TITLE
A filter-integrated method to improve the radiation performance of planar UWB antenna

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In this talk, we will propose a filter-integrated method to improve the stability of the radiation patterns of the compact planar UWB antenna, especially increasing the broadside realized gain values at the higher portion of the UWB frequency range. As is known, with the rapid development of UWB technology for commercial communication applications, many practical applications, such as portable devices, high-accuracy positioning systems, cognitive radios and so on, require constant realized gains in a specified direction. However, the radiation pattern degradation in the upper portion of the UWB frequency range is a serious defect of the planar designs.

In order to alleviate this defect, many effective techniques, have been reported, such as including electromagnetic band gaps (EBGs) [1], modifying the radiating patches [2], re-constructing the ground planes [3], and resorting to a trident-shaped strip together with a tapered impedance transformer on the feedline [4].

As an alternative, in this talk, by integrating an asymmetrical single-wing and a symmetrical dual-wing filters into the feed-line section of a modified arc-slot UWB antenna, respectively, the broadside gain of the antenna in the upper portion of the UWB band is increased, because the magnitude of surface currents on the antenna radiation patch are improved. For example, the simulated broadside gains at 10 GHz are increased from -3.89 dBi to 4.16 dBi for the single-wing antenna, and to 2.36 dBi for dual-wing antenna. Accordingly, the specific operation scheme of the filter-integrated antennas will be introduced and the differences between the asymmetrical and symmetrical versions will be illustrated in detail. Besides, the integration of filter into the antenna enhances the sharp cutoff performance at the two edges of the UWB frequency range. Moreover, the proposed co-design technology save the total size of the filter and antenna as a whole system effectively [3]. Finally, the experimental results, which are in agreement with the simulations, will be given in the talk to verify the proposed method.

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