

DUAL POLARIZED ADAPTIVE ANTENNA TEST-BEDS FOR GSM

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Abstract:

Ericsson has developed adaptive antenna test-beds for GSM 900 and GSM 1800 to evaluate the performance of the radio interface in a mobile communication network. This is performed in a joint research project with the German operator Mannesmann. Field trials with live traffic are also included in the evaluation of adaptive antennas at the base station.

Multi-path effects are considered for the base station with diversity reception. Space diversity is currently being replaced by polarization diversity. Polarization diversity is therefore employed in the antennas on receive to achieve a compact antenna installation compared to using space diversity.

The performance is compared for a two branch dual-polarized ($\pm 45^\circ$) sector antenna and a dual-polarized array antenna with Butler matrices and summing networks for each polarization state. The array antenna has eight interleaved beams; four in each polarization state. Results from measurements indicate a 4 to 5 dB improvement in C/N environments both in up and down link. The improvements in C/I environments are better than 10 dB in up link and 5 to 6 dB in down link.

The expected subscriber capacity increase is more than 100% for a mature GSM operator in replacing sector antennas with adaptive array antennas in an existing network. A new GSM operator may use the benefits of adaptive array antennas to achieve coverage extensions using 50 % fewer sites than employing existing base station techniques.