

# **Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields**

**KHHK-KRSE-KXDD Auxiliary Transmitter Site  
Larsen Building Rooftop  
E. Yakima Avenue and S. 2<sup>nd</sup> Street  
Yakima, Washington**

**Report of Measurements & Conclusions  
June 24, 2014**

This report details radio frequency radiation (RFR) measurements made on June 24<sup>th</sup>, 2014, at the KHHK-KRSE-KKXD auxiliary transmitter site located on the rooftop of the Larsen Building at the corner of E. Yakima Avenue and S. 2<sup>nd</sup> Street in downtown Yakima, Washington. The measurements detailed herein were made by James Boyd of Boyd Broadcast Technical Services.

The measurement equipment used consists of a Narda Microwave model 8718B RFR meter (SN: 7127) with a model A8722D E-Field probe (SN: 09014). The E-Field probe is broadband with a frequency coverage of 300 kHz to 50 GHz. The instrument set was calibrated in August of 2013.

The A8722D probe used is a “shaped” probe, meaning that the response to radiofrequency fields follows the 1997 FCC Limits for Maximum Permissible Exposure (MPE) for Occupational/Controlled Exposure, resulting in a display on the 8718B meter of percentage of MPE. Because of the frequencies in use at this site, the MPE for General Population/Uncontrolled Exposure limit is one-fifth or 20% of the Occupational/Controlled Exposure limit. Readings in areas where access is available to the General Population (Uncontrolled), were multiplied by a factor of 5. The FCC Limits for Maximum Permissible Exposure curve is shown on page twelve. A picture of the test equipment used is shown on page thirteen.

Measurement techniques used are consistent with generally accepted practices. Steps and procedures used in making these measurements are similar to those printed in Section 3 of OET Bulletin 65, Edition 97-01, August 1997, published by the FCC Office of Engineering and Technology.

The auxiliary facility is designed to be used by just one of three stations at a time. Each one operating with a maximum of 1,000 watts ERP in the Horizontal and Vertical planes. The antenna, which is an EPA Type 2 Double V antenna is mounted on a 20 foot pole which is mounted on the roof of a building housing an HVAC air handler. This building is a structure constructed on top of the roof of the Larsen Building. It is part of another taller structure adjacent to the antenna which houses the elevator motors and controls for the elevator system of the building. In addition to the antenna system for these three stations there are a number of other communications and microwave relay antennas. Immediately below the roof where these buildings are located is an attic structure which is less than six feet from ceiling to floor. The attic and rooftop are only accessible by a stairway leading from the eleventh floor of the Larsen Building. Access to the stairwell, the attic and the rooftop is through a locked door.

To make the measurements detailed in this report one of the three stations was operated with facilities and power levels specified in the station construction permit.

The data collected conclusively shows RFR levels in areas accessible to the general public do not exceed FCC limits for General Public/Uncontrolled MPE. The only areas accessible to the General Public are at the eleventh floor of the Larsen Building and at floors lower than the eleventh.

Workers in the attic and on the roof top of the building are safe at full power levels.

Areas on the roof of the structure supporting the antenna and on the roof of the building adjacent to this area which houses the elevator motors and controls exceed Occupational/Controlled Exposure MPE levels as well as General Population/Uncontrolled MPE.

Areas inside the elevator motor and control room exceed General Population/Uncontrolled Exposure MPE levels. These areas are only accessible by authorized workers.

All other areas on the roof, the attic and areas on the eleventh floor and lower have no measureable RFR.

**Here are recommendations:**

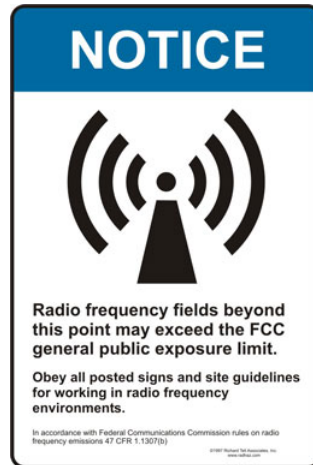
Adequate signs need to be posted at several locations.

