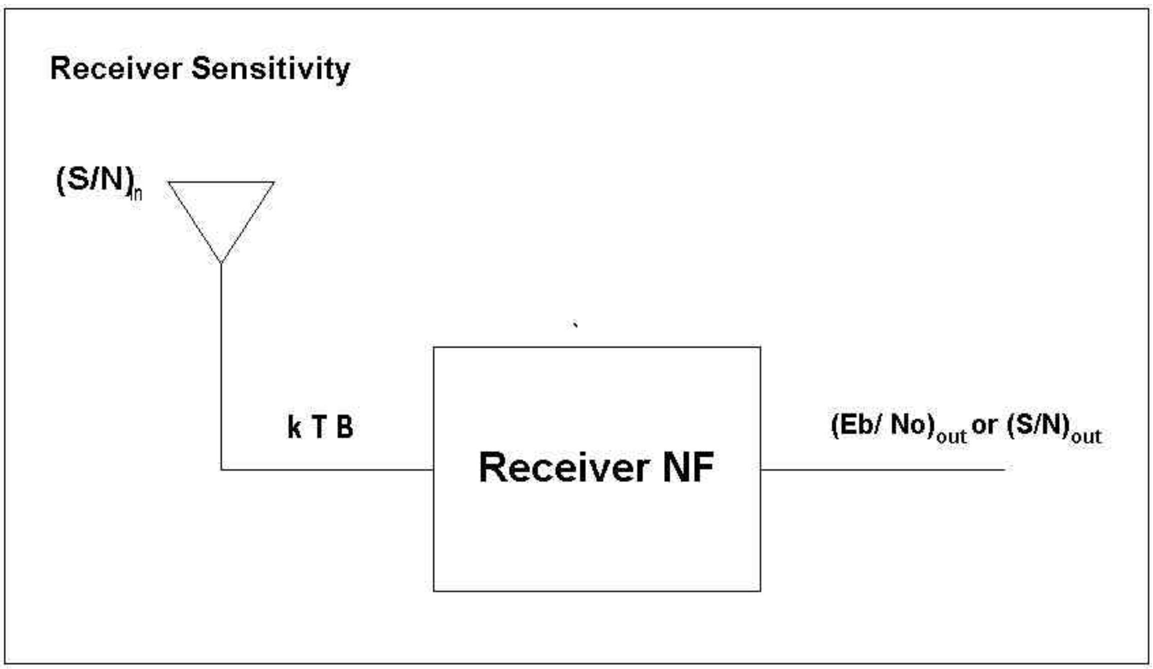
Receiver Sensitivity



$(S/N)_{in} = (S/N)_{out} + NF$
$S_{in} - N_{in} = (S/N)_{out} + NF$
$S_{in} = N_{in} + (S/N)_{out} + NF$
where $N_{in} = 10 * \log (k * T * B)$

thus, $\mathbf{S_{in} = 10 * \log (k * T * B) + NF + (S/N)_{out}}$

where S_{in} is the receiver sensitivity
N_{in} is the antenna noise that is transferred to the receiver
k is the Boltzmann constant (1.38 x 10^{-23} J/°K)
T is the system operating temperature in °K, typically 290°K
B is the system noise bandwidth in Hz
NF is the noise figure
$(S/N)_{out}$ is the usable sensitivity of the analog receiver. In digital systems, the receiver performance is stated as E_b/N_o, the Modulation Bit Energy (E_b) divided by noise Spectral Density (N_o)

Total Noise input in dBm is given by
Absolute Sensitivity (dBm) = 10 * log (k * T * B) + NF
Absolute Sensitivity (dBm) = 10 log (k * T) + log B + NF
Absolute Sensitivity (dBm) = -174 + log B + N