

Techniques to perform beam-steering and beam-forming to transmit data on a single eigenmode in a wideband multiple-input channel. In one method, a steering vector is obtained for each of a number of subbands. Depending on how the steering vectors are defined, beam-steering or beam-forming can be achieved for each subband. The total transmit power is allocated to the subbands based on a particular power allocation scheme (e.g., full channel inversion, selective channel inversion, water-filling, or uniform). A scaling value is then obtained for each subband based on its allocated transmit power. Data to be transmitted is coded and modulated to provide modulation symbols. The modulation symbols to be transmitted on each subband are scaled with the subband's scaling value and further preconditioned with the subband's steering vector. A stream of preconditioned symbols is then formed for each transmit antenna.