



ATTACHMENT – RF EXPOSURE
Form 442
CONVENTIONAL LICENSE NARRATIVE

prepared for
University of Alaska – Fairbanks
Geophysical Institute
FRN: 0025173931

In keeping with §1.1307(b) of the Commission’s Rules, the proposed operation has been evaluated for human exposure to radiofrequency energy using the procedures outlined by the Federal Communications Commission in FCC OET Bulletin 65 (“OET-65”). OET-65 describes a means of determining whether a proposed facility exceeds the radiofrequency exposure guidelines specified in §1.1310 of the Commission’s Rules. Under present Commission policy, a facility may be presumed to comply with the limits in §1.1310 of the Commission’s Rules if it satisfies the exposure criteria set forth in OET-65. Based upon that methodology, and as demonstrated in the following, the proposed transmitting system will comply with the cited adopted guidelines.

A peak effective radiated power (“ERP”) of 1.829 kW will be employed, utilizing an antenna consisting of a tower and slant wires as radiators. The antenna is designed to radiate upward toward the ionosphere, with an elevation pattern such that the power toward the horizon (toward nearby population) is at least 3 dB down from the peak. Also, the transmission system emits short pulses of 533 microsecond duration, with a repetition rate of 4 Hz, for a duty cycle of 0.002132. Thus, an average power of 3.9 Watts is used for the calculation. A fence surrounds the tower and radiating elements at a minimum distance of 100 feet (30.48 meters) and a minimum of 6 meters from the nearest radiating slant wire. The operation uses frequencies ranging from 1 up to 40 MHz. The worst-case limit for power density is in the 30 to 40 MHz range, so that is used in this calculation. The “uncontrolled/general population” limit specified in §1.1310 for the 30 to 40 MHz frequency range is 200 $\mu\text{W}/\text{cm}^2$.

OET-65’s formula for signal density in this analysis is essentially the same as equation (10) in OET-65:

$$S = (33.4098) (F^2) (ERP) / D^2$$

Where:

S	=	power density in microwatts/cm ²
ERP	=	total (average) ERP in Watts
F	=	relative field factor
D	=	distance in meters



Using this formula and the above assumptions, and ignoring the elevation pattern for now, the proposed facility would contribute a maximum power density of $3.6 \mu\text{W}/\text{cm}^2$ near the fence at two meters above ground, or 1.8 percent of the general population/uncontrolled MPE limit. At ground level locations away from the fence, the calculated RF power density will be lower, due to the increasing distance from the transmitting antenna. Thus, the proposed facility complies with §1.1307(b) of the Commission's Rules regarding exposure to radiofrequency radiation.

With respect to worker safety, it is believed that based on the preceding analysis, excessive exposure would not occur in areas at ground level. A site exposure policy will continue to be employed protecting maintenance workers from excessive exposure when work must be performed on the tower in areas where high RF levels may be present. Such protective measures may include, but will not be limited to, restriction of access to areas where levels in excess of the guidelines may be expected, power reduction, or the complete shutdown of facilities when work or inspections must be performed in areas where the exposure guidelines will be exceeded.