Decibels

Comparison of two powers (for example signal power and reference power):

$$P_{dB} = 10 \log_{10} \frac{P}{P_r}$$

Comparison of 2 amplitudes or rms values:

$$P_{dB} = 10 \log_{10} \frac{A^2}{A_r^2} = 10 \log_{10} \left(\frac{A}{A_r} \right)^2 = 20 \log_{10} \left(\frac{A}{A_r} \right)$$

Decibels

P/P_r	A/A_r	P_{dB}
1	1	0 dB
2	$\sqrt{2}$	3 dB
4	2	6 dB
10	$\sqrt{10}$	10 dB
100	10	20 dB
1000	$10\sqrt{10}$	30 dB
10^n	$\sqrt{10^n}$	10 n dB
$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	-3 dB
$\frac{1}{4}$	$\frac{1}{2}$	-6 dB
0.1	$\sqrt{0.1}$	-10 dB
0.01	0.1	-20 dB
0.001	$\sqrt{0.001}$	-30 dB
10^{-n}	$10^{-n/2}$	-10 n dB