

# Exhibit B



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

(10) **Patent No.:** **US 7,567,622 B2**  
(45) **Date of Patent:** **\*Jul. 28, 2009**

(54) **CONSTITUTION REARRANGEMENT FOR ARQ TRANSMIT DIVERSITY SCHEMES**

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(73) Assignee: **Panasonic Corporation**, Osaka (JP)

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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 0 days.

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This patent is subject to a terminal disclaimer.

Wengert, C et al., "Advanced Hybrid ARQ Technique Employing a Signal Constellation Rearrangement," 2002 IEEE 56<sup>th</sup>, IEEE Vehicular Technology Conference Proceedings, Vancouver, Canada, vol. 1 of 4 conf. 56, XP010608782, pp. 2002-2006. Sep. 24, 2002.

(21) Appl. No.: **11/633,421**

(Continued)

(22) Filed: **Dec. 5, 2006**

*Primary Examiner*—Temesghen Ghebretinsae

(65) **Prior Publication Data**

US 2007/0147531 A1 Jun. 28, 2007

(74) *Attorney, Agent, or Firm*—Dickinson Wright, PLLC

(57) **ABSTRACT**

**Related U.S. Application Data**

(63) Continuation of application No. 10/501,906, filed as application No. PCT/EP02/11694 on Oct. 18, 2002, now Pat. No. 7,154,961.

An ARQ (re-) transmission method of transmitting data in a wireless communication system wherein data packets are transmitted from a transmitter to a receiver, using a first transmission and a second transmission based on a repeat request. The method comprises the steps of modulating data at the transmitter using a first signal constellation pattern to obtain a first data symbol. The first data symbol is transmitted as the first transmission to the receiver using a first diversity branch. Further, the data is modulated at the transmitter using a second signal constellation pattern to obtain a second data symbol. Then, the second data symbol is transmitted as the second transmission to the receiver over a second diversity branch. Finally, the received first and second data symbol data symbol are diversity combined at the receiver. The invention further relates to a transmitter and a receiver embodied to carry out the method of the invention.

(51) **Int. Cl.**

**H04B 7/02** (2006.01)

(52) **U.S. Cl.** ..... **375/267; 375/299; 375/298; 370/349; 714/748**

(58) **Field of Classification Search** ..... **375/267; 375/299, 295, 298, 308, 261; 370/349, 465; 714/748, 701, 786**

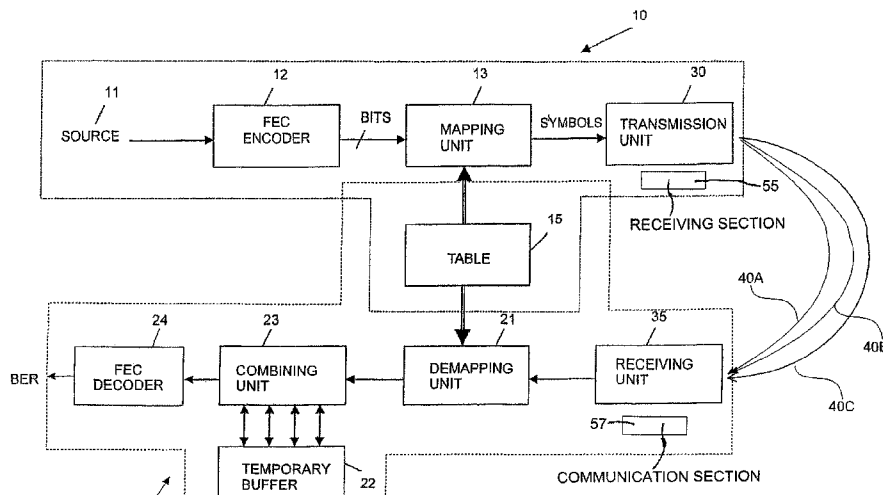
See application file for complete search history.

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**20 Claims, 6 Drawing Sheets**



