August 21, 2017

Antenna and Station Design for SEQP for KK4BZ

Equipment:
    Radio - Kenwood TS-570S
        operated at a power output level of 80 watts
    Antenna – G5RV 102 ft dipole above 38 ft ladder line
        configured as a flat top at approximately 45 ft above ground
    Transmission Line – 50 ft of RG-8X coax

Analysis:
    Assumptions
        Transmission line components are the PL-259 connectors at each end of the transmission line and the balun at the bottom of the ladder line. Loss in these components is very small and will be estimated at 0.001 dB for all operating bands.

    Calculations are provided for all the bands for which the antenna can operate efficiently even though QSOs were made on only 2 of the 5 bands.

Effective Radiated Power (ERP)

Total Power Out (TPO) = 80 Watts

ERP = TPO X System Gain

System Gain = Antenna Gain - Transmission Line Loss - Transmission Component Loss

Band	Antenna Gain (dB)	Transmission Line Loss (dB)	Transmission Component Loss (dB)	System Gain (dB)
80 m	0.3	0.277	0.001	0.022
40 m	1.2	0.382	0.001	0.817
20 m	2.8	0.548	0.001	2.251
15 m	4.3	0.682	0.001	3.617
10 m	5	0.798	0.001	4.201

ERP = TPO X Log(-1)[System Gain dB / 10] = TPO X 10 ^ (System Gain dB / 10)

Band	TPO (Watts)	System Gain (dB)	10 ^ (System Gain dB / 10)	ERP (Watts)
80 m	80	0.022	1.01	80.8
40 m	80	0.817	1.21	96.8
20 m	80	2.251	1.68	134.4
15 m	80	3.617	2.3	184
10 m	80	4.201	2.63	210.4

Summary

Band	TPO (Watts)	ERP (Watts)
80 m	80	80.8
40 m	80	96.8
20 m	80	134.4
15 m	80	184
10 m	80	210.4