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(54) Title: SYSTEMS AND METHODS FOR COMMUNICATING BY MODULATING DATA ON ZEROS IN THE PRESENCE OF CHANNEL IMPAIRMENTS

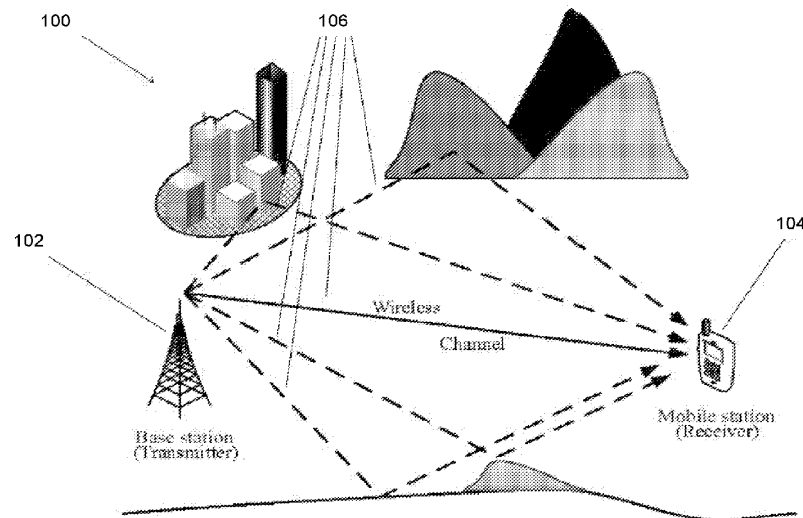


Fig. 1

(57) Abstract: Communication systems and methods in accordance with various embodiments of the invention utilize modulation on zeros. Carrier frequency offsets (CFO) can result in an unknown rotation of all zeros of a received signal's z -transform. Therefore, a binary MOCZ scheme (BMOCZ) can be utilized in which the modulated binary data is encoded using a cycling register code (e.g. CPC or ACPC), enabling receivers to determine cyclic shifts in the BMOCZ symbol resulting from a CFO. Receivers in accordance with several embodiments of the invention include decoders capable of decoding information bits from received discrete-time baseband signals by: estimating a timing offset for the received signal; determining a plurality of zeros of a z -transform of the received symbol; identifying zeros from the plurality of zeros that encode received bits by correcting fractional rotations resulting from the CFO; and decoding information bits based upon the received bits using a cycling register code.

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