

Design of parallel-plate waveguide simulator for 3 GHz microwave device characterization

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Abstrak

Characterization of the properties of microwave device proves to be an essential complement to theoretical or simulation works. Thus, the establishment of tool used for the characterization is one of the important steps in the experimental study. In this paper, a test-fixture to characterize the reflectivity and transmission of microwave device is reported whereby the reflection and transmission properties could be obtained under normal incidence using a specially designed parallel plate waveguide (PPW) simulator. This is possible since this type of simulator is potentially very accurate in simulating its reflection and transmission response through the use of the available 3-dimension electromagnetic (3D EM) software. The simulator is designed numerically to work for 2.60 GHz to 3.95 GHz operation, with waveguide transducer type WGIO used for the wave exciter. After optimizing some parameters, the simulator with plate width of 200 mm, plate separation of 75 mm, and taper length of 100 mm is then fabricated. This was followed by the experimental measurement, taken to be compared with the design result. Some characterization of 3 GHz microwave devices including a sample of frequency selective surfaces (FSS) and microwave absorber is also demonstrated, from which the results are then compared with the simulator ones.