

Techniques to calibrate the downlink and uplink channels to account for differences in the frequency responses of the transmit and receive chains at an access point and a user terminal. In one embodiment, pilots are transmitted on the downlink and uplink channels and used to derive estimates of the downlink and uplink channel responses, respectively. Two sets of correction factors are then determined based on the estimate[^] of the downlink and uplink channel responses. A calibrated downlink channel is formed by using a first set of correction factorsⁱ for the downlink channel, and a calibrated uplink channel is formed by using a I second set of correction factors for the uplink channel. The first and second sets of correction factors may be determined using a matrix-ratio computation or a minimum mean sqdare error (MMSE) computation. The calibration may be performed in real-time based on over-the-air transmission.