RF Measurements and Modelling from the JET-ITER Like Antenna Testing*

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The RF characteristics of the JET-ITER Like Antenna relevant for operation on plasma such as the base resistive loading, mutual coupling levels between straps, resilience to load variations, and high voltage standoff capability are being assessed using measurements and modelling. The full 8-port antenna strap array behaviour was measured at low power with loading provided by a water tank at variable distance [1], and is compared with CST Microwave Studio simulations. These results are inserted into a complete RF transmission line circuit model to calculate analytical solutions for the internal matching capacitors and external adjustable transmission line matching elements, and to evaluate resilience to load variations. The predicted values are then applied to the actual antenna installed inside a vacuum tank test bed and verified prior to and during the high voltage testing with directional couplers and voltage probe diagnostics. The present updating of models based on measurements is a step towards the implementation of the automatic electronic feedback control of the matching capacitors based on the real-time RF measurements instead of model generated signals [2].

[1] A.M. Messiaen et al., Fus. Eng. Des., 74, 367-275, (2005)
[2] M. Evrard et al. Proc. 16th Top. Conf. RF Power in Plasmas, 186-189, Apr. 2005.