Antenna Factor of a 6m Dipole at 5 MHz

See HP Application Note 150-10

$E = \sqrt{120\pi P}$

$Power\ density, P = \frac{E^2}{120\pi}$

$E = field\ strength, volts/meter$

120π ohms impedance of free space

An incident field strength of $E = 1\ uV/meter$ gives

$P = 2.65\,x\,10^{-15}\ watts/m^2 = -115.76\ dBm$ in 1 square meter

At 5 MHz or 60 meters wavelength, a 6m dipole is $\frac{\lambda}{10}$ so qualifies as a "short dipole" having a gain of $(\frac{3}{2})G_i$, $aperture\ of\ an\ isotropic\ antenna = \frac{\lambda^2}{(4\pi)}$

$Aperture\ of\ 6\,m\ dipole = (\frac{3}{2})\frac{(60\,m)^2}{4\pi} = 429.7\,m^2$

must intercept $2.65\,x\,10^{-15} * 429.7 = 1.14\,x\,10^{-12}\ watts = -89.4\ dBm$

If this antenna is perfectly matched to 50 ohm load then a 1 uV/meter field produces

$E = \sqrt{50 * 1.14\,x\,10^{-12}\ watts} = 7.55\,uV$

$Antenna\ Factor, AF = \frac{incident\ field,\ \mu V/m}{voltage\ at\ 50\ ohm\ termination,\ \mu V}$

Antenna Factor = .1324 or **-17.56** dBuV