



The unknowns $G \cdot \Delta f \cdot k_B$ cancel in the Y ratio!

$$Y = \frac{P_2}{P_1} = \frac{T_2 + T_{RX}}{T_1 + T_{RX}}$$

$$T_{RX} = \frac{T_2 - Y \cdot T_1}{Y - 1}$$

$$T_0 = 290\text{K}$$

$$F_{dB} = 10 \log_{10} \left[1 + \frac{T_2 - Y \cdot T_1}{(Y - 1) \cdot T_0} \right]$$

Resistor type	Temperature
Antenna into cold sky	$\sim 20\text{K}$
Liquid N_2 cooled R	$\sim 77\text{K}$
Antenna into absorber	$\sim 290\text{K}$
R at room temperature	$\sim 290\text{K}$
Light-bulb filament as R	$\sim 2000\text{K}$
Ionized gas as R	$\sim 10^4\text{K}$
Avalanche breakdown	$\sim 10^6\text{K}$