October 2006
KUKI-FM Channel 277B Ukiah, California
NIER Analysis

Facilities Proposed

The proposed operation will be on Channel 277B (103.3 MHz) with an effective radiated power of 2.9 kilowatts. Operation is proposed with the existing 4-element circularly-polarized omni-directional antenna. The antenna is side-mounted on a tower located on a hilltop in the Laughlin Range.

The tower structure does not exceed 60.96 meters (200 feet) above ground and does not require notification to the Federal Aviation Administration. Therefore, this structure does not require an Antenna Structure Registration Number.

NIER 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.

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

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.

Hatfield & Dawson Consulting Engineers

Calculations of the power density produced by the KUKI-FM antenna system assume a Type 2 element pattern, which is the element pattern for the Jampro JMPC-4D antenna used by KUKI-FM. The highest calculated ground level power density occurs at a distance of 7 meters from the base of the antenna support structure. At this point the power density is calculated to be 88.8 µW/cm².

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

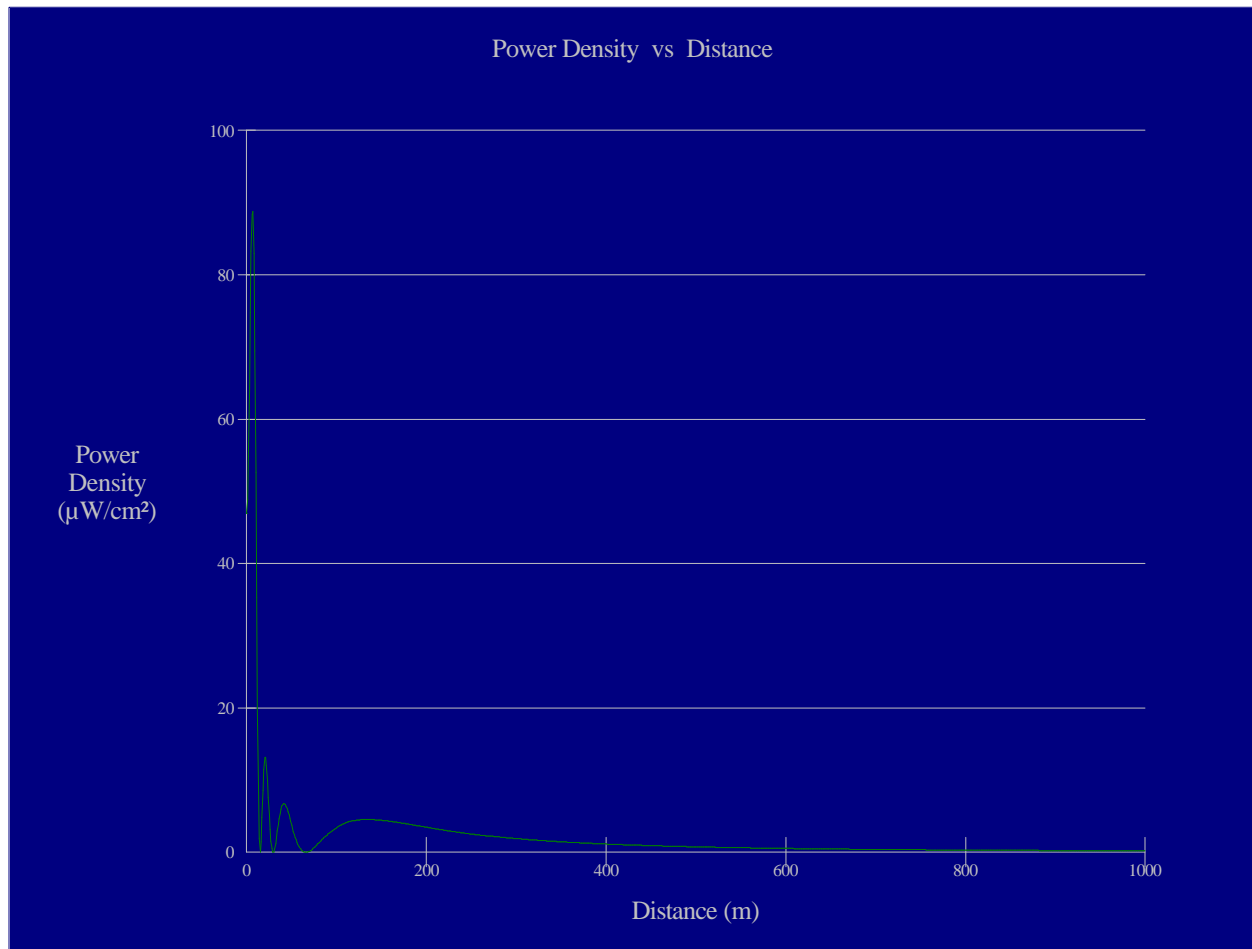| Call	Avg or Peak ERP Antenna Model	Relative Field	Height AGL	Calculated Exposure	Gen Pub FCC Limit	% of Limit
KZYZ(FM)	1.7 kW avg SHI 6813-2-SS	FMModel	15 m	56.7 µW/cm²	200 µW/cm²	28.4%
K240AU	0.09 kW avg ring stub assumed	FMModel	14 m	25.1 µW/cm²	200 µW/cm²	12.6%
KUKI-FM	2.9 kW avg JAM JMPC-4D	FMModel	19 m	88.8 µW/cm²	200 µW/cm²	44.4%

Nearby FM translator K244AH operates with an ERP of less than 100 Watts and is therefore excluded from this study.

