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(54) **MODIFIED PREAMBLE STRUCTURE FOR IEEE 802.11A EXTENSIONS TO ALLOW FOR COEXISTENCE AND INTEROPERABILITY BETWEEN 802.11A DEVICES AND HIGHER DATA RATE, MIMO OR OTHERWISE EXTENDED DEVICES**

Publication Classification

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(52) **U.S. Cl.** **455/101; 375/267**

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(57) **ABSTRACT**

A modified preamble is used by extended devices that operate at higher rates, MIMO or other extensions relative to strict 802.11a-compliant devices. The extended devices might use multiple antenna techniques (MIMO), where multiple data streams are multiplexed spatially and/or multi-channel techniques, where an extended transmitter transmits using more than one 802.11a channel at a time. Such extensions to IEEE 802.11a can exist in extended devices. The modified preamble is usable for signaling, to legacy devices as well as extended devices, to indicate capabilities and to cause legacy devices or extended devices to defer to other devices such that the common communication channel is not subject to unnecessary interference. The modified preamble is also usable for obtaining MIMO channel estimates and/or multi-channel estimates. The modified preamble preferably includes properties that facilitate detection of conventional and/or extended modes ("mode detection") and provides some level of coexistence with legacy IEEE 802.11a devices.

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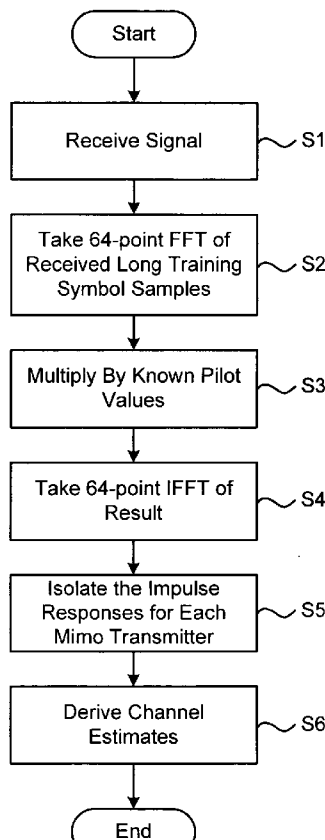
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Related U.S. Application Data

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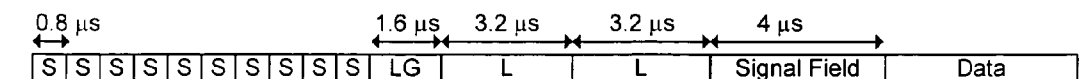


FIG. 1 (PRIOR ART)

$$L1 = \{ \begin{matrix} 0 & 1 & -1 & -1 & 1 & 1 & -1 & 1 & -1 & 1 & -1 & -1 & -1 & -1 & -1 & 1 \\ 1 & -1 & -1 & 1 & -1 & 1 & -1 & 1 & 1 & 1 & 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 & 1 & -1 & -1 & 1 & 1 & -1 & 1 & -1 & 1 \\ 1 & 1 & 1 & 1 & 1 & -1 & -1 & 1 & 1 & -1 & 1 & -1 & 1 & 1 & 1 & 1 \end{matrix} \}$$

FIG. 2 (PRIOR ART)

