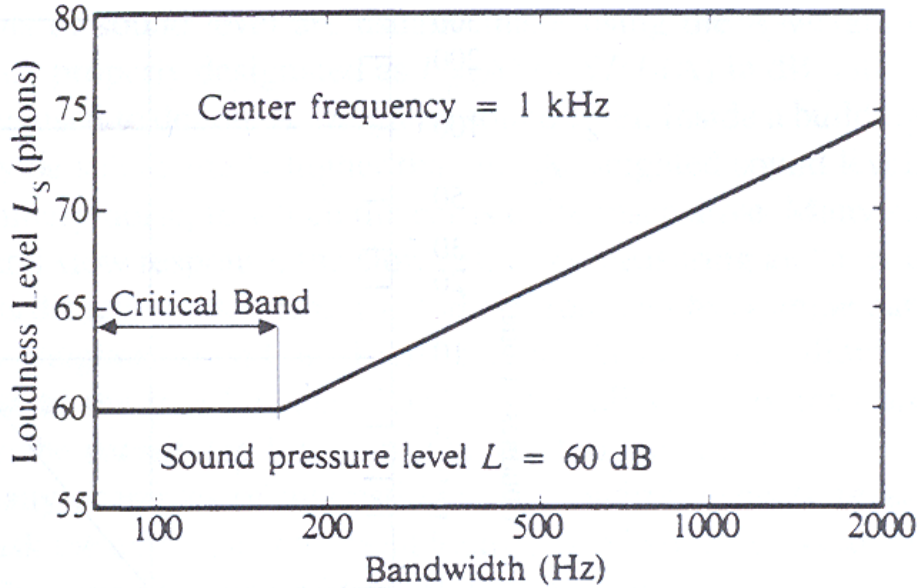


Loudness of Complex (Poly-Frequency) Tones & The Critical Band:

If two pure tones of frequency f_1 and f_2 each individually have the same SPL , but are within the critical band Δf_{crit} of each other, we perceive the overall sound as not as loud as when the two frequencies are well-separated from each other, *i.e.* outside the critical band. The following figure shows this effect:



If white noise (= all frequencies in the audio band, of equal amplitude) is used to compare the overall apparent loudness of white noise e.g. with that of a pure tone sine wave type signal at $f = 1$ KHz, as a function of SPL (in dB), the result shown in the graph on the right is obtained:

