KHTB FM2 Transmission System
Transmitter Power Output Calculations

This exhibit has been included to explain the basis for the transmitter power output utilized to achieve the authorized effective radiated power of 4.6 kW.

Note, the booster is only transmitting in the vertical polarization.

The antenna system consists of a vertically polarized Nicom BKK2/2V antenna. The antenna has a power gain of 11.22 at 94.9 mHz. Therefore, an antenna input power of 410 watts is required to achieve 4.6 kW.

The transmission line used to get from the transmitter to the antenna input is Andrew LDF5-50 (7/8 inch) foam dielectric heliax. With 61 meters of length, the transmission line attenuation is 0.74 dB yielding an efficiency of 84.36%. Therefore, a power of 486 watts is required at the input of the transmission line, which is also the transmitter output, to achieve the authorized effective radiated power. After rounding, a transmitter power output of 486 watts is needed to achieve the permitted ERP.

Feed System Efficiency:

In calculating the Feed System Efficiency, the following values were used based on the insertion loss data provided by each manufacturer.

Andrew LDF5-50 Heliax (61 meters)
    Insertion Loss = 0.74 dB (at 94.9 mHz)

Antenna Gain:

In calculating the Antenna Gain, the following value was used based on data provided by the manufacturer:

Nicom BKK2/2V
    Power Gain: 11.22x

TPO Calculations:

$$\frac{\text{Effective Radiated Power}}{(\text{Antenna Power Gain} * \text{Feed System Efficiency})} = \text{TPO}$$

4.6 kW

--   =   **.48599 kW = 0.486 kW TPO**

(11.22 * 84.36%)