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Compact Multilayer Wideband Symmetric Five-Port Reflectometer

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Abstract: This article presents a new design of a wideband, compact, and low-cost symmetric five-port reflectometer (5PR). The proposed 5PR features a wide operational bandwidth of 3240 MHz (about 162% centered at 2 GHz). Five-symmetric branch-lines consist of SCURVE, STEE, SLIN, and Term were designed and optimized to achieve an equivalent value of 78 dB for S_{11}, S_{22}, S_{33}, S_{44}, and S_{55} at center frequency of 2 GHz. Such consistent value between those S-parameters proven a perfect matching impedance are successfully obtained by proposed symmetric 5PR even own a bandwidth as high as 162%. Moreover, the simulated and measured results show the proposed 5PR has realized magnitude of 0 dB (S_{11}), 0.5 (S_{12}, S_{13}, S_{14}, S_{15}, S_{21}, S_{23} . . . S_{54}) as well as phase relative error of 1208 which in parallel to theoretical values. With all capabilities mentioned, the proposed 5PR is a promising candidate to be installed in a microwave imaging system for biomedical applications in the future.

Keywords:
Five port, reflection coefficient, reflectometer, microstrip, wideband

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