These calculations show that the maximum calculated power density produced at two meters above ground level by the proposed operation of KUKI-FM and the present operation of the other stations at this transmitter site (were their maxima to coincide, which they do not) is 85.3% of 200 µW/cm² (the FCC standard for uncontrolled environments).

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

Hatfield & Dawson Consulting Engineers

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.

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 radiation in excess of FCC guidelines.

Hatfield & Dawson Consulting Engineers

Power Density vs Distance

Power Density (μW/cm²) vs Distance (m)

Ground-Level NIER   **OET FMModel**

KUKI-FM 277B Ukiah
Antenna Type: Jampro JMPC-4D "double V"
Number of Elements: 4
Element Spacing: 1.0 wavelength

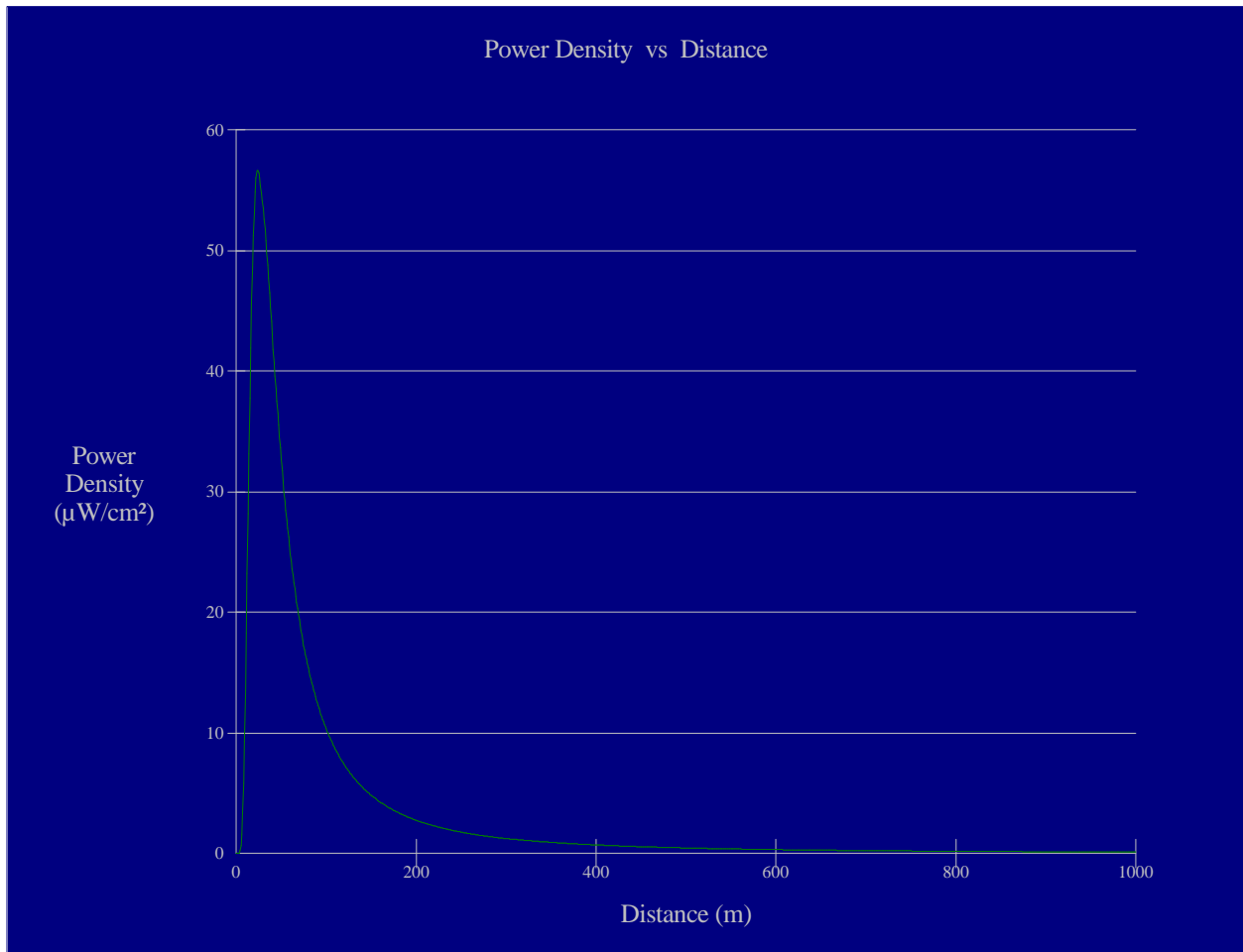Distance: 1000 meters
Horizontal ERP: 2.9 kW
Vertical ERP: 2.9 kW

Antenna Height: 19 meters AGL

Maximum Power Density is 88.8 : W/cm2 at 7 meters from the antenna structure.

