radiation Exposure Limits** (Occupational/Controlled Environment) maximum permissible exposure (MPE) over a frequency range from 300 kHz to 2.7 GHz. The isotropic response of the NARDA 8742 probe is +/-0.75dB.

The NARDA Model 8718 Electromagnetic Radiation Survey Meter allows for accurate and repeatable spatially averaged measurements through the use of its time averaging feature. A single key stroke implements the meter's time averaging function as the probe is swept through an area that approximates that of the human body. Spatial peak fields are also stored by the meter during the spatially averaged measurement.

The NARDA diode probes, such as the Model 8742, are designed to provide signal detection on a square law basis and yields accurate readings of fields from multiple fields. Other available measurement devices, such as those manufactured by Holaday and Wandel & Golterman, use linear detection and square the signals after adding. If there are two signals of roughly equal intensity, $E_1 + E_2$ the desired summation is $(E_1)^2 + (E_2)^2$. The result obtained by squaring the signals after addition is $(E_1)^2 + (E_1)(E_2) + (E_2)^2$. The $(E_1)(E_2)$ term results in a measurement error. For this reason the most accurate measurements of RF fields using diode detection are provided by use of probes such as the NARDA 8742D probe that utilize square law detection. Diode probe errors are also discussed in "*Multiple-Source, Multiple Frequency Error of an Electric Field Meter*" (Randa and Kanda).

MEASURED FIELDS

All other areas within the site area are below the FCC Occupational/Controlled Environment MPE. Publicly accessible areas outside site associated with this transmitting facility are below the FCC General Public MPE. The following measurements were made at the points where maximum fields were measured.

Location	Percent of FCC Occupational/Controlled Environment MPE ¹
20 feet west of KTVZ-TV (KXPA & KQAK) tower	45.0 %
10 feet south of KTVZ-TV building	21.5%

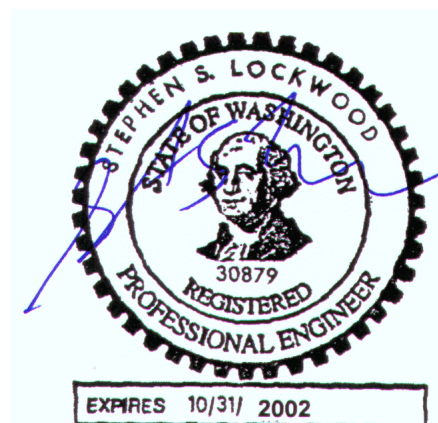
Outside the site area no locations were found where the spatially averaged measured power densities exceeded the FCC MPE for the general public environments, and no locations within the fenced area exceed the FCC MPE for occupational controlled environments. This site is located on a mountaintop accessible only by a gravel road and a locked gate. The site is posted with the appropriate warning signs. All station personnel and contractors are required to follow safety procedures before any work is commenced on the site.

STATEMENT OF ENGINEER

This Engineering Report, regarding radiofrequency field measurements around the TV and FM transmitter sites at the Awbrey Butte Communications Site, has been prepared by myself or under my direct supervision. All representations contained herein are true to the best of my knowledge. I am an experienced radio engineer whose qualifications are a matter of record with the Federal Communications Commission. I am a partner in the firm of Hatfield and Dawson Consulting Engineers and am Registered as a Professional Engineer in the States of Washington and Alaska.

Stephen S. Lockwood, P.E.

15 May 2001



¹According to **CFR 47 §1.1310 Radiofrequency Radiation Exposure Limits** the General Population/Uncontrolled Environment MPE is 20% of Occupational/Controlled Environment MPE

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SITE DIAGRAM

NEW FM

BEND, OR

9/97