Subject: Re: crossover point
Posted by Duke on Fri, 13 Jun 2008 10:33:22 GMT
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Hi zonkers,Thanks for asking for clarification.The "on-axis response "measures the frequency response along one axis only, typically assuming anechoic conditions (in other words, reflections are excluded from this measurement).The "power response" is the summed omnidirectional response of the loudspeaker; it's total output taking into account all angles. It is impractical to measure, but because the ear hears the reflected sound in a room it matters. The power response is strongly influenced by the speaker's radiation pattern.Assuming a two-way with a dome tweeter, the woofer will be beaming somewhat at the crossover frequency but the tweeter's radiation pattern will be quite wide, possibly more than 180 degrees if the speaker's front baffle is less than 1/2 wavelength wide at the crossover frequency. So if the speaker measures "flat" on-axis, the tweeter will be putting out quite a bit of extra energy off-axis just above the crossover frequency. Typically, this is the lower treble region, maybe 3-4 kHz or so, right smack where the ear is most sensitive. Because the reverberant energy contributes to perceived tonal balance, such a speaker may measure "flat" but sound bright and in extreme cases even harsh due to all the extra lower treble energy in the reverberant sound.Such a speaker cannot have a smooth on-axis response and a smooth power response at the same time, and in my opinion the power response corresponds more closely with perceived tonal balance in a normal listening room. So, my suggestion (and it's hardly original) is to design in an on-axis dip on the tweeter's side of the crossover, in that lower treble region, as this will smooth out the power response. Because of the way frequency response is typically measured this approach will look less smooth on paper, but it will sound smoother under most listening conditions. Let me know if you have further questions.Duke