

Miniaturization of Ultra-wideband Antennas

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Abstract: Ultra-wideband (UWB) has become the promising wireless technology in commercial applications such as next-generation short-range high-data-rate wireless communications, high resolution imaging, and high accuracy radar. The antenna is one of the key designs in UWB wireless systems. This talk starts with a brief introduction to design challenges of UWB antennas, followed by state-of-the-art solutions. Next, miniaturization technologies for UWB antennas are addressed. Planar designs are highlighted due to their unique merits and wide adoption in practical applications. First, a newly developed technique to achieve ground-independent UWB antenna performance, one of the most challenging issues in small antenna design, is addressed. A design example is used to elaborate the mechanism of the method. Based on this concept, an antenna with further reduced size is designed to fit wireless USB dongles. Furthermore, an innovative compact diversity UWB antenna shows the advantage of ground-independence for small antennas in diversity applications. Last, UWB antennas co-designed with filtering performance using filters integrated into the antenna are proposed to reduce the overall size of devices and enhance antenna performance. At the end, the trends of UWB antenna R&D are discussed, correlated with applications and market demands.