Subject: Re: Horn Mouth Diffraction
Posted by Earl Geddes on Sun, 30 Oct 2005 23:35:05 GMT
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As the author of one of those papers, you should have asked me. I'm easily reachable. I did not read any of the other replys so I may say the same things and I may say something different.To my knowledge no one but me has ever considered mouth diffraction in a theoretical sense. That was what my earler papers were about. There are two aspects to consider here. One relates to the cross-sectional shape - the shape normal to the wave propagation - and the other the shape in a plane of the wave propagation. The later one determines the amount of diffraction, while the cross-sectional shape has an influence on the axial and polar aspects.Let me first say that NO diffraction is best, so its best to first worry about the in-plane shape. Here the answer is simple, radius the junction of the waveguide with the baffle as large as possible. This will minimize the diffraction and if done correctly will make it small enough that the other shape question is mute.But it is often the case that one cannot radius the edge enough to yield no diffraction and the cross-sectional shape enters into the problem in a subtle way. A circular shape turns out not to be ideal since on axis the diffraction effects all add up in phase to yield a "hole" on axis at some frequency. This can be clearly seen in the Summas polar response. An elliptical section minimizes this hole, smearing it in frequency. But an ellipse has other problems like non-axi-symmetric polar response. Woofers usually have axi-symmetric polar responses. In the Summas, I don't recommend listening on-axis so this hole is not a big problem.Beyond the circle and the ellipse, every other shape has basically these same characteristics.But don't forget the Golden Rule here. NO diffraction is best, and no shape can compensate for a poorly diffracting waveguide mouth.Hope this helps.