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In recent years, there is a visible trend for products/services which demand seamless integration of cellular networks, WLANs and WPANs. This is a strong indication for the inclusion of high speed short range wireless technology in future applications. In this context UWB radio has a significant role to play as an extension/complement to existing cellular/access technology.

In the present work, three major types of ultra wide band planar antennas are investigated: Monopole and Slot. Three novel compact UWB antennas, suitable for portable applications, are designed and characterized, namely

1) Ground modified monopole
2) Serrated monopole
3) Triangular slot

The performance of these designs have been studied using standard simulation tools used in industry/academia and they have been experimentally verified. Antenna design guidelines are also deduced by accounting the resonances in each structure.

In addition to having compact sized, high efficiency and broad bandwidth antennas, one of the major criterion in the design of impulse-UWB systems have been the transmission of narrow band pulses with minimum distortion. The key challenge is not only to design a broad band antenna with constant and stable gain but to maintain a flat group delay or linear phase response in the frequency domain or excellent transient response in time domain. One of the major contributions of the thesis lies in the analysis of the frequency and time-domain response of the designed UWB antennas to confirm their suitability for portable pulsed-UWB systems. Techniques to avoid narrowband interference by engraving narrow slot resonators on the antenna is also proposed and their effect on a nano-second pulse have been investigated.

Abstract