



(12) **United States Patent**
Li et al.

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

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(76) Inventors: **Xiaodong Li**, 9919 129th Pl. NE., Kirkland, WA (US) 98033; **Titus Lo**, 13312 SE. 43rd St., Bellevue, WA (US) 98006; **Kemin Li**, 4228 144th La. SE., Bellevue, WA (US) 98006; **Haiming Huang**, 605 141st Ct. SE. #D203, Bellevue, WA (US) 98007

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 467 days.

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Primary Examiner—Huy D Vu
Assistant Examiner—Maria L. Sekul
(74) *Attorney, Agent, or Firm*—Schwabe, Williamson & Wyatt, P.C.

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(57) **ABSTRACT**

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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.

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Related U.S. Application Data

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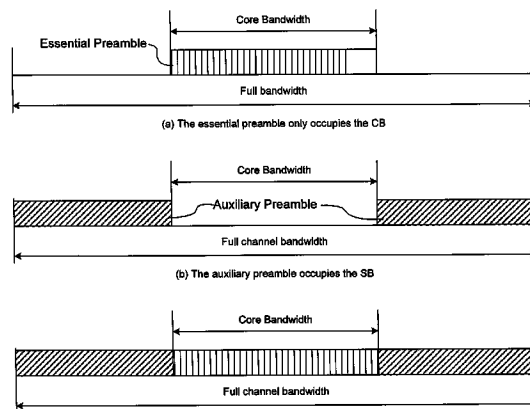
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H04J 1/00 (2006.01)

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370/468; 370/485; 370/536

(58) **Field of Classification Search** 370/343,
370/408, 485, 536

See application file for complete search history.

27 Claims, 10 Drawing Sheets



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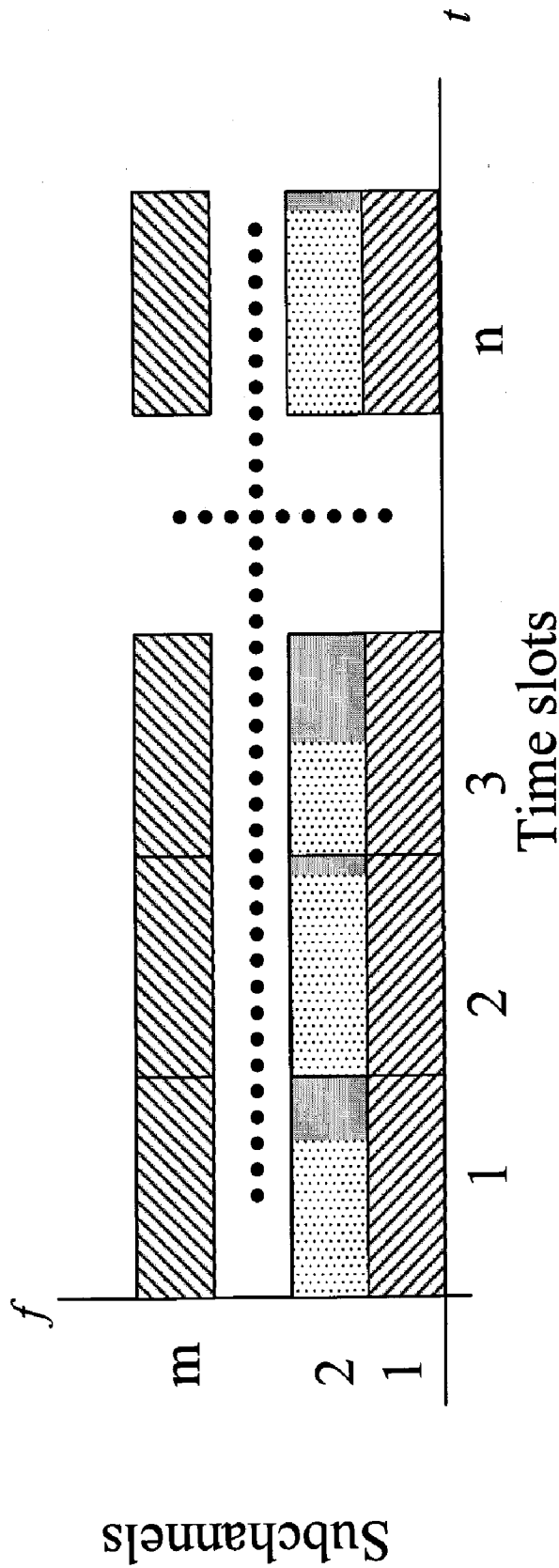
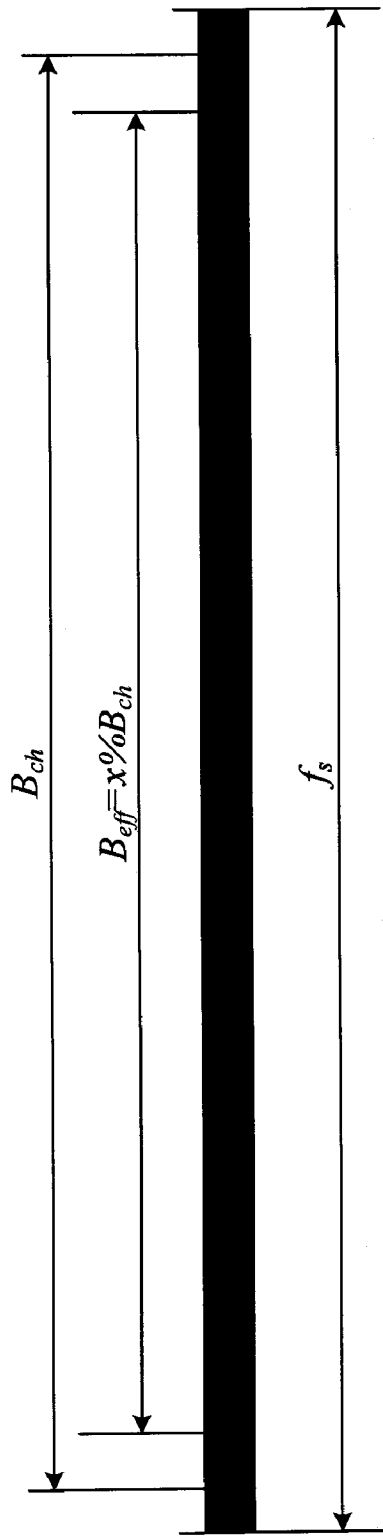


