Experimental Validation of the UTD Third Order Diffraction Coefficient

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We consider an experimental validation of the accuracy of the recently developed UTD third order diffraction coefficient.

Consider three wedges that are aligned and that are illuminated at grazing incident by a plane wave. It is known that the field scattered by such geometrical configuration cannot be accurately described by ray-fields and, therefore, the scattered field cannot be accurately computed by cascaded product of three single wedge (first order) diffraction coefficients (S.-W. Lee, Y. Rahmat-Samii, R. Menendez, "GTD, ray field, and comments on two papers," IEEE Transactions on Antennas and Propagation, vol.26(2) pp. 352- 354, Mar 1978). In 1997, Albani et al. (M. Albani, F. Capolino, S. Maci, and R. Tiberio, "Diffraction at a thick screen including corrugations on the top face," IEEE Transactions on Antennas and Propagation, vol.45(2), pp.277-283, Feb 1997) developed a double wedge (second order) diffraction coefficient and one experimental validation of its accuracy was given by Erricolo in (D. Erricolo, "Experimental validation of second order diffraction coefficients for computation of path-loss past buildings," IEEE Transactions on Electromagnetic Compatibility, Vol. 44, No. 1, Feb. 2002, pp. 272-273). In 2012, Carluccio et al. (G. Carluccio, F. Puggelli, M. Albani, "A UTD Triple Diffraction Coefficient for Straight Wedges in Arbitrary Configuration," IEEE Transactions on Antennas and Propagation, vol.60(12), pp.5809-5817, Dec. 2012) developed a triple wedge (third order) diffraction coefficient.

The purpose of this work is to measure the field scattered by geometrical configurations of objects involving three edges and compare the measurement results with the scattered field computed using the recently developed third order UTD diffraction coefficient. The measurements will be performed in the anechoic room of the Andrew Electromagnetics Laboratory of the University of Illinois at Chicago using various copper obstacles representing wedges in various spatial configurations. Numerical results will be presented during the conference.