

The Study of Design and Manufacture of Flat-Panel Speaker and Mini-Earphone

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ABSTRACT

This study focus on design and manufacture flat-panel speaker that can apply to Medium-sized display system of 20 inches. The size of rectangular shape flat-panel speaker was defined 95mm × 50mm and bar shape flat-panel speaker was defined 95mm × 50mm. The thickness is all controlled in 15mm. Use composite with different stiffened designs and nano-carbon tube coating to improve stiffness of speaker ' s panel. Expect to be able to reduce the distortion and increase effective frequency band of the flat-panel speaker and display more smooth sound pressure curve. Discuss what kind stiffened designs are better by use K-exciter and suspension with PU cloth. Can reduce f0 frequency and sound pressure responses can reach 85dB, and average sound pressure responses can reach 75dB under 30cm measure distance and frequency response during 100Hz to 20K Hz. Then use PSO Optimization method to find optimal manufacturing parameters (ex. stiffened designs , thickness rate with balsa wood and nano-carbon tube ,coefficient of elastic suspension and the length of excite)

Keywords : flat-panel speaker, nano-carbon tube, finite element analysis, optimal manufacturing parameters

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