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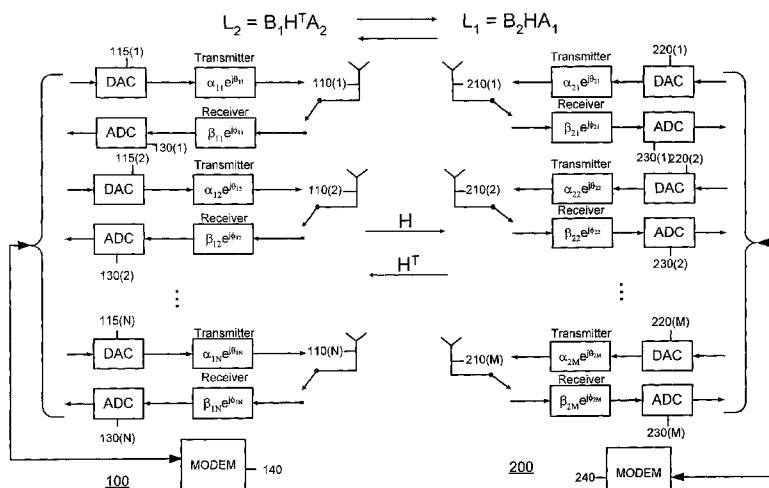
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(54) **Title:** TECHNIQUES FOR CORRECTING FOR PHASE AND AMPLITUDE OFFSETS IN A MIMO RADIO DEVICE



(57) **Abstract:** Techniques to correct for phase and amplitude mismatches in a radio device in order to maintain channel symmetry when communicating with another device using MIMO radio communication techniques. Correction for the amplitude and phase mismatches among the plurality of transmitters and plurality of receivers of a device may be made at baseband using digital logic (such as in the modem) in the receiver path, the transmitter path or both paths of that device. In a device, amplitude and phase offsets are determined among the plurality of radio transmitter and radio receiver paths by measuring phase and amplitude responses when supplying a signal to a transmitter in a first antenna path of the device

and coupling the radio signal from a first antenna to a second antenna path of that device where the signal is downconverted by a receiver associated with the second antenna path, and similarly coupling a signal from the second antenna path to the first antenna path. Measurements are obtained between the first antenna path and each of the other antenna paths when coupling a signal in both directions between them. Phase and amplitude offset correction values are computed from the phase and amplitude measurements during a self-calibration operation or mode of the device, and are used during a run-time operation or mode when processing the baseband transmit and/or receive signals to compensate for the phase and amplitude offsets among the plurality of transceiver paths of a device. Amplitude offset correction may not be necessary (or optional) for certain radio implementations or MIMO radio algorithms. The device may execute the self-calibration mode on device power-up, and then periodically thereafter. Self-calibration may also be performed at the factory on a device.



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