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(54) **PILOT TRANSMISSION SCHEMES FOR WIRELESS MULTI-CARRIER COMMUNICATION SYSTEMS**

(52) **U.S. Cl. .... 370/208; 370/203**

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(57) **ABSTRACT**

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Pilot transmission schemes suitable for use in wireless multi-carrier (e.g., OFDM) communication systems. These pilot transmission schemes may utilize frequency, time, or both frequency and time orthogonality to achieve orthogonality among the pilots transmitted by multiple base stations on the downlink. Frequency orthogonality is achieved by transmitting pilots on disjoint sets of subbands. Time orthogonality is achieved by transmitting pilots using different orthogonal codes (e.g., Walsh codes). The pilots may also be scrambled with different scrambling codes, which are used to randomize pilot interference and to enable identification of the transmitters of these pilots. Pilot interference cancellation may be performed to improve performance since subbands used for data transmission by one transmitter may also be used for pilot transmission by another transmitter. Pilot interference is estimated and then subtracted from received symbols to obtain pilot-canceled symbols having improved quality.

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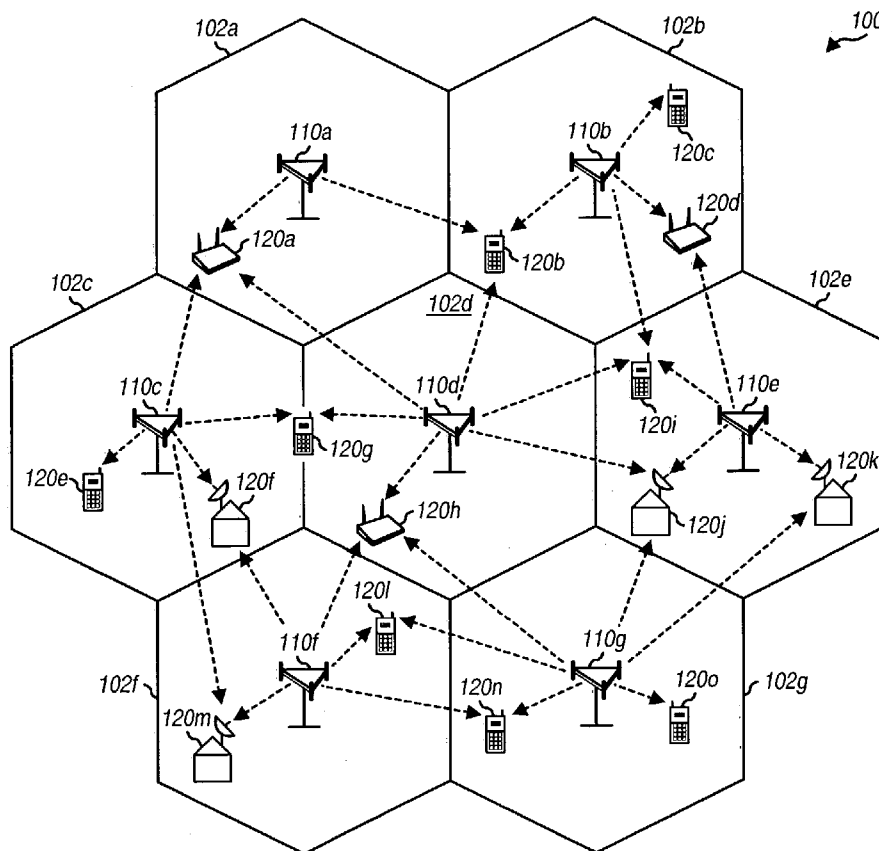
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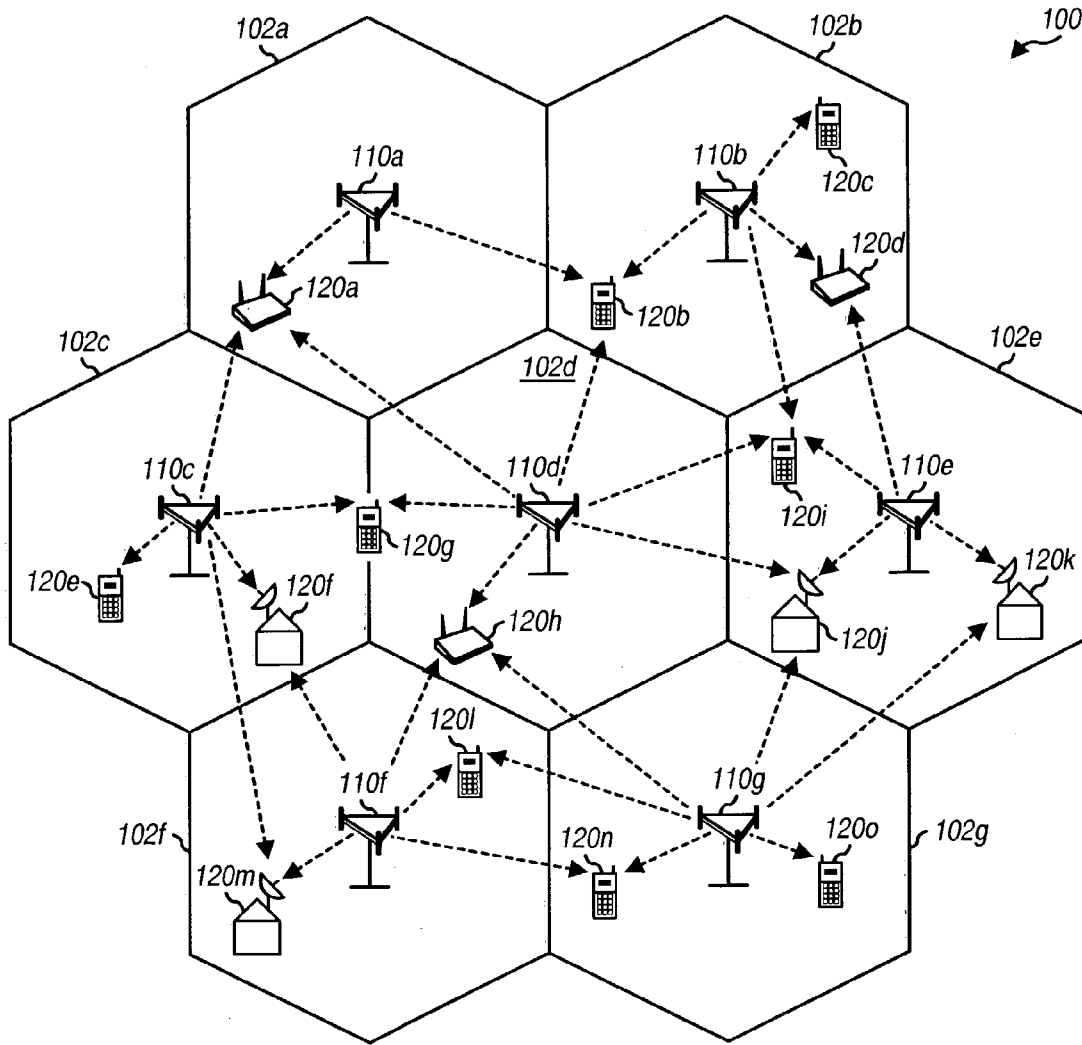


