

## 博士論文の要旨

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博士論文題名

Circular Polarization and Reconfigurable  
Microstrip Antennas for Advanced Wireless  
Communication Systems(無線通信システム高度化のためのマイクロスト  
リップ型円偏波アンテナおよびリコンフィギュ  
ラブルアンテナの研究)

要旨(2,000字程度にまとめること。)

Due to the advancement of modern communication systems, reconfigurable and array antennas are attractive for advance wireless communication applications for their multifunctional capability and enhanced gain. Simple and compact structure with design flexibility will be an added advantage for such kind of antennas in terms of low power loss, high efficiency and compactness.

In this dissertation, some circularly polarized (CP) array antennas and reconfigurable antennas are reported. Two types of CP array antennas using orthogonally fed technique and inclined linear polarization patches are proposed where feed networks are designed by using both-sided MIC technology to overcome the challenge of impedance matching of conventional feed network. A new 3-way power divider employing microstrip and slot lines is also designed to realize the orthogonally fed array antenna. Finally, this orthogonally fed array is converted to dual CP

antenna with wideband performance combining with quadrature hybrid. Moreover, this antenna also gives a more compact structure than conventional one because of its multi-layer structure. In this research work, two CP antennas with polarization and frequency diversity are designed where both are characterized for their good radiation performance for using least number of diodes associated with simple DC biasing circuit designed using high impedance microstrip lines and no passive devices. Corner truncated perturbation technique is used to achieve polarization diversity. Defected ground technique is also studied in this work to achieve CP and polarization reconfigurability. A CP antenna by loading a square slot on the ground plane is demonstrated first and after that this antenna is use to realize a polarization reconfigurable antenna by applying a novel technique of using positive and negative perturbation simultaneously. Besides these antennas, a dual-band dual-polarized antenna is also realized in this study by loading a pair of slots. This antenna can excite different polarization at different frequency bands whereas other slot loaded antennas reported so far can excite same polarization at different bands. The performance of all antennas reported here are experimentally verified. All antennas are very simple with good radiation performance that makes them attractive for advanced wireless communication applications.