KBMG-FM1 – Salt Lake City

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 2.1 kW. The antenna system consists of a cicularly polarized Shively 6016/2 Antenna. The antenna has a power gain of 6.153 at 106.1 MHz. Therefore, an antenna input power of 0.341 watts is required to achieve 2.1 kW ERP.

To get the signal from the transmitter to the antenna, it must pass through 7 meters of Andrew HJ4-50 (1/2") transmission line (0.22 dB loss), a Jampro RCCC.8 Balanced Combiner (0.8 dB loss), and 30 meters of Andrew HJ7-50 (1 5/8") transmission line (0.24 dB loss). Total insertion losses encountered between the transmitter and antenna are 1.17 dB yielding an efficiency of 74.89%. Therefore, a power of 456 watts is required at the transmitter output to achieve the authorized effective radiated power.

TPO Calculations:

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

$$\frac{2.1\text{ kW}}{(6.153 \quad * \quad 74.89\%)} = \textbf{0.456 kW TPO}$$