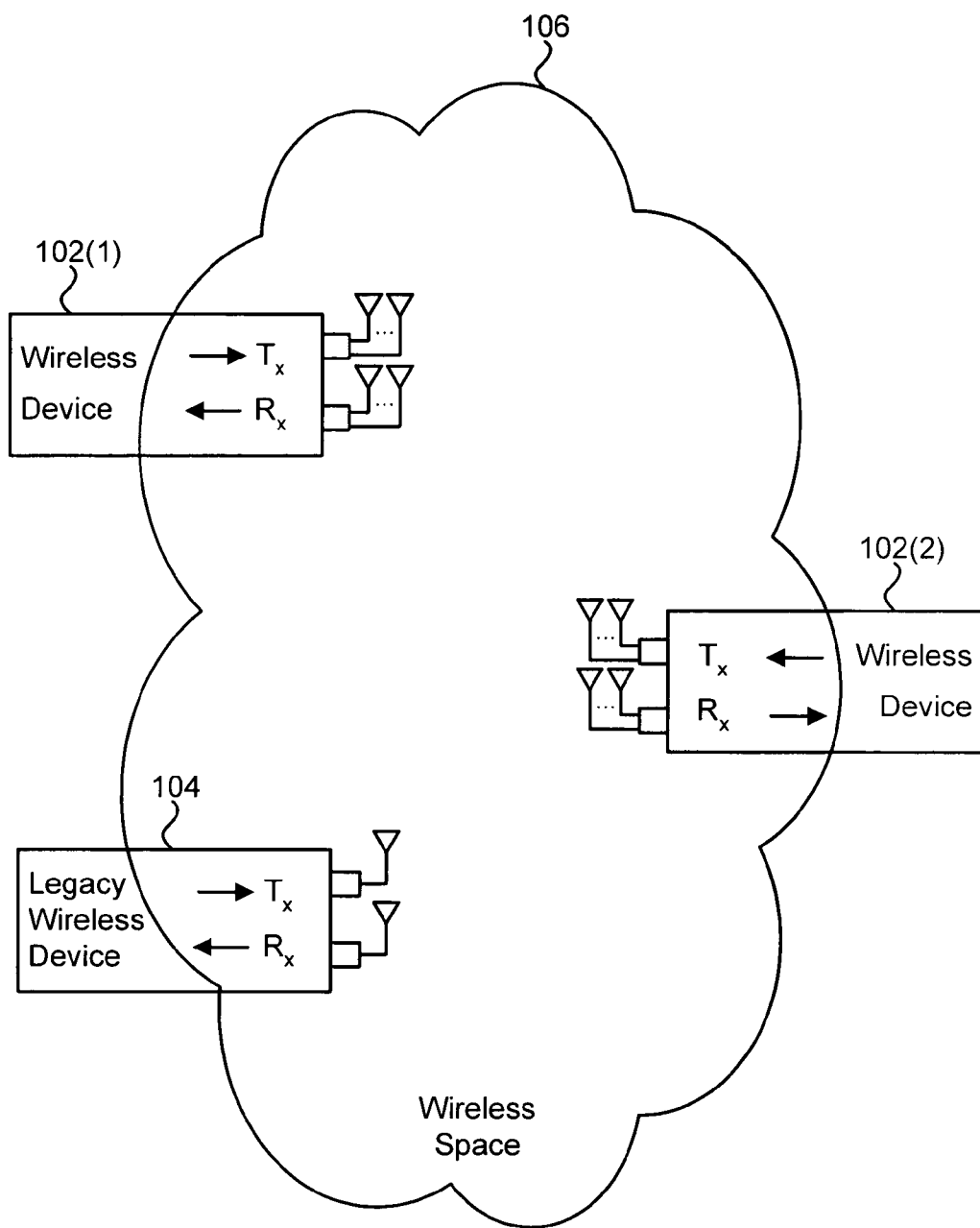


FIG. 3

$$\begin{aligned}
 L2 &= \{ \begin{array}{cccccccccccccccc} 0 & 1 & -1 & -1 & 1 & 1 & -1 & 1 & -1 & 1 & -1 & -1 & -1 & -1 & -1 & 1 \\ 1 & -1 & -1 & 1 & -1 & 1 & -1 & 1 & 1 & 1 & 1 & -1 & -1 & -1 & 1 & -1 \\ -1 & -1 & 1 & 1 & 1 & 1 & 1 & 1 & -1 & -1 & 1 & 1 & -1 & 1 & -1 & 1 \\ 1 & 1 & 1 & 1 & 1 & -1 & -1 & 1 & 1 & -1 & 1 & -1 & 1 & 1 & 1 & 1 \end{array} \} \\
 L3 &= \{ \begin{array}{cccccccccccccccc} 0 & 1 & -1 & -1 & -1 & -1 & 1 & -1 & -1 & 1 & -1 & -1 & 1 & 1 & 1 & -1 \\ 1 & -1 & -1 & 1 & 1 & -1 & 1 & -1 & 1 & 1 & 1 & -1 & 1 & 1 & -1 & 1 \\ -1 & -1 & 1 & 1 & -1 & -1 & -1 & -1 & -1 & -1 & 1 & 1 & 1 & -1 & 1 & -1 \\ 1 & 1 & 1 & 1 & -1 & 1 & 1 & -1 & 1 & -1 & 1 & -1 & -1 & -1 & -1 & -1 \end{array} \} \\
 L4 &= \{ \begin{array}{cccccccccccccccc} 0 & -1 & 1 & 1 & 1 & 1 & 1 & 1 & -1 & -1 & 1 & 1 & -1 & 1 & -1 & 1 \\ 1 & 1 & 1 & 1 & 1 & -1 & -1 & 1 & 1 & -1 & 1 & -1 & 1 & 1 & 1 & 1 \\ -1 & 1 & -1 & -1 & 1 & 1 & -1 & 1 & -1 & 1 & -1 & -1 & -1 & -1 & -1 & 1 \\ 1 & -1 & -1 & 1 & -1 & 1 & -1 & 1 & 1 & 1 & 1 & -1 & -1 & -1 & 1 & -1 \\ -1 & -1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & -1 & -1 & 1 & 1 & -1 & 1 & 1 \\ 1 & 1 & 1 & 1 & 1 & -1 & -1 & 1 & 1 & -1 & 1 & -1 & 1 & 1 & 1 & 1 \\ -1 & 1 & -1 & -1 & 1 & 1 & -1 & 1 & -1 & 1 & -1 & -1 & -1 & -1 & -1 & 1 \\ 1 & -1 & -1 & 1 & -1 & 1 & -1 & 1 & 1 & 1 & 1 & -1 & -1 & -1 & 1 & -1 \end{array} \}
 \end{aligned}$$

