

June 2015
KOIT(FM) Channel 243B
San Francisco, California
Auxiliary Antenna Engineering

Facilities Proposed

The proposed auxiliary antenna operation will be on Channel 243B (96.5 MHz) with an effective radiated power of 36 kilowatts. Operation is proposed with a 6-element circularly-polarized omni-directional half-wave-spaced antenna which will be side-mounted on an existing tower with FCC Antenna Structure Registration Number 1001289. This is also the site of the licensed KOIT main operation.

Grandfathered Superpowered Facility

KOIT is licensed as a grandfathered superpowered station. While the reference 60 dBu contour distance for a Class B station is 52 kilometers, the KOIT main facility BMLH-20111004ACJ operates with 24 kW ERP at 480 meters HAAT. This results in a 60 dBu contour distance of 70.2 kilometers.

The proposed KOIT auxiliary facility will operate with 36 kW ERP at 412 meters HAAT, which results in a 60 dBu contour distance of 69.9 kilometers. Furthermore, since the auxiliary facility will be located on the same tower as the main facility, the auxiliary 60 dBu contour will be completely contained within the main 60 dBu contour as required by §73.1675(a)(1) of the Commission's Rules.¹

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.

¹ Informal consultation with Audio Division staff confirms our conclusion that §73.1675 does not in any way require that an auxiliary facility for a grandfathered superpowered station comply with the ERP/HAAT limits in §73.211 of the Rules. Indeed, the existing KOIT auxiliary facility BXLH-20071210ACZ is licensed with technical parameters in excess of those normally permitted by §73.211.

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

Where: *AdjERP(Watts)* is the maximum lobe effective radiated power times the element pattern factor times the array pattern factor.

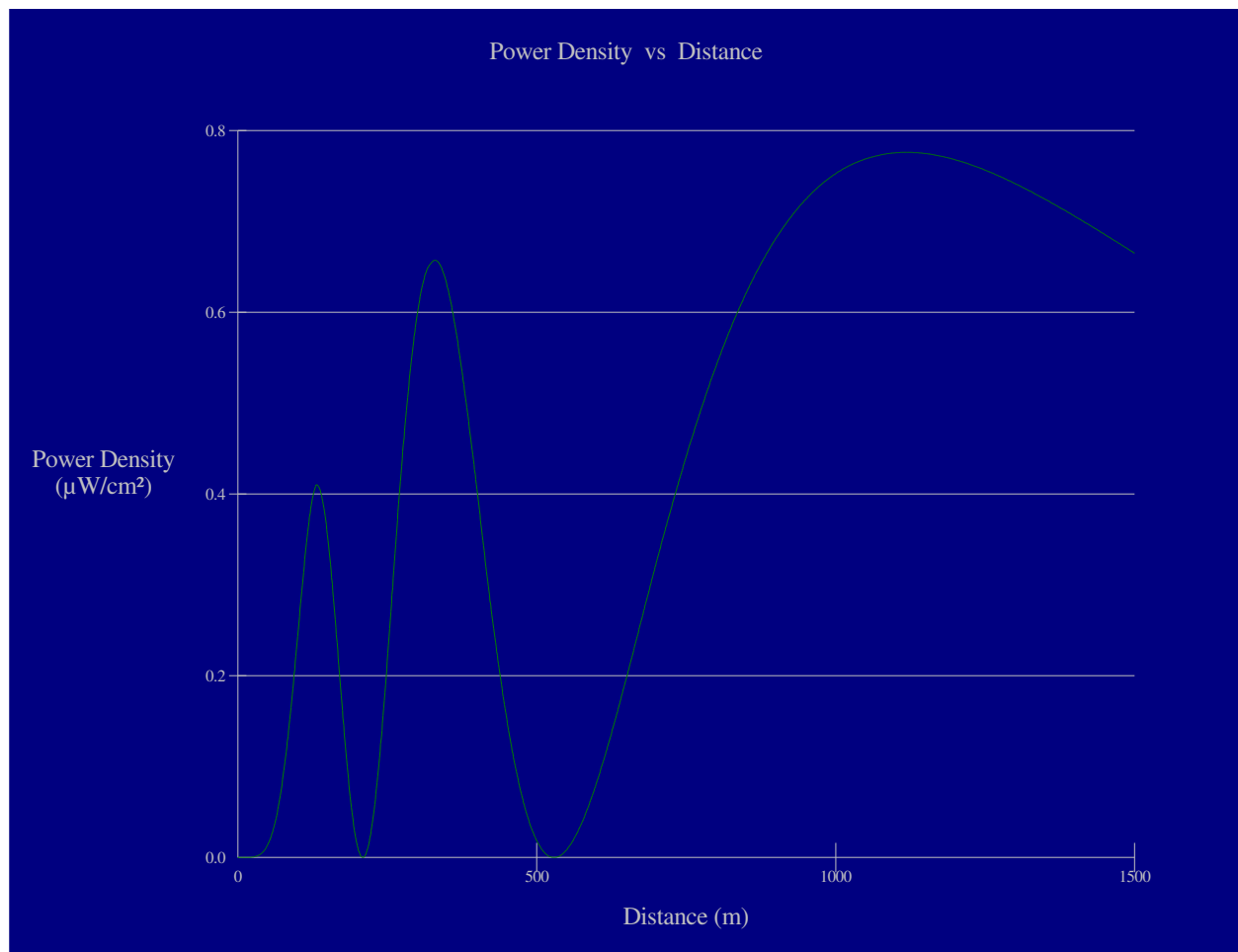
D is the distance in meters from the center of radiation to the calculation point.

Ground level power densities have been calculated for locations extending from the base of the tower to a distance of 1500 meters. Values past this point are increasingly negligible.

Calculations of the power density produced by the proposed antenna system assume a Type 3 element pattern, which is the element pattern for the ERI SHP-6AC-HW antenna proposed for use. The highest calculated ground level power density occurs at a distance of 1118 meters from the base of the antenna support structure. At this point the power density is calculated to be 0.8 $\mu W/cm^2$, which is <0.1% of 1000 $\mu W/cm^2$ (the FCC standard for controlled environments) and 0.4% of 200 $\mu W/cm^2$ (the FCC standard for uncontrolled environments).

These calculations show that the maximum calculated power density produced at two meters above ground level by the proposed operation of the KOIT auxiliary alone is less than 5% of the applicable FCC exposure limit at all locations between 1 and 1000 meters from the base of the antenna support structure. Section 1.1307(b)(3) of the Commission's Rules excludes applications for new facilities or modifications to existing facilities from the requirement of preparing an environmental assessment when the calculated emissions from the applicant's proposed facility are predicted to be less than 5% of the applicable FCC exposure limit. Therefore, the proposed facility is in compliance with Section 1.1301 *et seq* and no further analysis of RF exposure at this site is required in this application.

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.



Ground-Level RF Exposure

OET FMModel

KOIT Auxiliary Antenna

Antenna Type: ERI SHP-6AC-HW "rototiller"

No. of Elements: 6

Element Spacing: 0.5 wavelength

Distance: 1500 meters

Horizontal ERP: 36 kW

Vertical ERP: 36 kW

Antenna Height: 189 meters AGL

Maximum Calculated Power Density is $0.8 \mu\text{W}/\text{cm}^2$ at 1118 meters from the antenna structure.

Hatfield & Dawson Consulting Engineers

