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Pattern and Polarization Diversity Antenna for Indoor Wireless Communications

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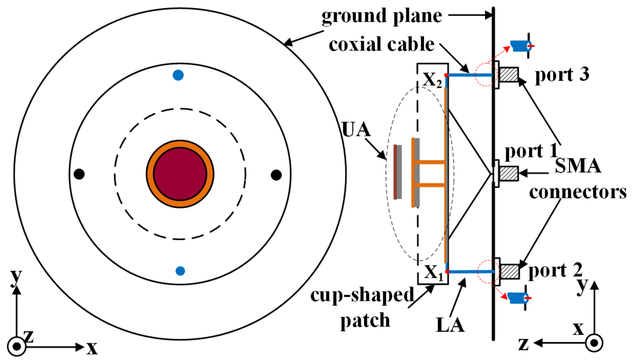
INTRODUCTION

- The indoor signal quality is degraded because of the penetration of buildings. In order to solve this problem, ceiling antennas are installed indoors.
- The diversity characteristic is needed for the MIMO (multiple-input and multiple-output) systems to enhance signal reception. Low profile design is also necessary for indoor wireless communications to achieve aesthetic requirement.
- A single antenna can hardly realize pattern and polarization diversity simultaneously.
- Without much disruption for each antenna, the integration of two antennas which have frequency overlap is a great challenge. The mutual coupling would affect the antenna performance.

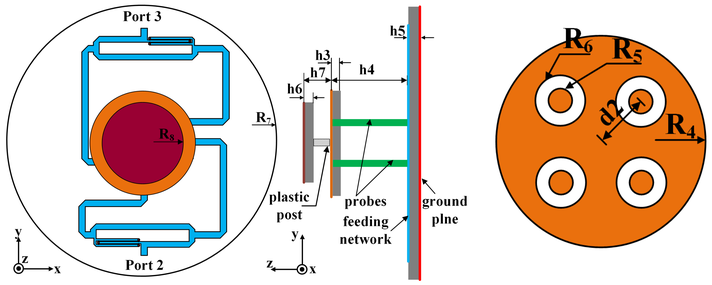
Our Work

- We propose a pattern and polarization diversity antenna for indoor wireless communications.
- The antenna consists of a monocone antenna (LA) and a microstrip antenna (UA). The antenna has diversity characteristics for the 1710-2690 band, which is the overlapping band of the monocone antenna and the microstrip antenna.
- The proposed antenna is also compatible with GSM900 applications due to the broad bandwidth of the monocone antenna.
- The monocone antenna and the microstrip antenna are integrated using the reusing technique, resulting in a compact structure.

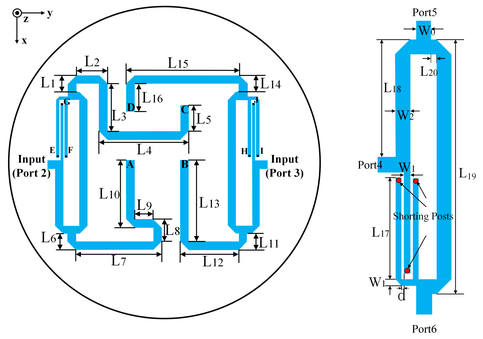
Antenna Structure



Geometry and design parameters of the proposed antenna.

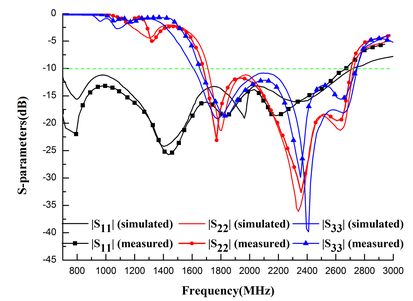


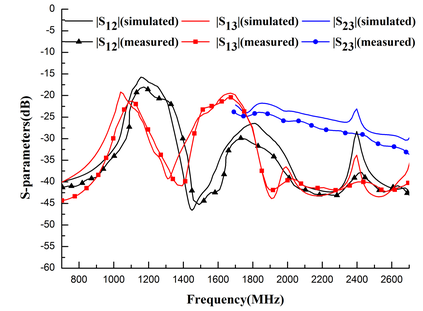
Geometry and design parameters of the UA:
Top view, side view, bottom patch.

