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(54) **METHODS AND APPARATUS FOR MULTI-CARRIER COMMUNICATIONS WITH VARIABLE CHANNEL BANDWIDTH**

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H04J 1/00   (2006.01)
(52) **U.S. Cl.** **370/343**; 370/203; 370/437; 370/468; 370/485; 370/536
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See application file for complete search history.

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(57)   **ABSTRACT**

Methods and apparatus for multi-carrier communication with variable channel bandwidth are disclosed, where the time frame structure and the OFDM symbol structure are invariant and the frequency-domain signal structure is flexible. In one embodiment, a mobile station, upon entering a geographic area, uses a core-band to initiate communication and obtain essential information and subsequently switches to full operating bandwidth of the area for the remainder of the communication. If the mobile station operates in a wide range of bandwidths, the mobile station divides the full range into sub-ranges and adjusts its sampling frequency and its FFT size in each sub-range.

27 Claims, 10 Drawing Sheets

(a) The essential preamble only occupies the CB

(b) The auxiliary preamble occupies the SB
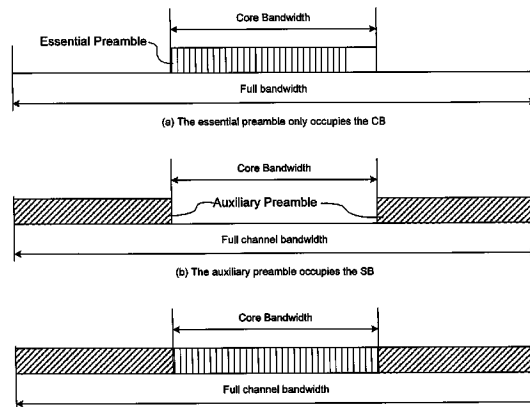
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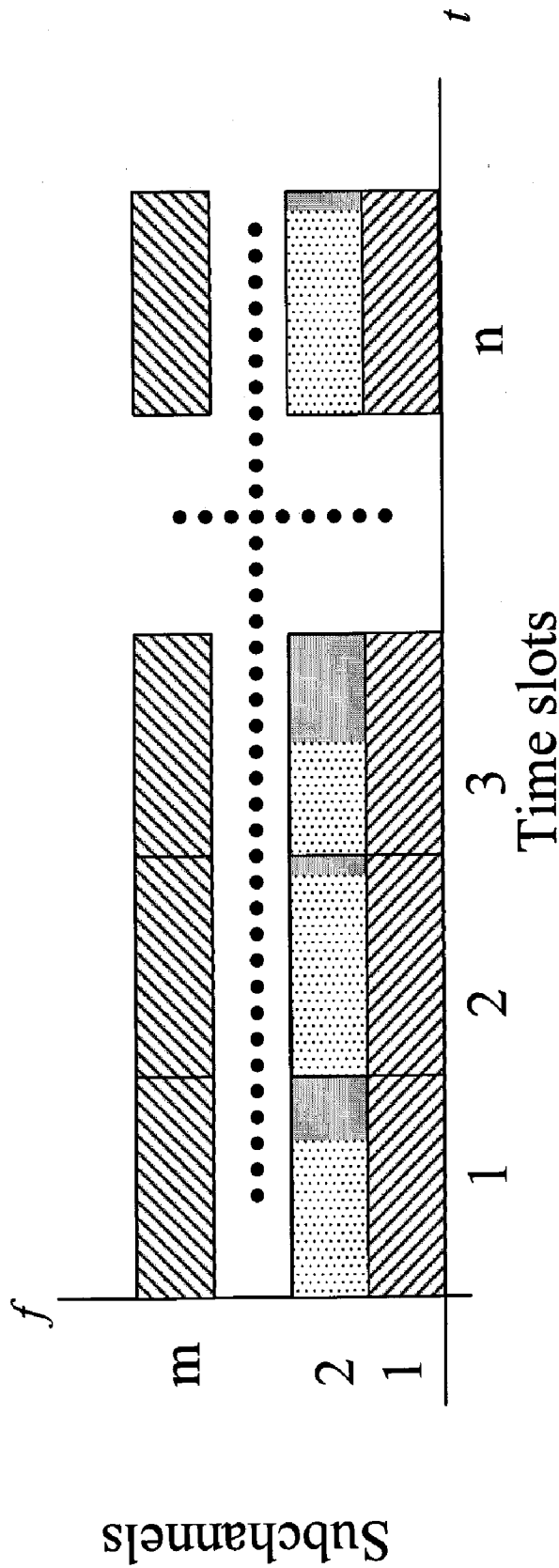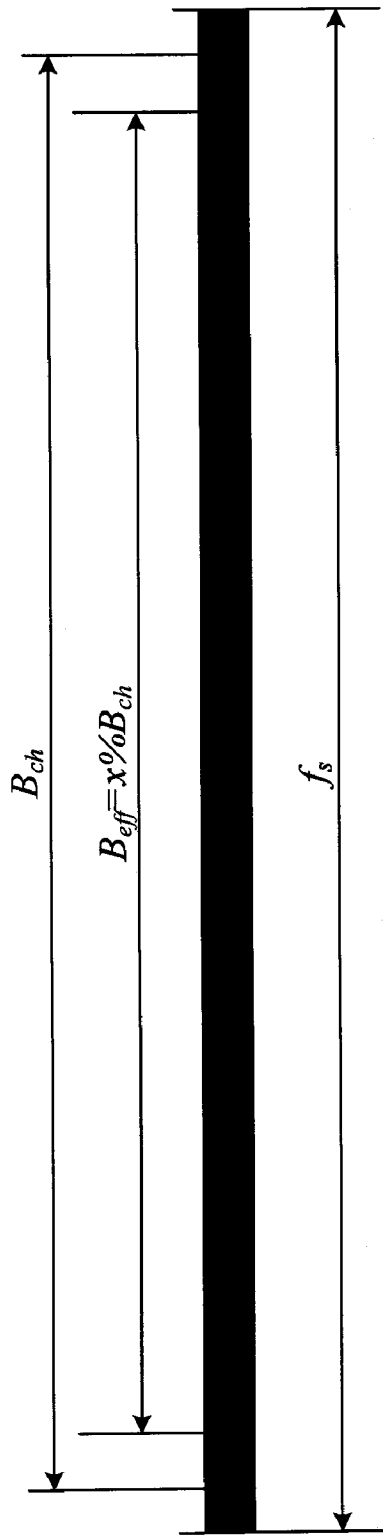
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Subchannels

