November 2018
KNUC(FM)   Channel 255C
Seattle, Washington
Auxiliary Antenna Facility Modification

Facilities Proposed

The instant Form 302-FM application requests an increase in TPO and ERP for the auxiliary facility, now that a new transmitter (with higher power output rating) has been installed at the transmitter site. The upgraded auxiliary facility has an effective radiated power of 8.5 kilowatts. Operation is with the existing 4-element circularly-polarized omni-directional Jampro JLPC-4 antenna.

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 500 meters. Values past this point are increasingly negligible.

Calculations of the power density produced by the proposed antenna system assume a Type 2 element pattern, which is the element pattern for the Jampro JLPC-4 antenna which is used by this facility. The highest calculated ground level power density occurs at a distance of 24 meters from the base of the antenna support structure. At this point the power density is calculated to be 20.3 µW/cm².   This maximum occurs within the secured fenceline of the Cougar Mountain communications site. The several towers at this site are surrounded by a fence with a locked gate

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to prevent casual access to the towers and transmitter buildings. The FCC standard for controlled environments is considered to pertain within the fenceline, and the calculated maximum ground level power density from the KNUC auxiliary facility is 2.0% of 1000 μW/cm^2 (the FCC standard for controlled environments).

The nearest point on the fenceline is approximately 52 meters from the base of the tower on which the KNUC auxiliary antenna is installed. At distances greater than 52 meters from the tower, the highest calculated ground level power density occurs at a distance of 71 meters from the base of the antenna support structure. At this point the power density is calculated to be 3.3 μW/cm², which is 1.7% of 200 μW/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 KNUC auxiliary alone is less than 5% of the applicable FCC exposure limit at all locations between 1 and 500 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.

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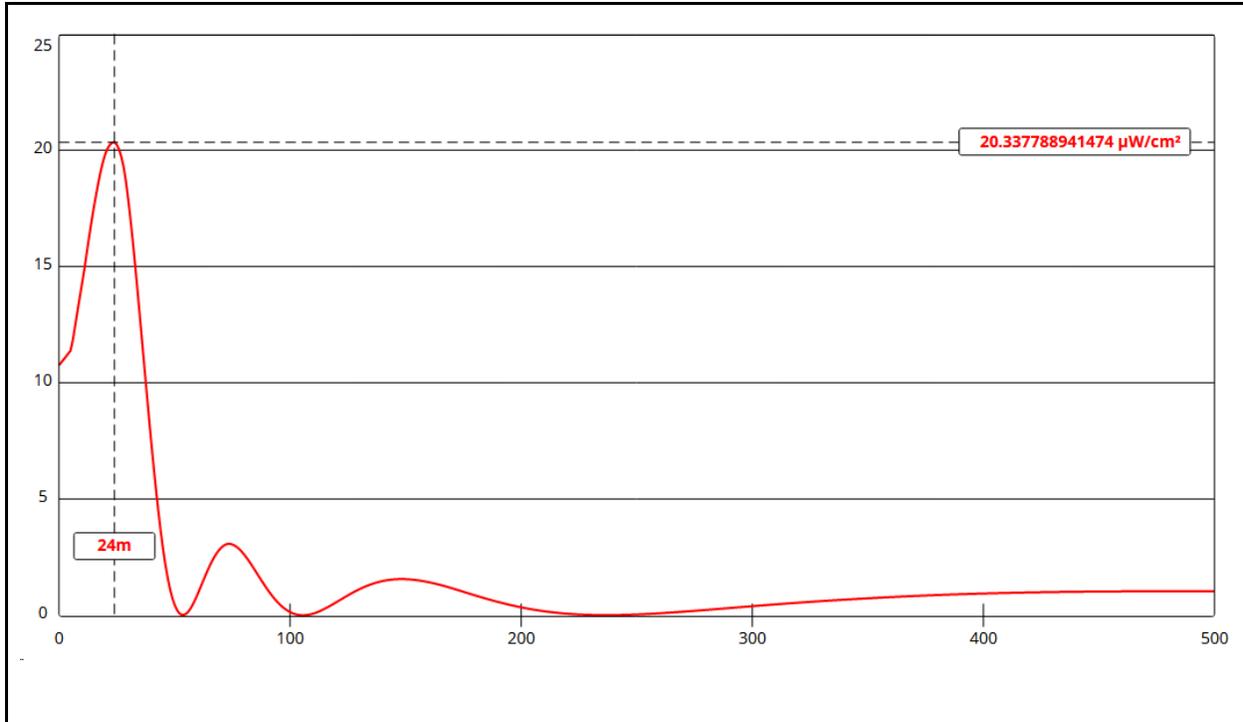
Ground-Level RF Exposure   **OET FMModel**

KNUC 255C Auxiliary

Antenna Type:	Jampro JLPC-4 (Type 2)
No. of Elements:	4
Element Spacing:	1.0 wavelength

Distance:	500 meters
Horizontal ERP:	8.5 kW
Vertical ERP:	8.5 kW

Antenna Height:	63 meters AGL

Maximum Calculated Power Density is 20.3 μW/cm^2 at 24 meters from the antenna structure.

