February 2016
New FM   Channel 229C3
Waldport, Oregon
RF Exposure Study

Facilities Constructed

The construction permit BNPH-20150914AFC bears a set of conditions which require that post-construction RF exposure measurements be performed as a condition of licensing, and that those a report detailing those measurements should be included with the Form 302-FM application, along with a description of any measures taken to restrict access to areas to prevent the exposure of humans to RF fields in excess of the FCC limits.

Those conditions were imposed because at the time of application the exact antenna model to be used had not yet been determined, and so the calculations could assume only the "worst case" model of antenna. The permittee has installed an ERI LPX-4E antenna, which has a much more favorable elevation pattern than does the worst-case assumption. As a result, the following calculations demonstrate that the constructed facility is in compliance with the FCC guidelines, and no measurements are necessary as a condition for licensing.

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.
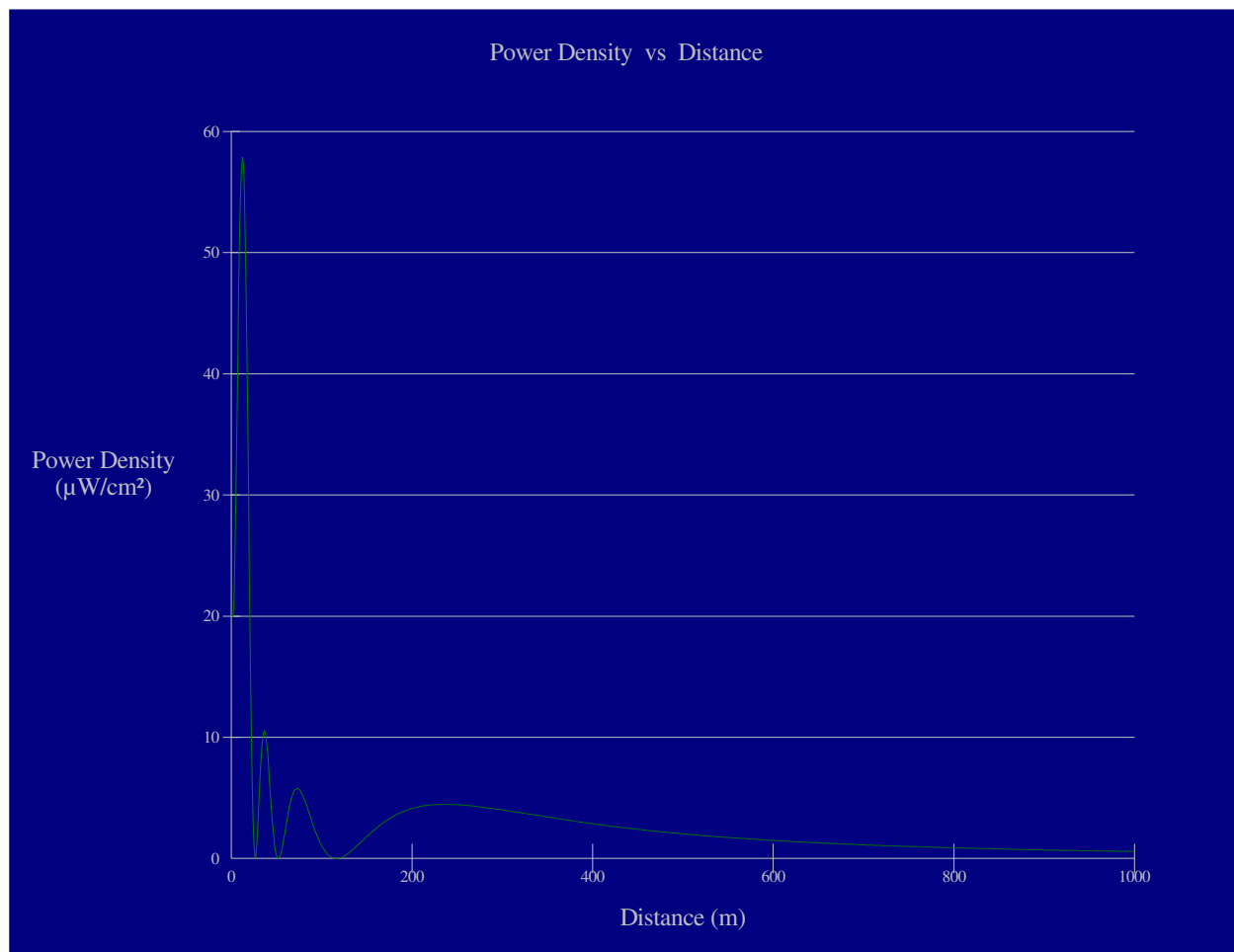
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Calculations of the power density produced by the constructed antenna system assume a Type 3 element pattern, which is the appropriate element pattern for the ERI LPX-3E antenna which has been installed. The highest calculated ground level power density occurs at a distance of 12 meters from the base of the antenna support structure. At this point the power density is calculated to be 57.9 $\mu W/cm^2$.

Calculations of the power density produced by this and the other stations at this transmitter site are summarized in the following table:

Call	Avg or Peak ERP Antenna Model	Relative Field	Height AGL	Calculated Max Exposure	Gen Pub FCC Limit	% of Limit
Waldport 229C3	9 kW H 9 kW V ERI LPX-4E 4-bay full-wave	FMModel	32 m	57.9 $\mu W/cm^2$	200 $\mu W/cm^2$	29.0%
KYAQ 219A	0.690 kW H 0.690 kW V SWR FMEC/2-HWS ring stub assumed 2-bay full-wave	FMModel	42 m	3.4 $\mu W/cm^2$	200 $\mu W/cm^2$	1.7%
K217FZ	0.140 kW H 0.140 kW V BEX TFC-1K ring stub assumed 1-bay	FMModel	24 m	11.6 $\mu W/cm^2$	200 $\mu W/cm^2$	5.8%
K204CP	0.062 kW V dipole assumed 1-bay	FMModel	20 m	6.1 $\mu W/cm^2$	200 $\mu W/cm^2$	3.1%

These calculations show that the maximum calculated power density produced at two meters above ground level by the proposed operation and the present operation of the other stations at this site (were their maxima to coincide, which they do not) is 39.5% of 200 $\mu W/cm^2$ (the FCC standard for uncontrolled environments).

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.

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Power Density vs Distance

Ground-Level RF Exposure   **OET FMModel**

Waldport 229C3
Antenna Type: ERI LPX-4E "rototiller"
No. of Elements: 4
Element Spacing: 1.0 wavelength

Distance: 1000 meters
Horizontal ERP: 9 kW
Vertical ERP: 9 kW

Antenna Height: 32 meters AGL

Maximum Calculated Power Density is 57.9 μW/cm^2 at 12 meters from the antenna structure.

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