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**Krishnan et al.**

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(54) **CHANNEL ESTIMATION FOR OFDM COMMUNICATION SYSTEMS**

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(51) **Int. Cl.**  
**H04J 11/00** (2006.01)

(52) **U.S. Cl.** ..... **370/203; 370/210; 370/207; 370/208; 370/342; 370/343; 370/335; 370/480; 455/63.1; 455/450; 455/67.11; 455/67.16; 455/464; 375/340; 375/342; 375/346; 375/347**

(58) **Field of Classification Search** ..... **455/67.11, 455/67.16, 703, 464, 450, 63.1; 375/340, 375/346, 347, 260; 370/203, 210, 342, 347, 370/348, 480**

See application file for complete search history.

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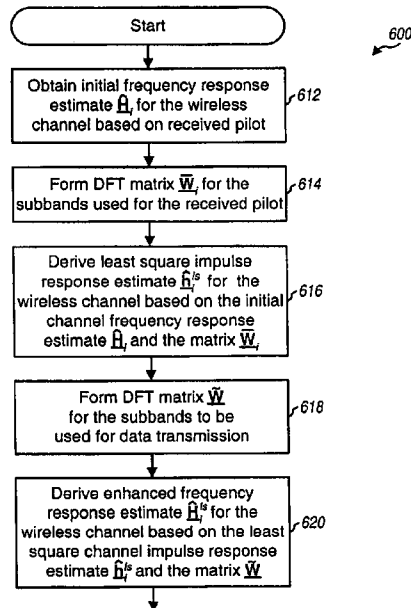
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(57) **ABSTRACT**

Techniques to estimate the frequency response of a wireless channel in an OFDM system. In one method, an initial estimate of the frequency response of the wireless channel is obtained for a first group of subbands based on a pilot transmission received via the subbands in the first group. An estimate of the impulse response of the wireless channel is then derived based on the initial frequency response estimate. An enhanced estimate of the frequency response of the wireless channel is then derived for a second group of subbands based on the impulse response estimate. The first and second groups may each include all or only a subset of the usable subbands. Subband multiplexing may be used to allow simultaneous pilot transmissions by multiple terminals on their associated groups of subbands.