Time slots

FIG. 1
Prior Art

$$B_{ch}$$

$$B_{eff} = x\% B_{ch}$$

$$f_s$$

$$\text{\# of usable subcarriers} = \frac{B_{eff}}{f_s} \times N_{fft}$$

FIG. 2
Prior Art
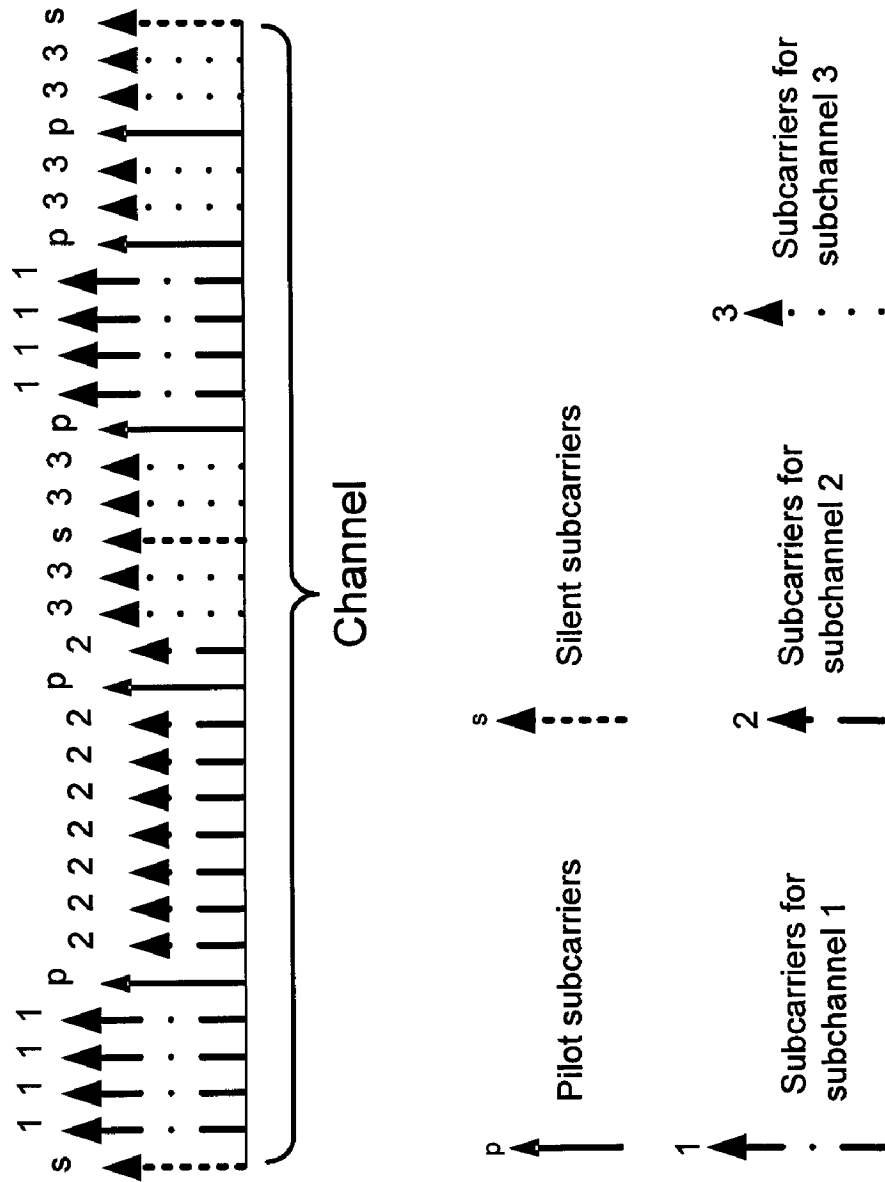
FIG. 3
Prior Art

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