FIG. 1

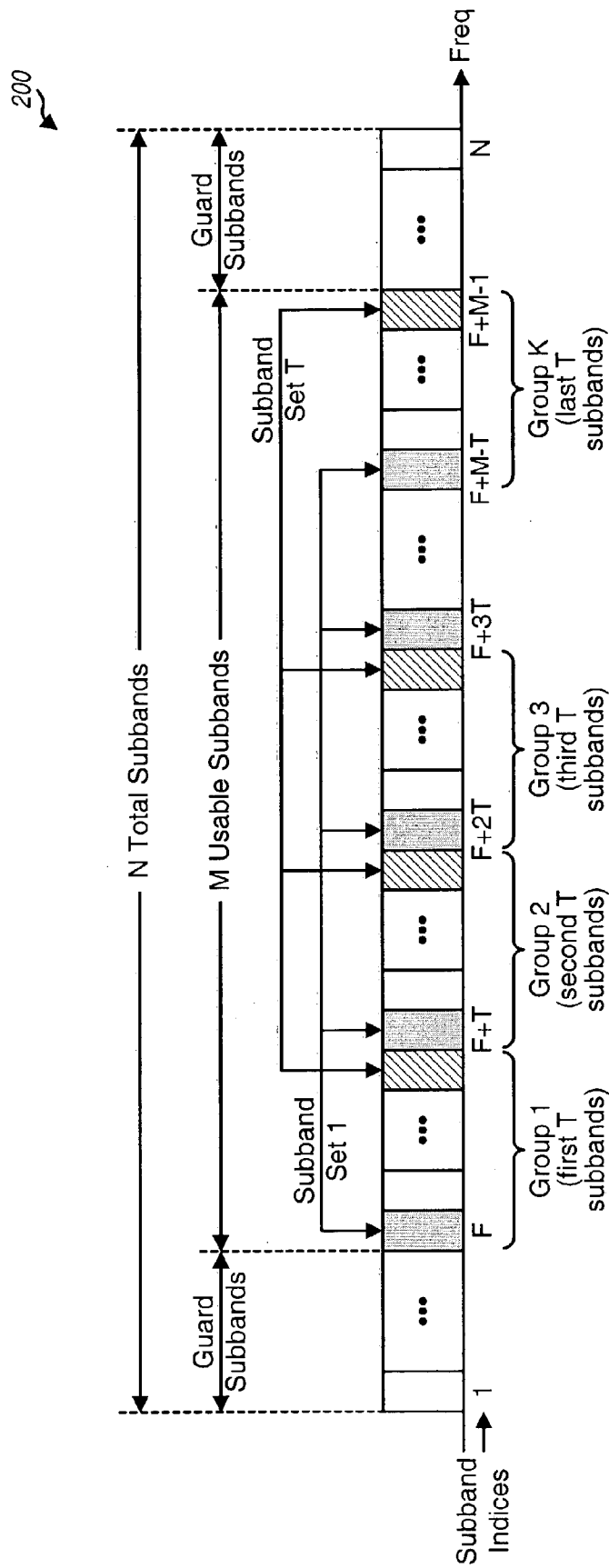


FIG. 2A

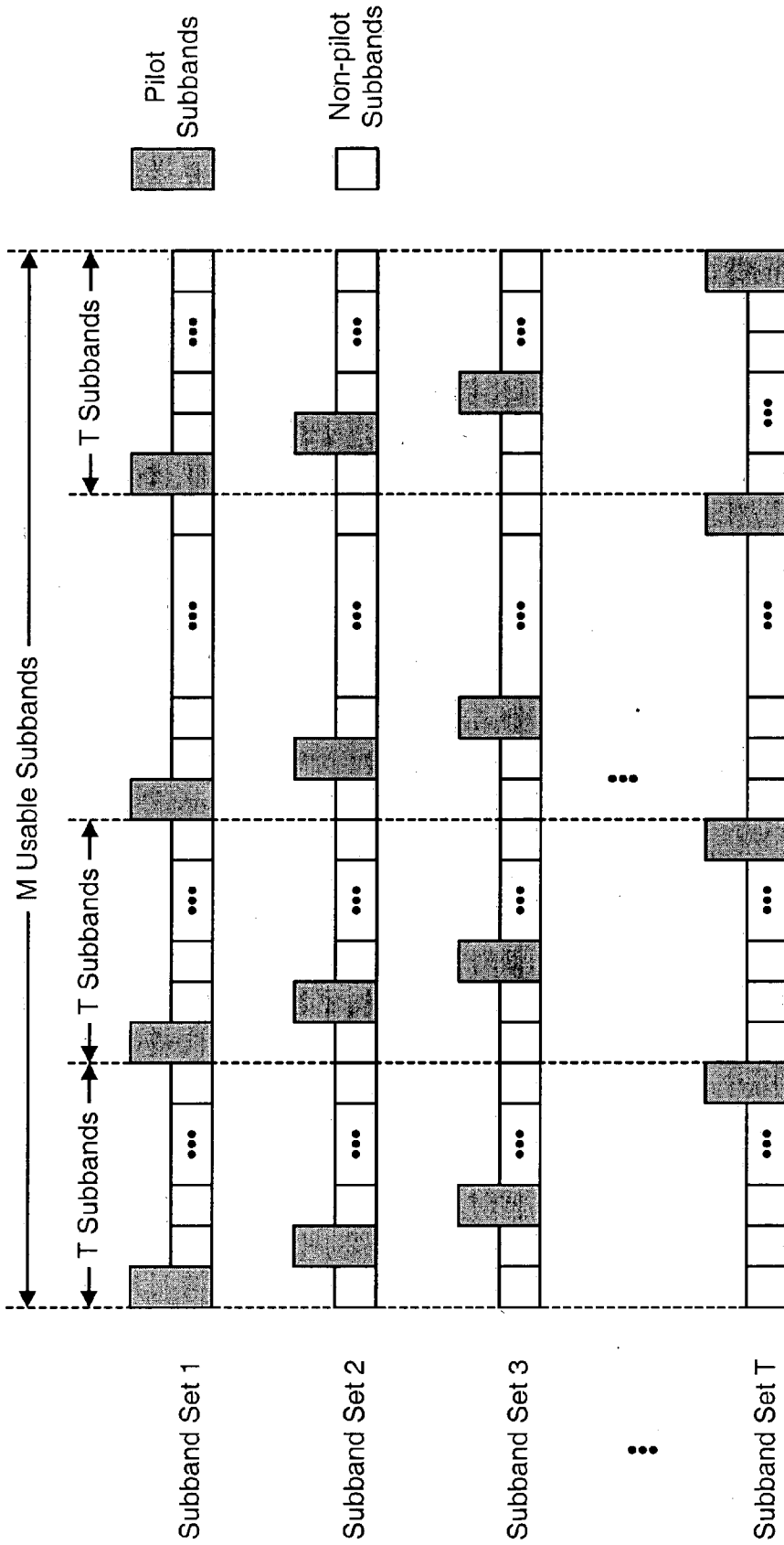