**27 Claims, 5 Drawing Sheets**



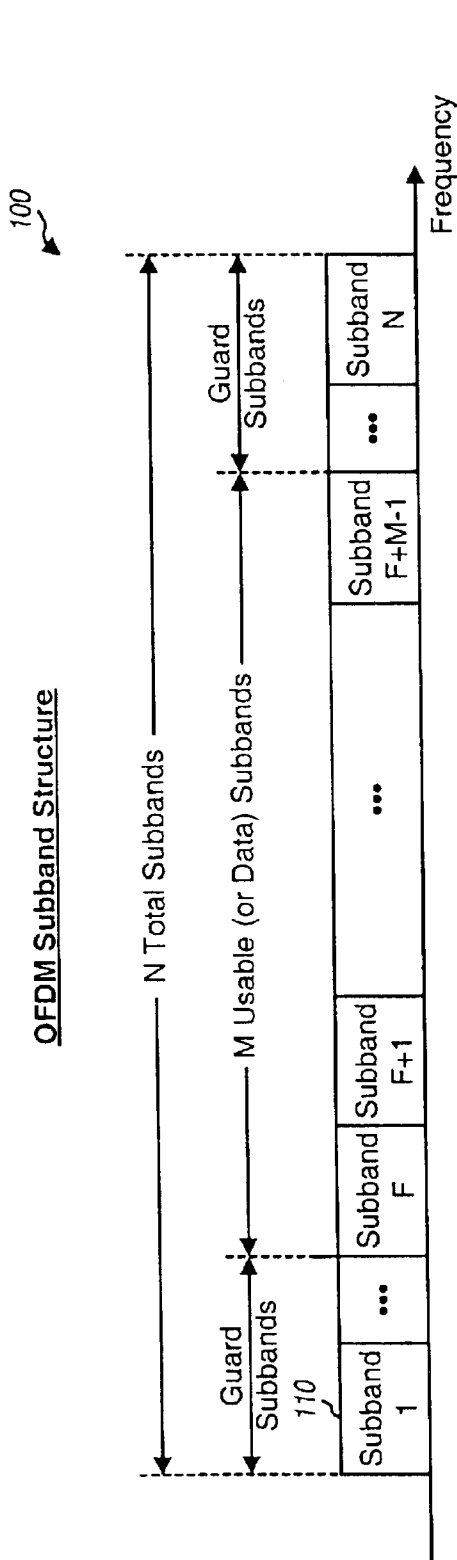


FIG. 1

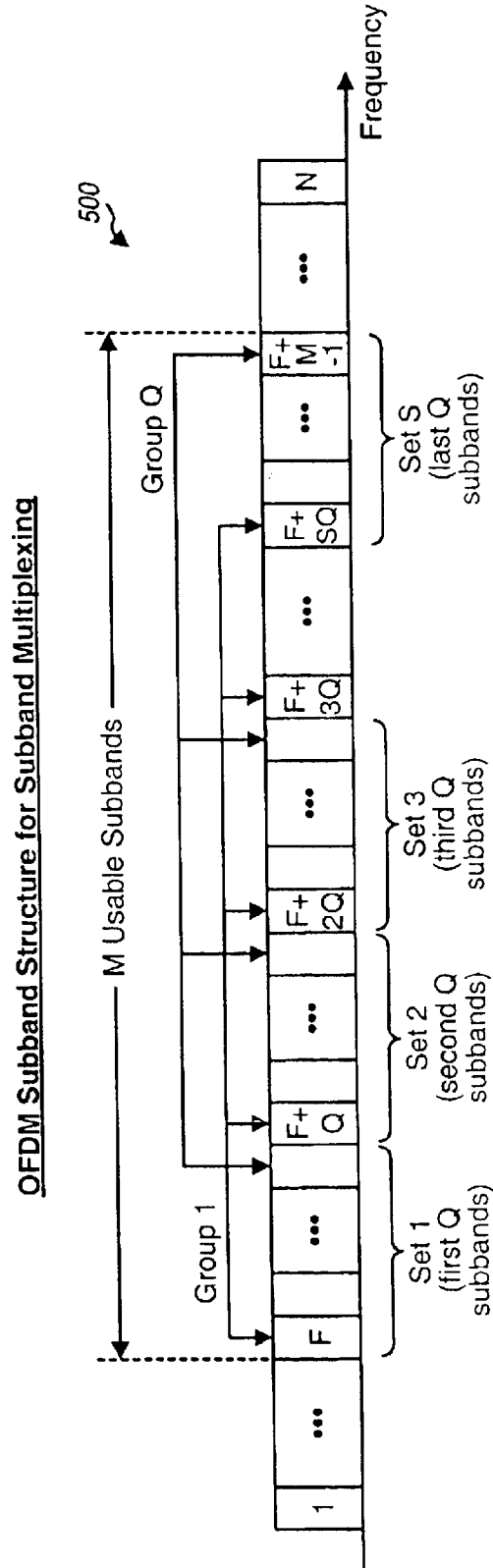


FIG. 5

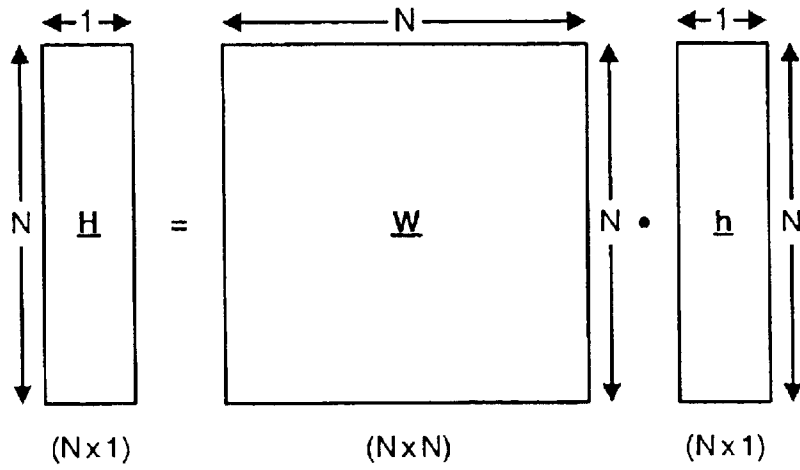


