KLCY-FM 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 3.3 kW. The antenna system consists of a circularly polarized Jampro JHPC-2R Half Wave Spaced antenna. The antenna has a peak power gain of 0.71 at 105.5 mHz. Therefore, an antenna input power of 4,647 watts is required to achieve 3.3 kW.

The transmission line used to get from the transmitter to the antenna input is Andrew HJ7-50 (1 5/8 inch) air dielectric heliax. With 27 meters of length, the transmission line attenuation is 0.22 dB yielding an efficiency of 95.05%. Therefore, a power of 4,889 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 4,900 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 HJ7-50 Heliax (27 meters)
Insertion Loss = 0.22 dB (at 105.5 mHz)

Antenna Gain:

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

Jampro JHPC-2R (Half Wave)

Power Gain: .71 dB

TPO Calculations:

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

$$\frac{3.3\text{ kW}}{(0.71 \quad * \quad 95.05\%)} = \mathbf{4889\ W = 4.9\ kW\ TPO}$$