

**DELAUDER COMMUNICATIONS, INC.**

P.O. Box 1095  
Ashburn, Virginia 20146-1095  
(703) 299-9222

**ENGINEERING REPORT**

---

**WKQS-FM, Negaunee, MI, FM Auxiliary Application (For IBOC Service)**

**ENGINEERING STATEMENT**

Great Lakes Radio, Inc. ("Applicant") proposes this auxiliary antenna for WKQS-FM, Negaunee, MI, 270C2, that will be used to transmit its Digital Audio Broadcasting ("DAB") IBOC radio service using a separate antenna (mounted on the same tower as WKQS-FM) for the digital transmission. Pursuant to 47 CFR Section 73.404(d)(1), Applicant is hereby requesting a auxiliary antenna via this experimental FM application.

Figure EE1 is a map that shows contour overlap between the 60 dBu F50,50 contours for both WKQS-FM's main licensed facility and for the herein proposed auxiliary service.

The proposed auxiliary antenna's maximum ERP will be 518 watts via a circularly-polarized six-bay antenna with 85% wavelength spacing between antenna bays. (This represents a digital injection power level of 4%.) The centerline height of the proposed antenna is 122 meters AGL with a height above average terrain ("HAAT") of 223 meters. As required for a separate IBOC antenna service, the proposed centerline height is mounted between 70 and 100 percent of the 286 meter HAAT level of the licensed main facility (at 78 percent) in accordance with 47 CFR Section 73.404(d)(3).

The blanketing contour extends 0.3 kilometers for the proposed transmitter site; and Applicant recognizes its responsibility to resolve complaints of blanketing interference as required by 47 CFR Section 73.318.

Radiofrequency Electromagnetic Field Exposure

The auxiliary antenna produces a maximum ERP that is less than 0.52 kilowatts. Assuming: (a) a maximum ERP of 0.52 kilowatts and circular polarization (for 1.04 kW total); (b) a relative field of less than 1.0 in the critical downward angles; and (c) a distance of at least 112 meters from the lowest antenna element to 2 meters above ground level, the maximum power density is calculated as follows:

$$S = 33.4 (F)(F)(ERP) / [(R)(R)]$$

Where,        S equals power density in uW/cm<sup>2</sup>  
                   F equals the relative field factor  
                   ERP equals the effective radiate power in watts  
                   R equals the distance in meters

$$= 33.4 (1.0)(1.0)(1,040) / [(112)(112)]$$

$$= 2.8 \text{ uW/cm}^2$$

2.8 uW/cm<sup>2</sup> represents less than 5% of the uncontrolled power density limit (200 uW/cm<sup>2</sup>) and this proposed facility is categorically excluded from RFR exposure evaluation.

**FIGURE EE1: Map Showing for WKQS-FM Main & Auxiliary  
60 dBu F50,50 Service Contours**

