

Analysis of the Radiation from a Complex Multi-Conductor Transmission Line

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Abstract. The Deployment of Power Line Transmission (PLT) and the development of new broadband services over the telephone network through technology like xDSL (x Digital Subscriber Line), requires higher data rates, consequently higher bandwidths, and operating frequencies. So it is generally accompanied with electromagnetic compatibility (EMC) phenomena, in particular the radiated emissions associated to the deployed system and used cables characteristics. In fact the electrical cable presents variations in their geometry, causing an increase in the electromagnetic radiation. This paper presents a theoretical approach to study a complex transmission line network over ground plane. This approach leads to an analytical expression for the evaluation of P.U.L. parameters of finite length twisted wires lines. These expressions give the capacitances and the inductances values in every point of the cable, the theoretical results are compared to measurements. The formalism is also derived to determine the distribution of the electromagnetic field radiated by Shielded or Unshielded Twisted Pair cables with discontinuity. The obtained results are compared to those provided by a code based on the antenna theory.