# Double Sided Rounded Bow-Tie Antenna Arrays for UWB Communications

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UWB systems require compact and extremely wide band antenna design covering the spectrum from 3.1 GHz to 10.6 GHz. High gain and constant phase are also desired in such systems. Compared to a single antenna, antenna arrays significantly enhance the overall system performance, in terms of capacity and spectrum efficiency achieving high data rate service. Improved directivity and beam scanning are added advantages of array systems.

In this study, double sided rounded bow-tie antenna arrays were considered. The elements consisted in the array system were shown in Fig. 1. Unlike a conventional bow-tie antenna, the antenna has two identical symmetric patches with one patch located on the front side of the substrate and the other on the back side. The antenna has also omni-directional radiation characteristics with reasonable gain values over the entire band. Fig. 2 shows one of the array configurations considered in which the second element is mirrored along the y-axis. The numerical simulations were carried out using an exact Finite Element-Boundary Integral Method (FE-BI). Different array configurations were considered in order to improve the pattern stability. The coupling effect between elements was investigated since coupling is a significant parameter in the array performance. High coupling may cause deficiency in beam scanning within the desired bandwidth. For this reason, two, three and four element arrays are designed. Results regarding antenna parameters such as S-parameters, radiation pattern, and gain will be presented for various array configurations. Results for different angles of phase shift between the elements will be also presented.

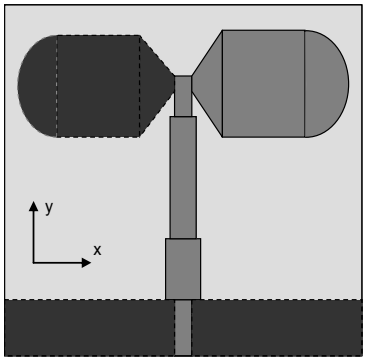


Fig.1. Geometry of the antenna.

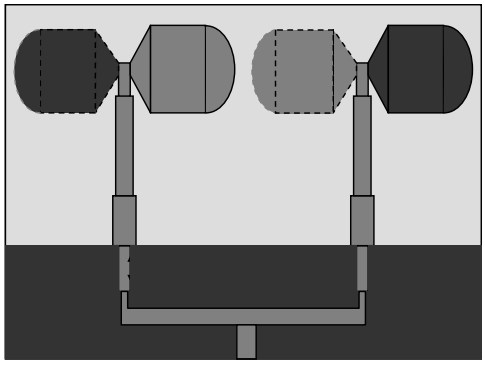

Fig. 2. A two-element array.