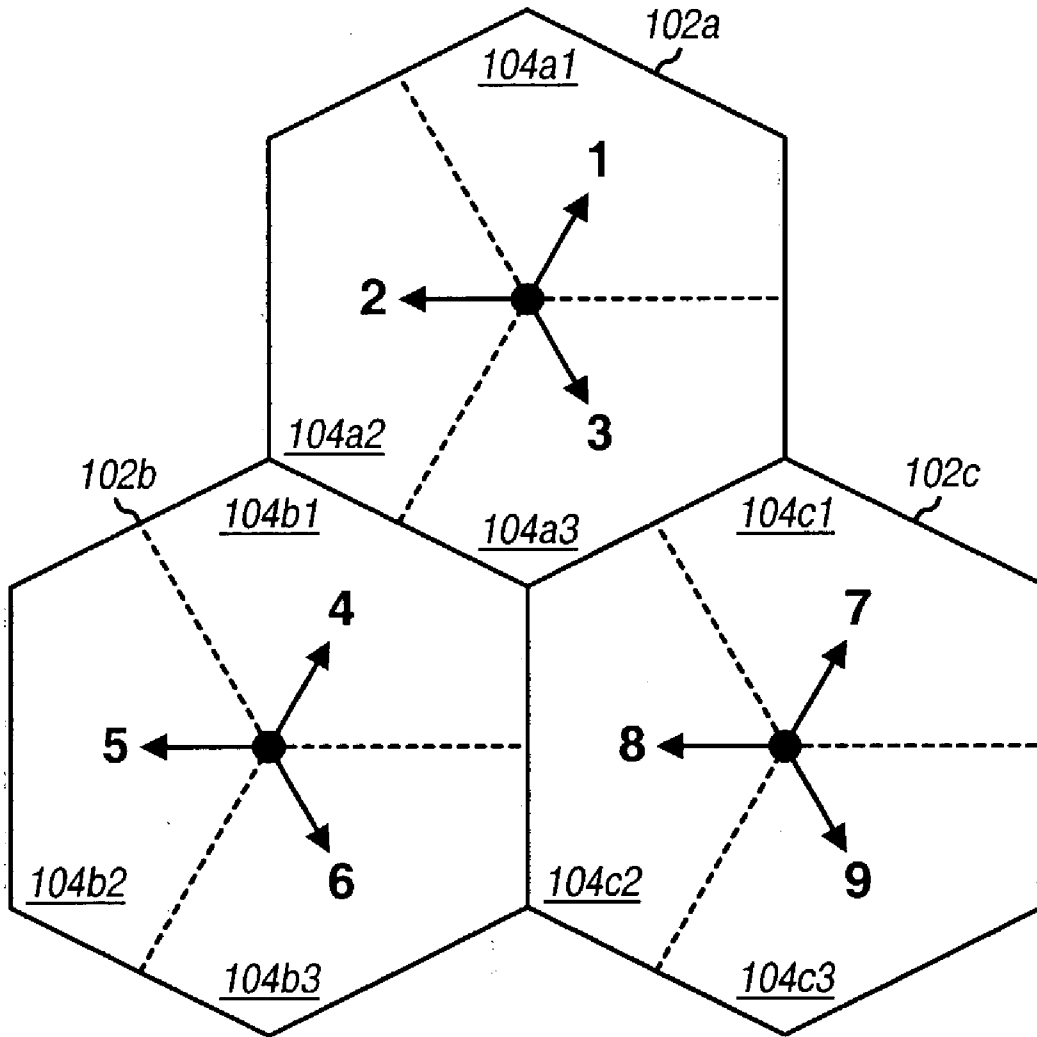


FIG. 2B



**FIG. 3A**

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