

Evaluation of performance of compact double diversity printed elements for MIMO applications

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MIMO systems making use of different kinds of diversities have been widely explored. From the initial concept based on space diversity to the use of polarization diversity or radiation pattern diversity, in all cases there is a challenge that is to be able afterwards to design the real antenna with the desired performance and size. The authors of this paper have previously studied the effect of combining spatial diversity with radiation pattern diversity in the same antenna element as a way to increase channel capacity in a compact terminal (Sanchez-Fernandez, et al., *Spectral Efficiency in MIMO Systems Using Space and Pattern Diversities Under Compactness Constraints*, IEEE Trans. on Vehicular Technology, vol.57, no.3, pp.1 637-1645, May 2008) . Besides, the proposed antennas have been designed and manufactured to this aim (Rajo-Iglesias et al. , *Compact Multimode Patch Antennas for MIMO Applications*, IEEE Antennas and Propagation Magazine, vol.50, no.2, pp.197-205, April 2008). We propose now to study the combination of radiation pattern and polarization diversities in the same antenna element as shown in Figure 1 and the use of such antennas as elements in a MIMO system to evaluate the spectral efficiency. In this way the three mentioned diversities will be simultaneously used.

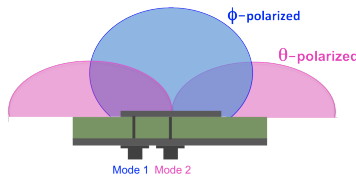


Figure 1: Description of the double-diversity antenna

Comparison of all the possible combinations of diversity will be evaluated by using the same channel model and assumptions as in the mentioned previous works. A discussion on the different performances for the different combinations ...

Besides, the design of the required dual-mode dual-polarized compact antenna in printed technology will be presented. The design is based on the use of patch antennas (with TM_{01} and TM_{11} modes) with slots and exciting with different ports the desired modes. One major challenge is the antenna design with different modes (radiation patterns) at identical frequencies.