Broadband Antennas Design and Applications - Propagation Property with Various Mediums

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ABSTRACT

For recognizing the EM characteristics of mediums, the simulation is developed in this thesis. Using the simulated results of S parameters, the dielectric constant and loss tangent of medium can be calculated by EM formulas. Generally, the transmitting antennas in test ranges are consist of various narrow band antennas for wide band applications. The drawback are higher cost for purchasing the probe antennas, time consuming for changing and uncertainty of the antenna patterns; therefore, a novel transmitter antenna constructed with low directivity wideband horn and wideband balun will be developed in this thesis and applied for the Near-field antenna measurement system. The operating frequency from 1 GHz to 18 GHz, low directivity and symmetry antenna pattern are achieved. Meanwhile, a ultra-wideband bow-tie receiving antenna is designed and applied in the water from 3GHz to 12.5 GHz. Both S-parameters and radiation patterns are measured by the network analyzer and impulse time domain antenna measurement system respectively. The EM wave propagation for various media is analyzed

Keywords : balun ; ultra-wideband antenna ; design ; system ; near-field

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