

# A Practical Space-Code Correlator Receiver for DSP Based Software Radio Implementation in CDMA2000

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**Abstract** Development of practical algorithms for beamforming in 3G CDMA systems and their software radio implementations are still a challenging task, which will facilitate upgrading of traditional base stations into smart antenna capable 3G base stations. In this paper, we propose a practical space-code correlator (SCC) receiver structure for its software radio implementation a DSP. SCC's advantage comes from the fact that it doesn't require any training sequence or learning parameter as in other algorithms (LMS or CM). DSP implementations of the SCC are performed using Texas Instruments C67xx family platforms. In the simulations, reverse link base band signal format of CDMA2000 is used and the effects of different array topologies (uniform linear array-ULA or uniform circular array-UCA) are considered. The implementation results regarding beamforming accuracy, weight vector computation time (execution time), search resolution effect on DOA estimation accuracy, DSP resource utilization, and received SINR are presented. The results show that DSP based SCC beamformer can estimate weight vectors within less than 10ms with DOA search resolution of  $2^\circ$  especially when C6713 DSP is used. With faster DSPs and

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