Simulation of Cylindrical Conformal Antennas for 3G Base Station

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ABSTRACT

Antennas may be one of the most important components in wireless and cellular communication systems. It is also critical to the operation of a cellular base station with many choices available depending upon the particular site and operating environment. Development of essentially new base station antennas has become one of the most important tasks in contemporary antenna engineering.

As wireless communication markets develop very rapidly, with it the number of base station antennas has also increased. In coming years, the new generation of wireless communication systems will demand new and improved base station antennas. New base station antennas will need to be developed that will replace current sector panel antennas and reduce the overall number of antennas on cellular base stations.

The purpose of this thesis is to investigate on third-generation mobile communication systems and conformal antenna arrays that could be used in such systems. This thesis aims to simulate the effects of curvature on the performance of cylindrical microstrip rectangular antenna and compare with the microstrip rectangular in planar plane for the main third-generation air interface, the WCDMA.

The dimensions of the patch are calculated using transmission line method of analysis. The microstrip patch is designed using Duroid as a dielectric material having dielectric constant, ε_r of 2.22 and metal used is PEC for the patch and the ground plane. The length and width of the rectangular patch are calculated for the desired frequency. Later the radiation pattern, efficiency and bandwidth are simulated for the desired antenna and analyzed using CST Microwave Studio 2006B CAD software. The presented work finishes with conclusion and suggestions for possible future works.