FIG. 1

Prior Art



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

FIG. 2
Prior Art

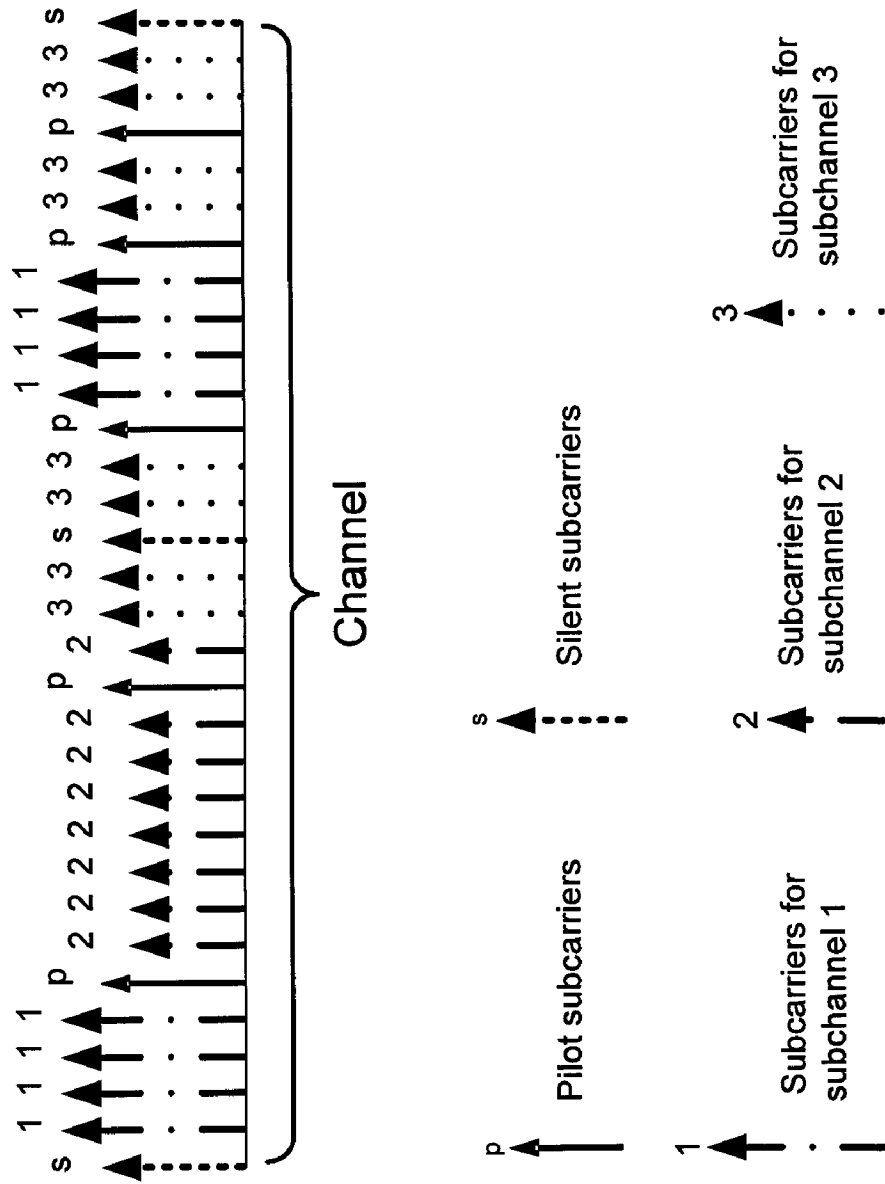


FIG. 3
Prior Art

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