FIG. 2A

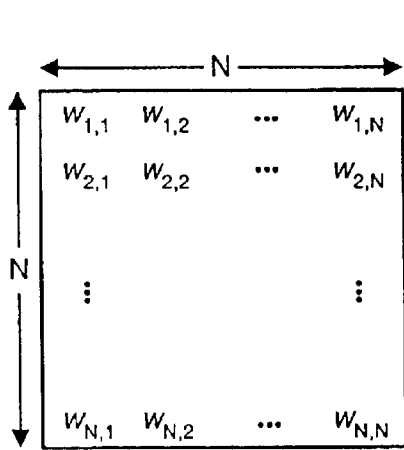


FIG. 2B

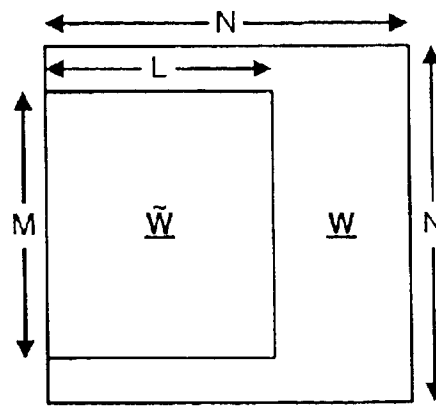


FIG. 3A

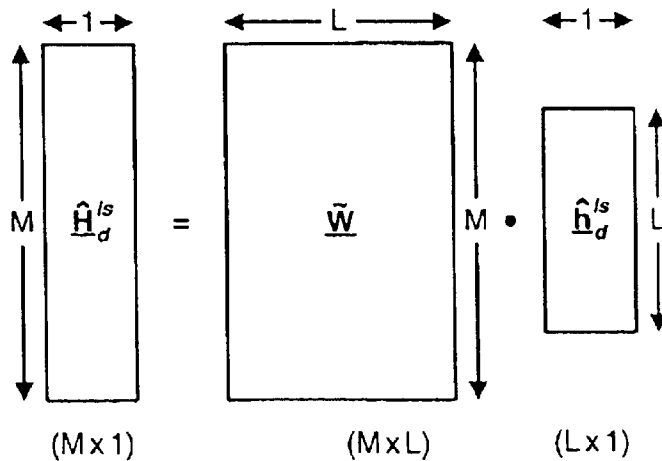


FIG. 3B

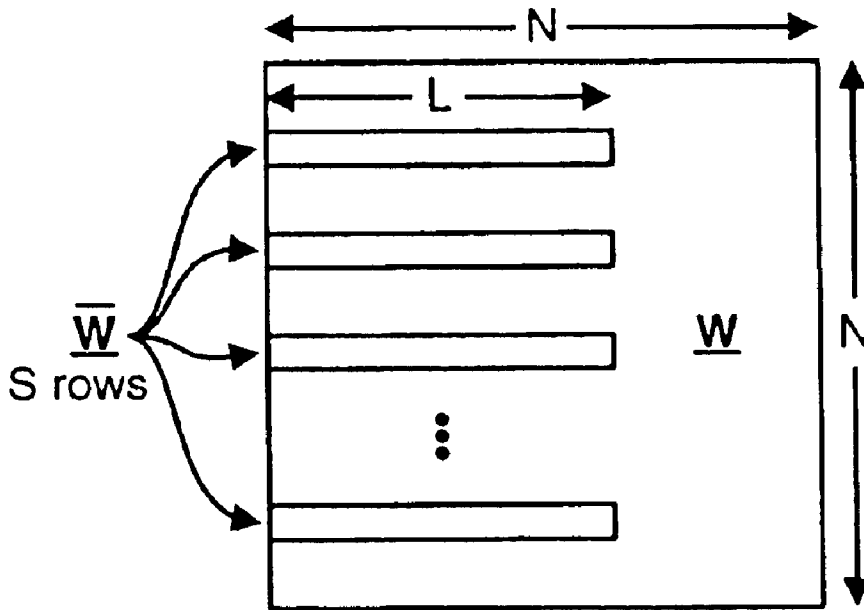


