

UWB Two-Flare Antenna Element

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We present a novel compact UWB antenna based on two smoothly shaped flares of a simple geometrical structure, Fig. 1a. The first flare, larger in size, serves as an antenna base, reflector and one of the radiator arms. The second flare, smaller in size, operates as the other arm of the radiator. This antenna behaves like an “ideal” broadband well-matched transformer for the current at its driving ports to the radiated fields. In order to create such a current-to-field transformer the flares of the proposed antenna are properly shaped and can be driven through direct connection to coaxial cables without balun. A set of the antenna computational models is developed for MoM, Fig. 1b, FDTD and FEM. Several antenna prototypes, Fig. 1 c-e, have been tested. The numerically predicted and measured data are in a good agreement for the prototyped antennas, Fig. 2. In particular, the antenna demonstrates <-10 dB return loss in the band $>10:1$, >10 dB front-to-back ratio, constant >5 dBi directive gain, constant beamwidth, and suitability for pulse transmission with minimized distortions.

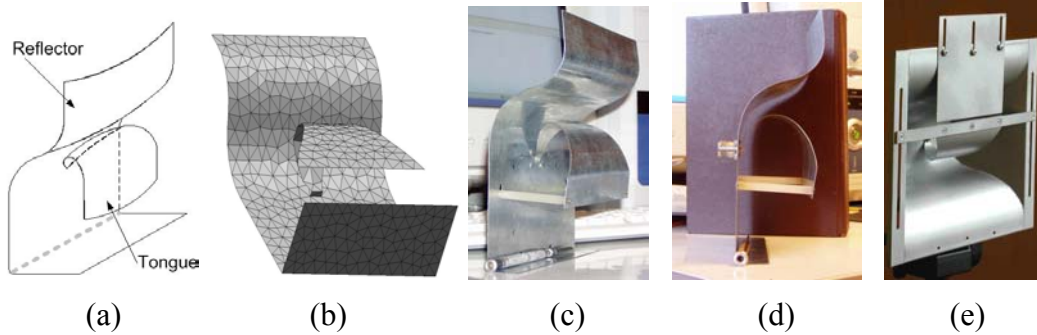


Fig. 1. Tongue antenna element design: (a) general sketch; (b) MoM simulation mesh; (c)-(e) samples of prototyped and tested tongue antennas.

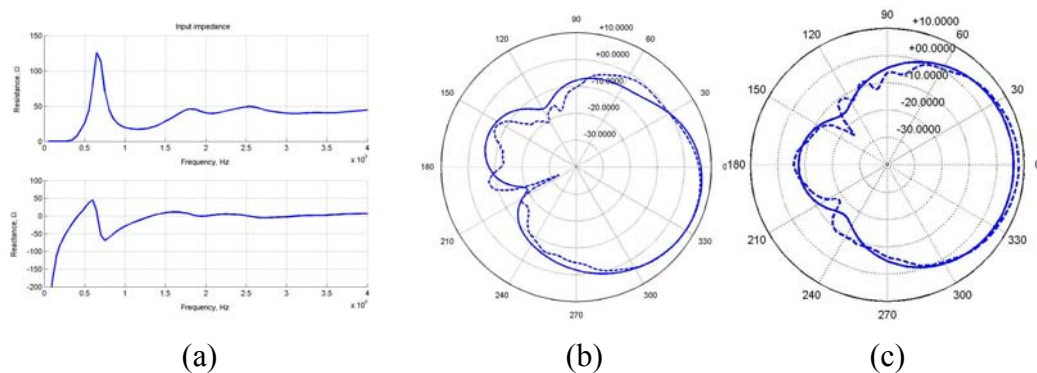


Fig. 2. Antenna performance: (a) simulated input impedance; (b)-(c) a sample of the E- and H-plane predicted (solid) and measured (dash) pattern at 3 GHz.

