Exhibit 1



US008467366B2

(12) United States Patent Li et al.

(10) Patent No.: US 8,467,366 B2 (45) Date of Patent: *Jun. 18, 2013

(54) METHODS AND APPARATUS FOR RANDOM ACCESS IN MULTI-CARRIER COMMUNICATION SYSTEMS

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(*) Notice: Subject to any disclaimer, the term of this

patent is extended or adjusted under 35 LLS C 154(b) by 140 days

U.S.C. 154(b) by 149 days.

This patent is subject to a terminal dis-

claimer.

(21) Appl. No.: 13/205,579

(22) Filed: Aug. 8, 2011

(65) **Prior Publication Data**

US 2011/0292881 A1 Dec. 1, 2011

Related U.S. Application Data

- (63) Continuation of application No. 10/583,158, filed as application No. PCT/US2005/008169 on Mar. 9, 2005, now Pat. No. 7,995,967.
- (60) Provisional application No. 60/551,589, filed on Mar. 9, 2004.
- (51) **Int. Cl. H04Q** 7/216 (2006.01)

See application file for complete search history.

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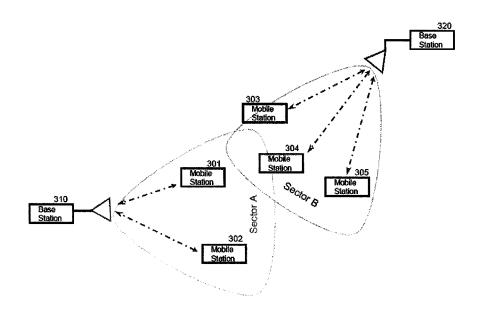
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(57) ABSTRACT

Methods and apparatus in a multi-carrier cellular wireless network with random access improve receiving reliability and reduce interference of uplink signals of a random access, while improving the detection performance of a base station receiver by employing specifically configured ranging signals.

24 Claims, 8 Drawing Sheets



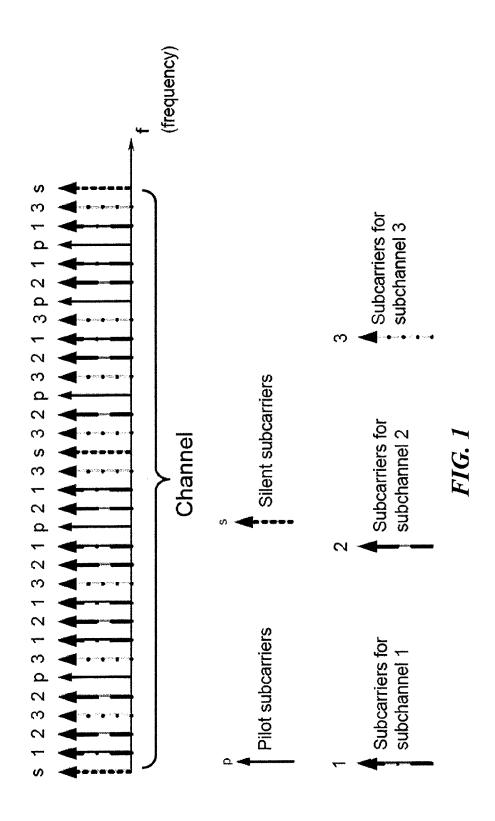


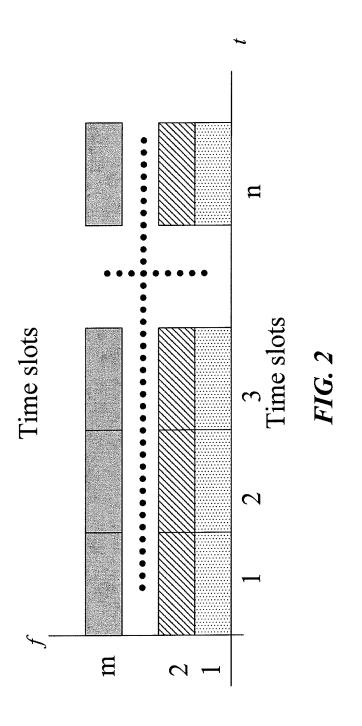
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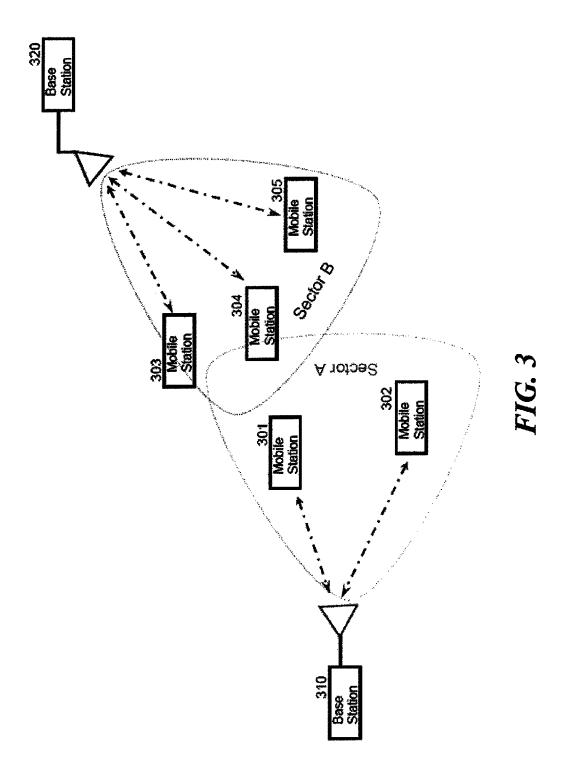
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