First, at the door to the stairwell leaving the eleventh floor. The following sign should be posted:

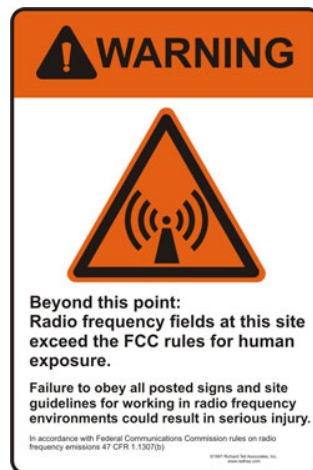


A sign with contact information for radio station technical personnel should be posted with this sign.

**At the top of the stairway leading to the attic area, the following sign should be posted.**



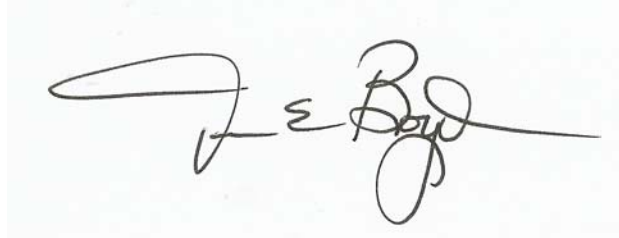
**At the stairwell leading to the elevator motor and control room, the following sign should be posted. Again contact information for radio station technical personnel should be posted with this sign.**



**The same sign should be posted on the roof of the building at the ladder leading to the antenna and the ladder leading to the roof of the elevator motor and control building adjacent to the antenna. And again, contact information for radio station technical personnel should be posted with this sign.**

A listing of peak RFR levels is shown on page five. A drawing of the site is shown on page six. Pictures of the transmitter site are shown on pages seven through eleven.

All measurements were made by the undersigned who is an experienced radio broadcast technician and has experience making these measurements. The technical qualifications of the undersigned are a matter of record with the Federal Communications Commission.

A handwritten signature in black ink, appearing to read "J E Boyd", with a long horizontal flourish extending to the right.

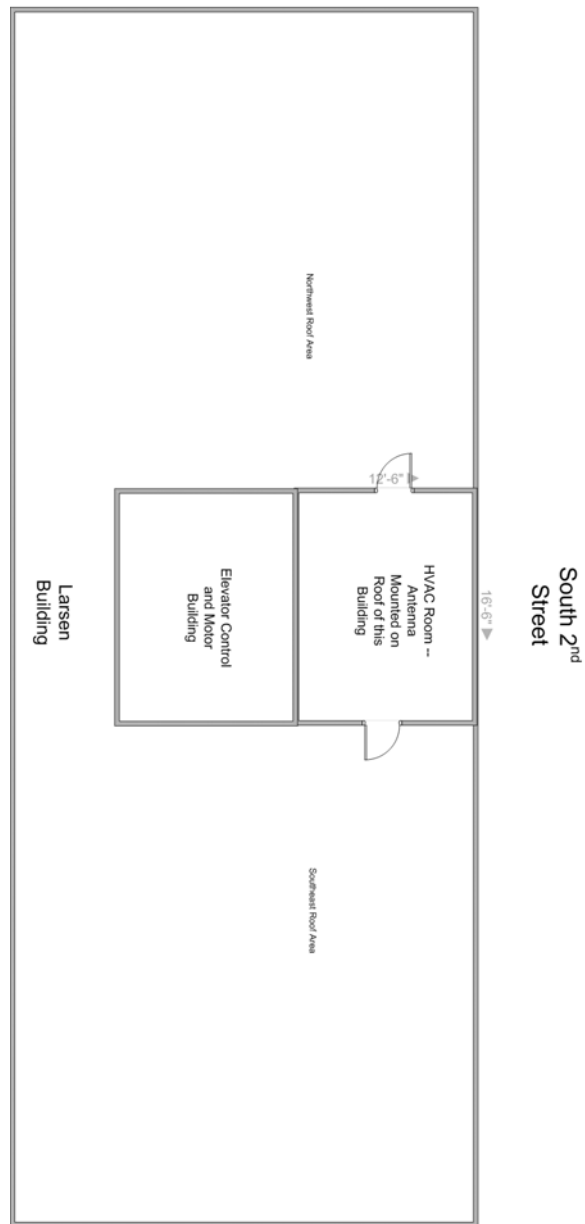
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### **Summary of Peak RFR Levels**

