KUDD FM1 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 kW.

The antenna system consists of a horizontally polarized Jampro JCPD antenna. The antenna has a power gain of 3.2 at 107.9 mHz in the Horizontal Polarization. Therefore, an antenna input power of 125 watts is required to achieve .4 kW.

The transmission line used to get from the multi-station combiner to the antenna input is Andrew LDF5-50 (7/8 inch) foam heliax. With 42.5 meters of length, the transmission line yielding an efficiency of 87.90%. Therefore, a power of 142 watts is required at the output of the transmitter to achieve the authorized effective radiated power.

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 (42.5 meters)
Efficiency: 87.90% (at 107.9 mHz)

Antenna Gain:

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

Jampro JCPD
Power Gain = 3.2 (circular polarization)

TPO Calculations:

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

$$\frac{.4 \text{ kW}}{(3.2 * 87.90\%)} = \textbf{.142 kW TPO}$$