Hatfield & Dawson Consulting Engineers

Power Density vs Distance

Ground-Level NIER   **OET FMModel**

KYKZ(FM) 218B Willits
Antenna Type: Shively 6813-2-SS
Number of Elements: 2
Element Spacing: 0.5 wavelength
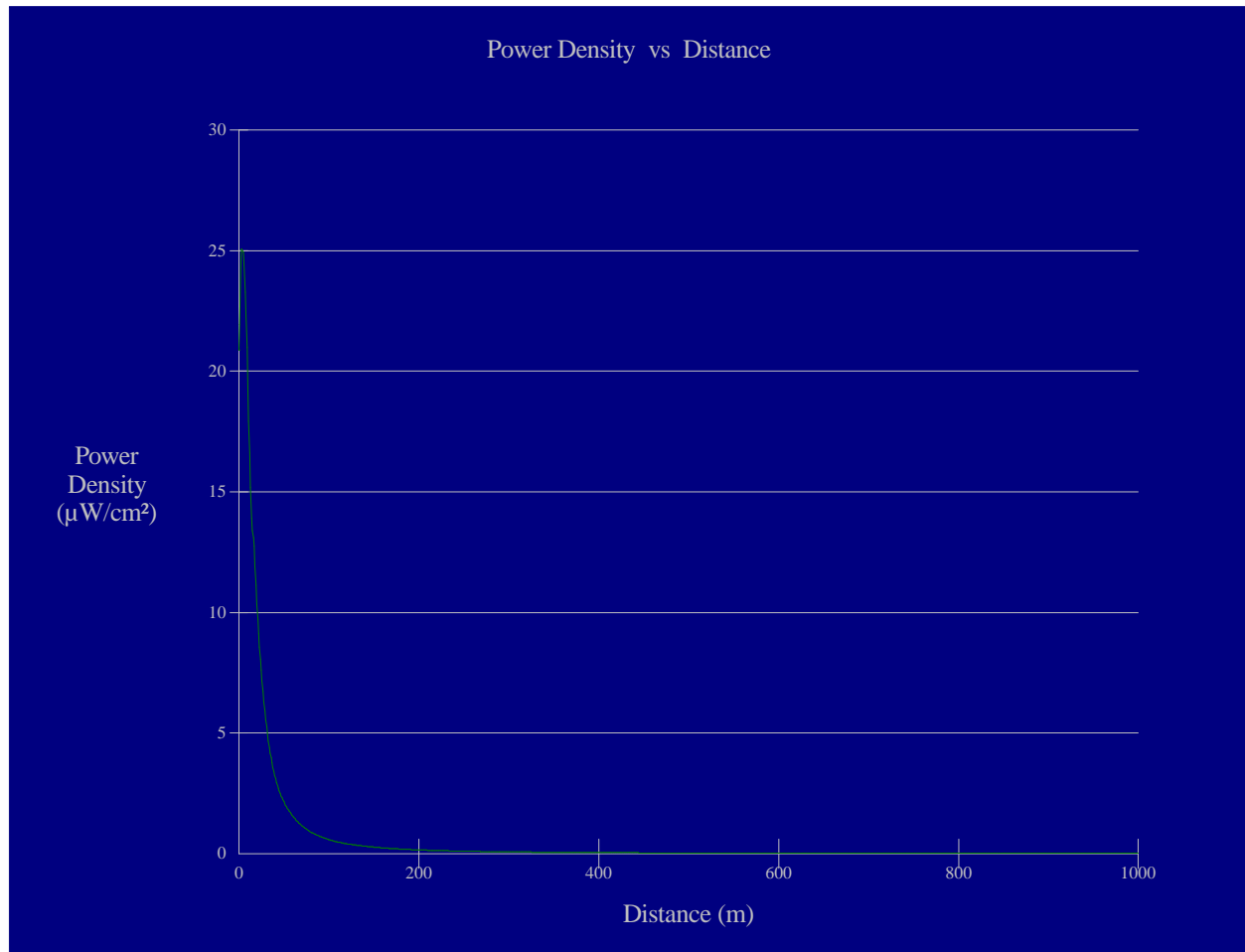
Distance: 1000 meters
Horizontal ERP: 1.7 kW
Vertical ERP: 1.7 kW

Antenna Height: 15 meters AGL

Maximum Power Density is 56.7 : W/cm2 at 24 meters from the antenna structure.

Hatfield & Dawson Consulting Engineers

Power Density vs Distance

Power Density (µW/cm²) vs Distance (m)

Ground-Level NIER   **OET FMModel**

K240AU Ukiah
Antenna Type: ring-stub assumed
Number of Elements: 1
Element Spacing: dna

Distance: 1000 meters
Horizontal ERP: 0.09 kW
Vertical ERP: 0.09 kW

Antenna Height: 14 meters AGL

Maximum Power Density is 25.1 : W/cm2 at 3 meters from the antenna structure.

Hatfield & Dawson Consulting Engineers