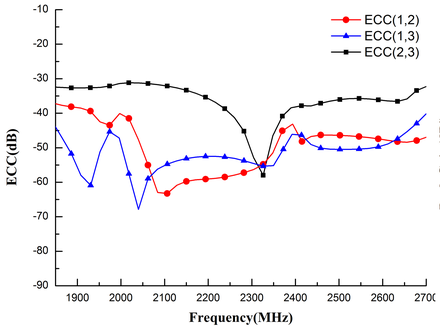


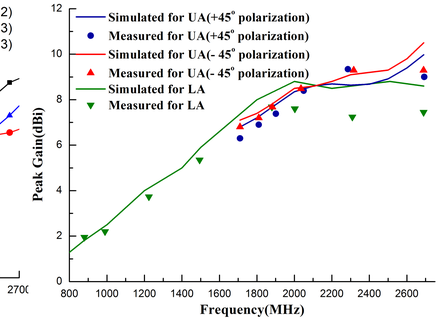
Configuration of :
the feeding network of the UA, out-of-phase power divider.

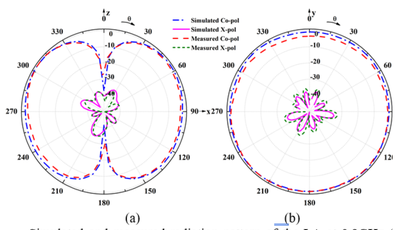
Experimental Results



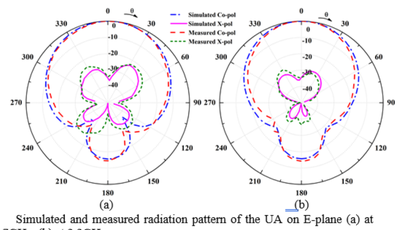




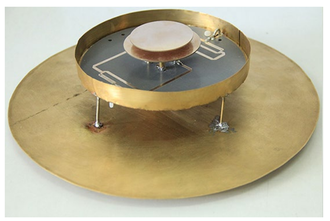


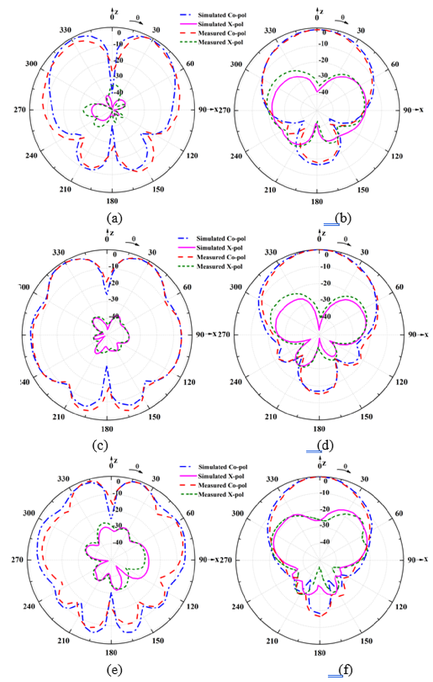


Simulated and measured radiation pattern of the LA at 0.9GHz (plane, (b) x-y plane.



Simulated and measured radiation pattern of the UA on E-plane (a) at 1.7GHz, (b) at 2.2GHz.





Simulated and measured radiation pattern on y-z plane (a) LA at 1.7GHz, (b) UA at 1.7GHz, (c) LA at 2.2GHz, (d) UA at 2.2GHz, (e) LA at 2.7GHz and (f) UA at 2.7GHz.