Subject: ZMAX - Maximum impedance, impedance at resonance
Posted by Wayne Parham on Fri, 16 Aug 2002 01:30:01 GMT
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The maximum impedance of a speaker is found at resonance. You can measure it with a test resistor, an oscilloscope or meter and a signal generator. The test resistor is placed in series with the speaker, and you will measure the voltage divided between the speaker and the resistor at its maximum point. Use a resistor value equal to the expected Zmax, between 50 and 200 ohms. The value should be precisely known because you will use it as a reference point; The division of voltage between the resistor and the speaker at resonance is used to calculate Zmax.The resonant frequency is where the voltage across the speaker is highest, and across the resistance is lowest. At this point, perform two simple measurements:1. Measure the voltage across the known-value reference resistor. Calculate current using Ohm's Law:I = E / R2. Measure the voltage across the speaker. At resonance, speaker impedance is purely resistive so the voltage across the speaker should be equal to the source voltage minus the drop from the resistor. Double check that this is true, and also calculate Zmax using the voltage across the speaker and the calculated current:Zmax = E / ISpeaker impedance is purely resistive at only at resonance, so these simple formulas will only work at this particular frequency. Reactive circuit formulas using vectors must be used to calculate impedance at other frequencies. But for Zmax, this simple measurement is perfectly adequate.