FIG. 4

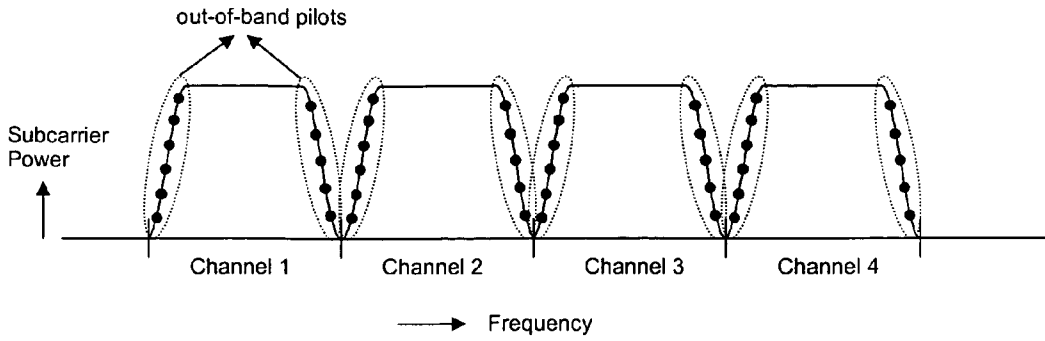


FIG. 5

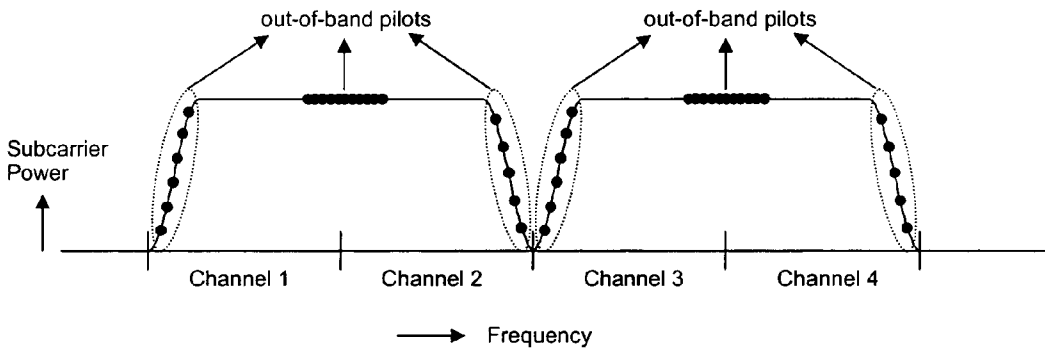


FIG. 6

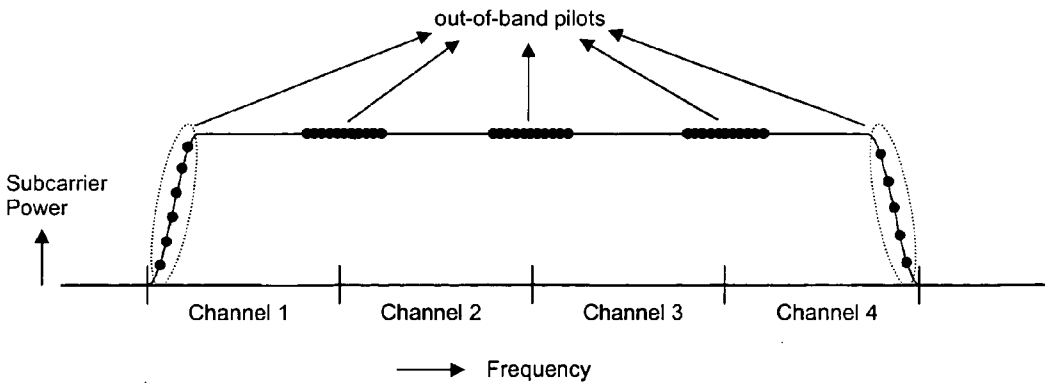


FIG. 7

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