Inside of HVAC building on which the antenna is roof mounted:	9.525% of Occupational/Controlled MPE MPE 30.1% of General Population MPE
Roof area on northwest end of building:	7.425% of Occupational MPE 37.125% of General Population MPE
Roof area on southeast end of building:	5.325% of Occupational MPE 26.625% of General Population MPE
Inside the elevator control and motor room:	20% of Occupational MPE 100% of General Population MPE
Roof where antenna is located:	300% of Occupational MPE
Roof of the elevator control and motor room:	100% of Occupational MPE



East  
Yakima  
Avenue



Building Layout



Larsen Building as seen from parking lot on South 2<sup>nd</sup> Street



Close up photo -- Antenna subject of study can be seen top center.





View of antenna from northwest roof. Ladder to roof of HVAC building can be seen.



Alternate view from northwest roof



Northwest roof looking northwest



Photo shows ladder to roof where antenna is located.



VIEW OF SOUTHEAST ROOF



INTERIOR VIEW OF ELEVATOR CONTROL AND MOTOR ROOM



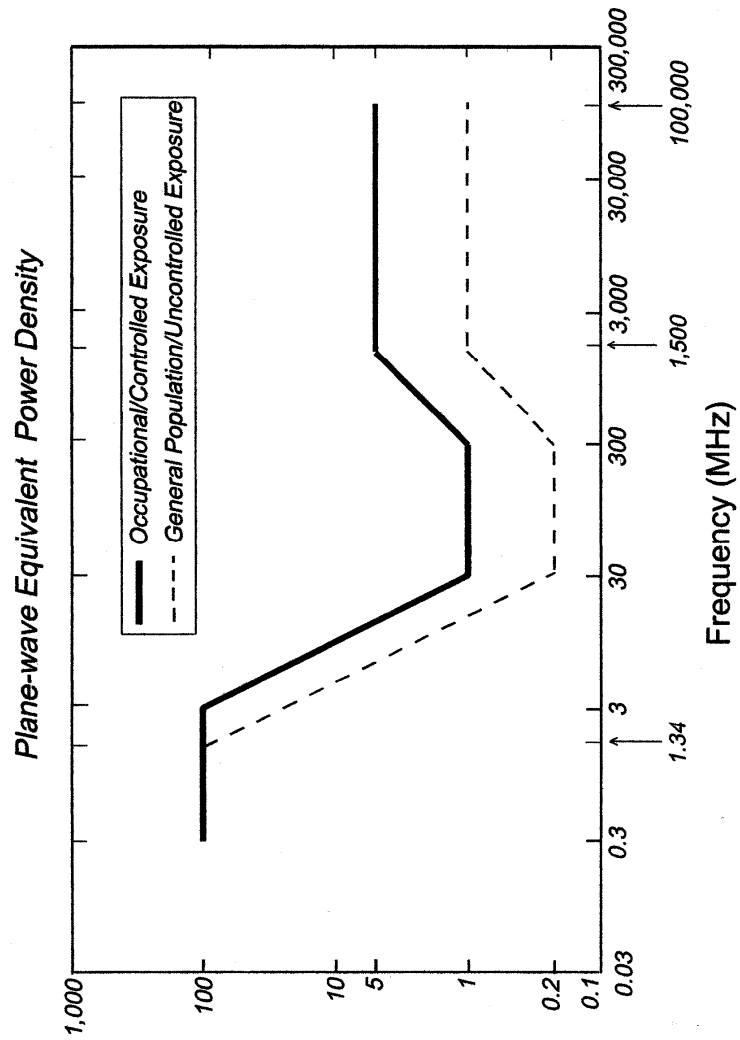


ATTIC AREA BELOW ROOF



ALTERNATE VIEW OF ATTIC AREA

**Figure 1. FCC Limits for Maximum Permissible Exposure (MPE)**





Narda Test Equipment