A Generalised (*M*, *Nr*) Mimo Rayleigh Channel Model for Nonisotropic Scatterer Distributions

David B. Smith[1], **Thushara D. Abhayapala**[2] **and Tim Aubrey**[3]

[1]Faculty of Engineering (ICT Group), University of Technology, Sydney, PO Box 123 Broadway NSW 2007 Australia
E-mail: davidsm@eng.uts.edu.au

[2]Department of Telecommunications, RSISE, Australian National University, ACT 0200, Australia, E-mail: Thushara.Abhayapala@anu.edu.au

[3]As (1) above, but E-mail: timaa@eng.uts.edu.au

Abstract

This paper extends a recently proposed space-time model for Rayleigh fading to include an arbitrary transmit antenna configuration of any shape and size transmitting simultaneously in a multiple-input multiple-output (MIMO) channel. The space-time correlation function and space-frequency cross spectrum function for a non-isotropic scatterer distribution around the receiver is derived for the arbitrary configuration as a further extension of a previous result of a multiple-input single-output Rayleigh wireless channel which used a ring of uniformly distributed scatterers model. Analysis based on achievable spectral efficiency for typical arbitrary transmit antenna configurations is given. The analysis demonstrates the utility of the correlation function.