Probe Compensated Fast Antenna Testing

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Modern telecommunication payloads are excellent examples of the increased testing complexity and have been subject to the development of dedicated testing techniques. Usually a Near Field (NF) antenna measurement is performed to characterize the Device under Test (DUT) in a more controlled environment and then a near-field to far-field transformation is performed to analyze the performance parameters of the DUT. Due to the close distance between DUT and probe, this latter could introduce some effect that have to be taken into account and possibly to be removed to obtain a far field which is only expression of the DUT.

This means that the RF end-to-end testing of an antenna can be complex and time consuming. In fact, each measurement point requires mechanical movement and signal integration time to produce a sample. A technique recently presented called Innovative RF Testing (IRFT) and based on a properly hybridization of measurements and simulations, demonstrates the possibility to perform a radical under sampling of the NF with respect to the conventional Nyquist criteria (G. Giordanengo, M. Righero, F. Vipiana, G. Vecchi, M. Sabbadini, *IEEE Transactions on Antennas and Propagation*, vol. 62, No. 5, May 2014). This allows to reduce the number of sampling points and then the testing time of the DUT.

In case of non-ideal probe (i.e. no Hertzian dipole) or measurement system different from a spherical system (e.g. planar scan) or error during the measurements (e.g. misalignment of the AUT w.r.t. to center of a spherical measurement system), a probe correction procedure may be useful to increase the performance of the measure/reconstruction. For these reasons the IRFT procedure has been modified and it has been integrated with a probe compensation algorithm that is able to exploit the strengths of the fast testing technique and, in the meantime, to perform a full probe correction for arbitrary probes independently from the type of near field scan (e.g. spherical, planar, etc.).

Experimental results showing the performance will be presented, with verification of probe compensated solution with respect to a solution without probe correction.