FIG. 4A

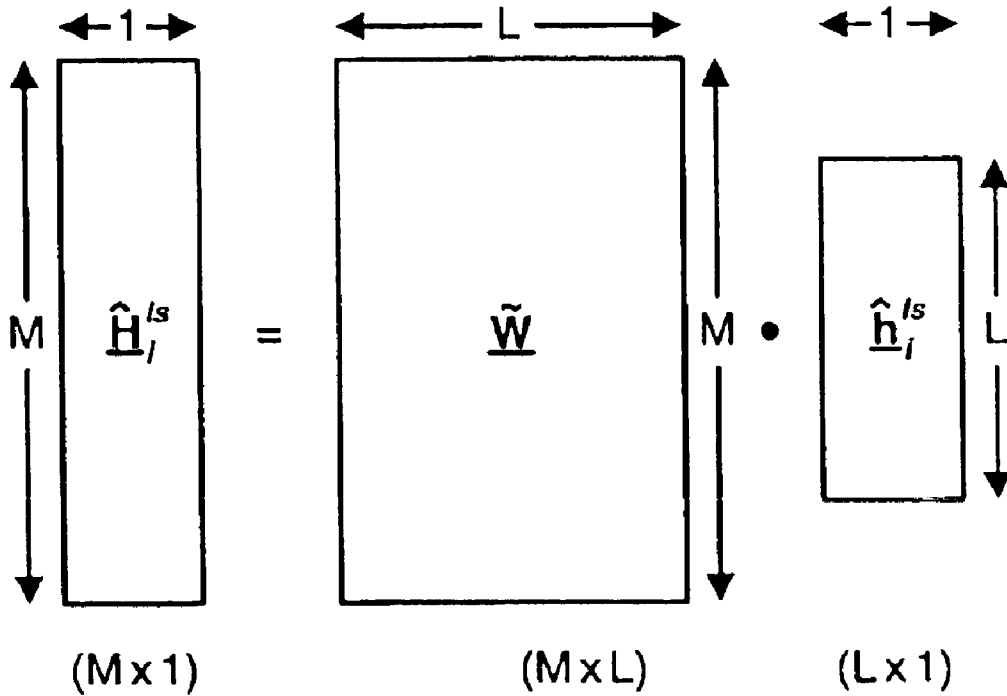


FIG. 4B

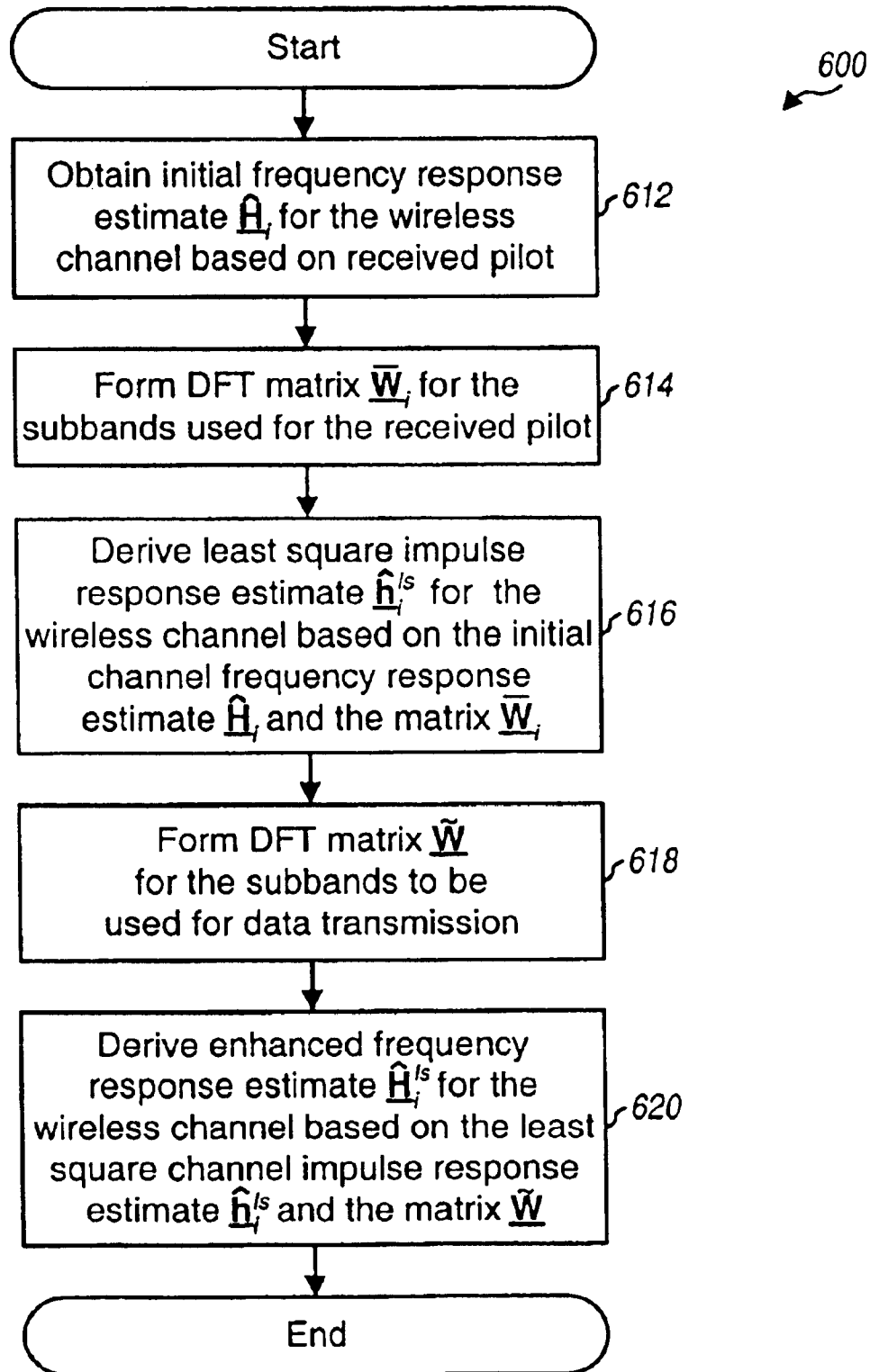


FIG. 6

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