

Visualized Evaluation Criteria and Fast Semi-Analytical Method for Optimizing Frequency-Selective Surface Based Structures

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Abstract: A considerable number of FSS-based designs in the existing literature claim to offer attractive features such as "wideband" performance or "ultrathin" profile. Although the practice of tabulating the proposed design with relevant state-of-the-art counterparts has become a standard requirement in IEEE publications in recent years, encountering comparisons that are either unfair or inappropriate is not an uncommon occurrence. More importantly, evaluation criteria not only highlight the merits of the proposed design, but also define the objective function for optimization. Our visualized evaluation approach enables fair, intuitive, and comprehensive comparison as shown in Fig. 1.

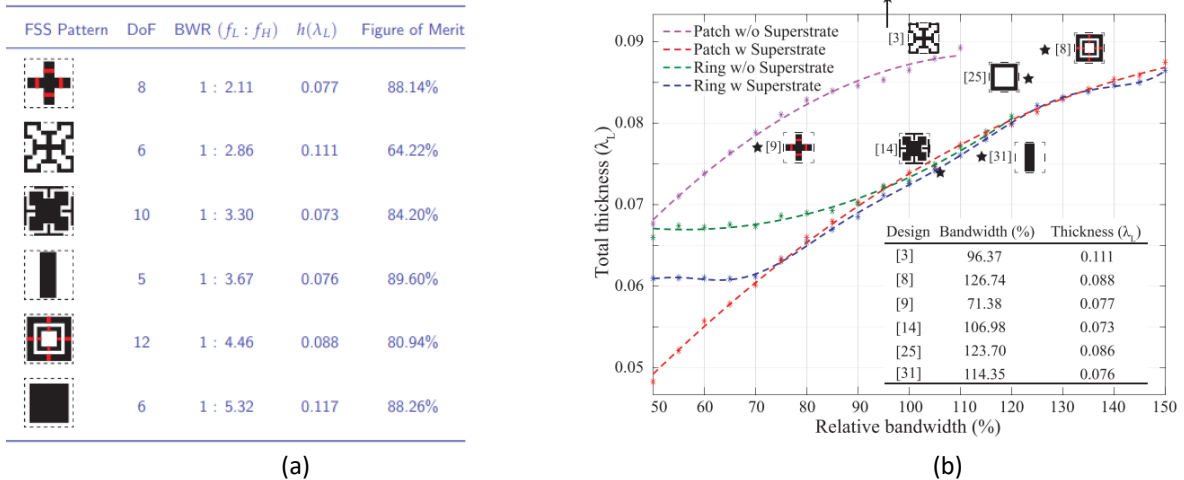


Fig. 1 Comparison of the proposed microwave absorber design and the state-of-the-art counterparts. (a) Classic comparison using calculated figures of merit; (b) Intuitive comparison in a coordinate system.

On the basis of clear design objectives, we can then efficiently optimize a proposed design using the semi-analytical method combining analytical formulas, numerical algorithms, empirical results and quantitative design aids [1]-[3].

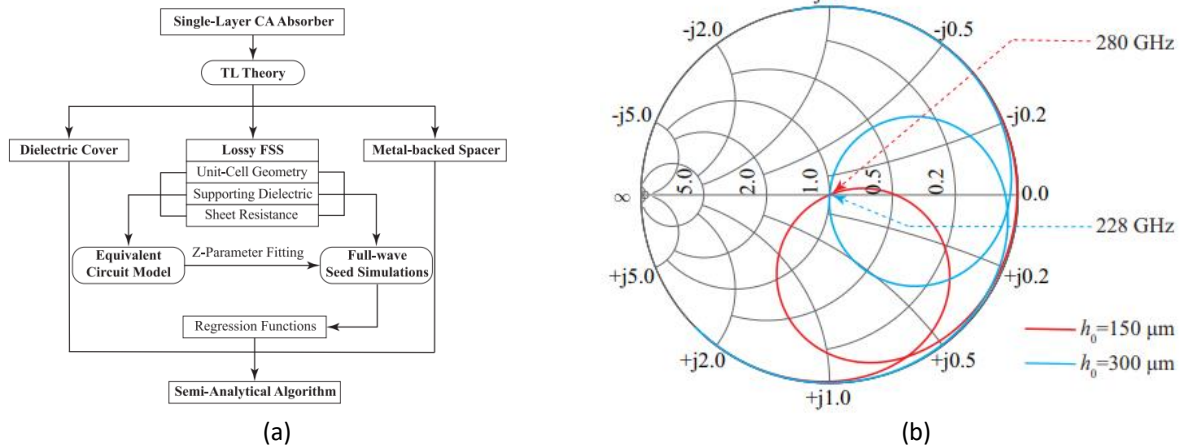


Fig. 2 Design and optimization aids for FSS-based structures. (a) Semi-analytical algorithm for microwave absorber; (b) Smith Chart locus tracking for reconfigurable bandpass filter.

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