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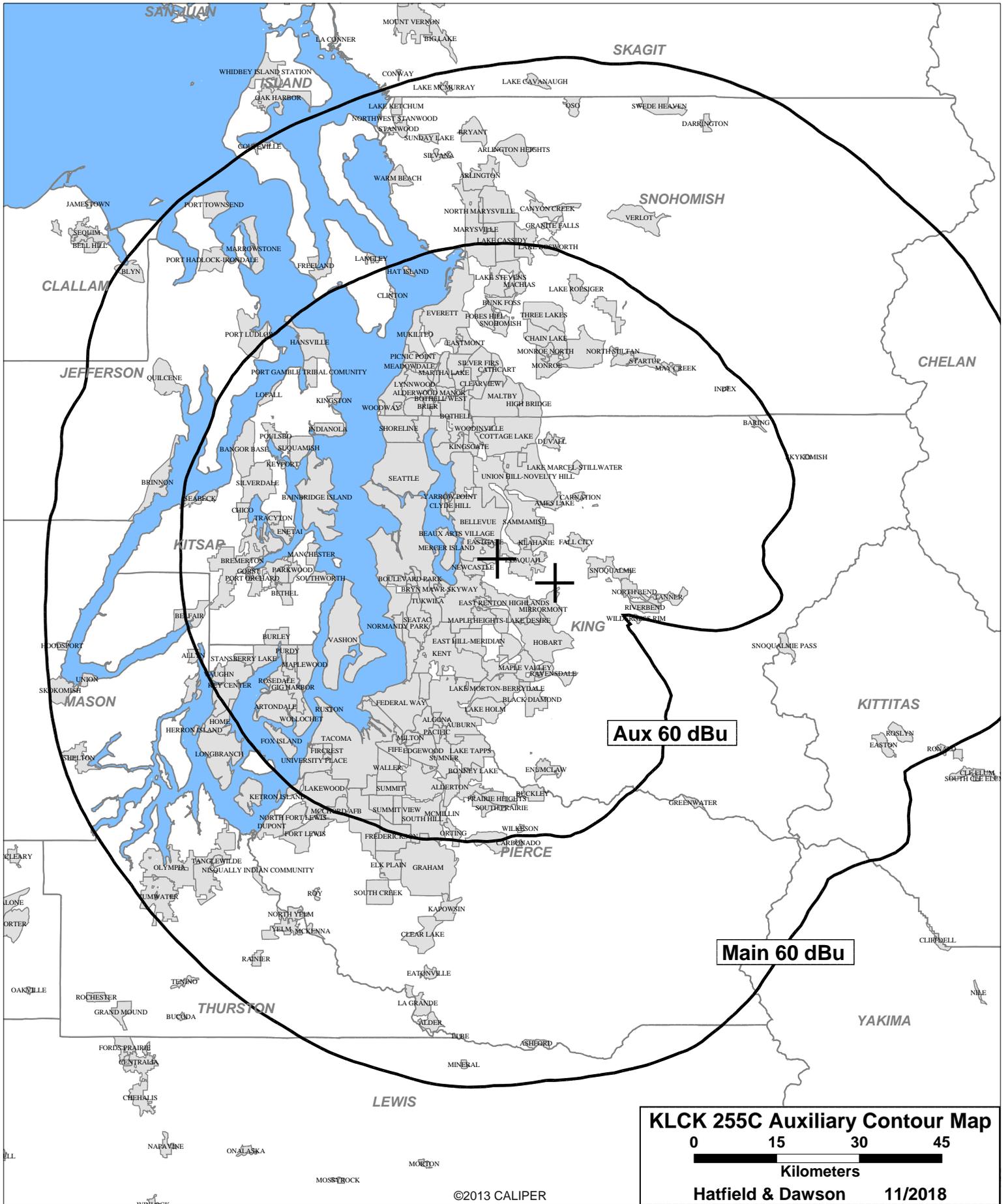
Aux 60 dBu

Main 60 dBu

KLCK 255C Auxiliary Contour Map

| 0 | 15 | 30 | 45 |

Kilometers

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