

You might be right. I suppose that higher-order harmonics might have the most negative impact, even from loudspeakers. I've heard that said of amplifiers too. Here's a little thought experiment that might be interesting to perform on actual devices. Let's assume we have two similar devices, one built with flux control and the other without. They each use the same cone, voice coil and suspension, and the magnets produce the same flux in the gap. The magnet geometry is the same, with the one difference being that one has an effective shorting ring and a little more magnet to make up the difference in strength lost by adding the ring. These two speakers sound very much the same, especially at low and moderate listening levels. But as power is increased, the differences become a little more apparent. The one with flux control sounds more clean. When a bass drum is struck, you hear the impact of the head as well as the resonance of the drum. And it is not as fatiguing to listen to for extended periods at high volume levels. The one without a shorting ring sounds a little less defined, and the resonance of the drums sounds more pronounced than the impact. The drum head impact becomes lost in the drone of the bass. The shorting ring reduces even-order harmonics. Measurements show a significant ~20dB reduction of 2nd harmonics. I'm not sure what the levels of 4th, 6th, 8th, ...20th, etc. are. But it stands to reason that they are reduced too. The driver is capable of generating from approximately 40Hz to 2kHz on axis within a 20dB range. So the fact that it is capable of generating 40Hz-2kHz sound means that it is capable of generating harmonics in this range when sent a low frequency fundamental if the motor produces harmonic artifacts. That leaves us with the question, what are the proportions of the harmonics and how objectionable are they? This begins to look like the tube-transistor debate. In one sense, it doesn't matter since the mechanisms that reduce 2nd harmonics also reduce 20th harmonics. The trick is improving symmetry, and that reduces all the even-orders. But the reason it might be important is that if, in fact, the high-orders are what are really objectionable, then this gives more credibility to the argument that mechanico-acoustic filtering is a good thing to do. Absorbent material can be used to attenuate high frequencies. Front chambers like are used in horns and bandpass boxes attenuate high frequencies. The folded path of bass horns attenuate high frequencies. Any of these techniques can be used. A low crossover point won't do it, because harmonics are generated by the motor, not transformed by it. But the lower crossover point will reduce intermodulation distortion and is required if the upper frequency response is to be attenuated anyway. I guess the thing to do is to measure high-frequency harmonics and see.

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