

K274AV 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 0.2 kW (vertical polarization).

The antenna system consists of a Scala FMV antenna consisting of 1 section. The antenna has a peak azimuth power gain of 1.2 at 102.7 MHz. Therefore, an antenna input power of 0.167 kW is required to achieve 0.2 kW ERP.

The transmission line used to get from the transmitter to the antenna input is Andrew LDF5-50 Low Density Foam Heliac. With 45.7 meters of length, the transmission line yields an efficiency of 87.4%. Therefore, a power of 0.191 kW is required at the output of the transmitter to achieve the authorized effective radiated power. This rounds to 0.19 kW TPO.

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 Heliac (45.7 meters)
Efficiency: 87.40% (at 102.7 MHz)

Antenna Gain:

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

Scala FMV
Power Gain = 1.2 (vertical polarization)

TPO Calculations:

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

$$\frac{0.2 \text{ kW}}{(1.2 * 87.4\%)} = \underline{\underline{0.19 \text{ kW TPO}}}$$