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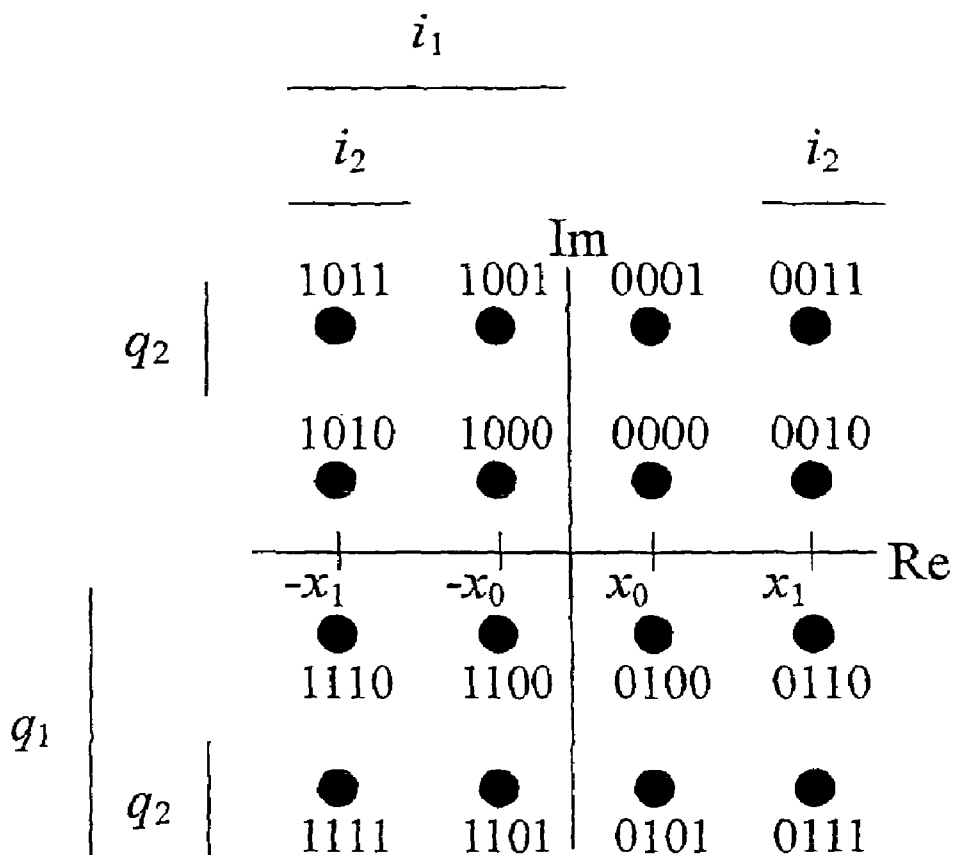
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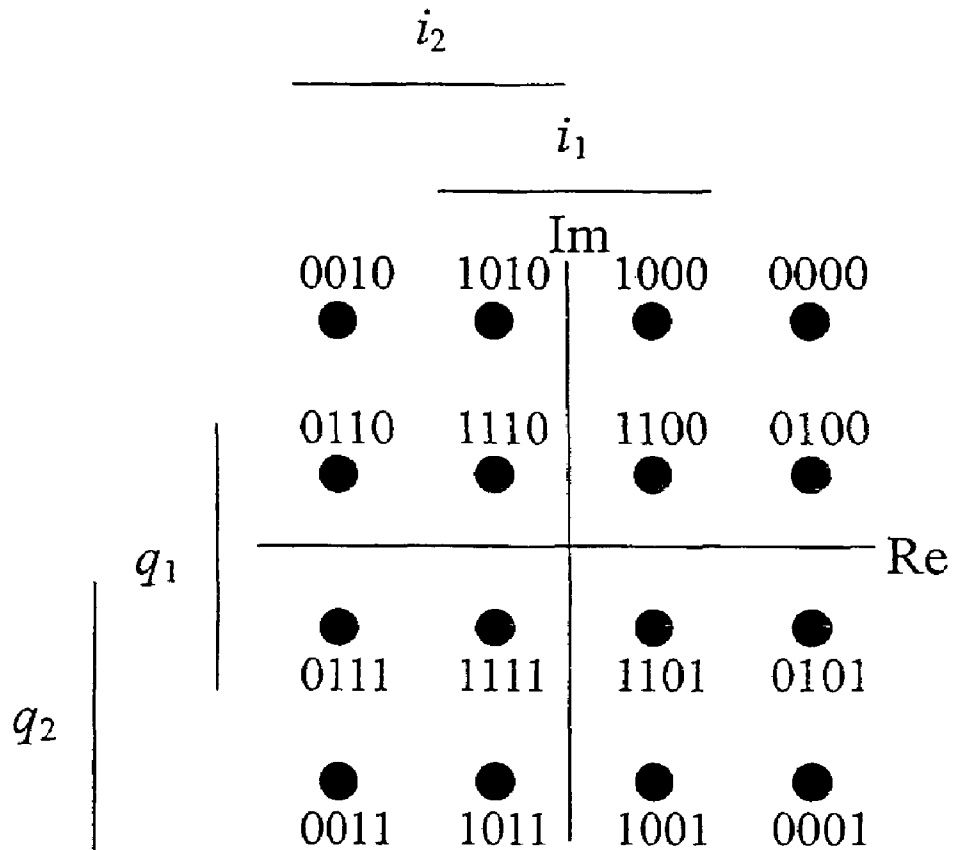
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Mapping 1 (bit-mapping order:  $i_1q_1i_2q_2$ )

FIG. 1



Mapping 2 (bit-mapping order:  $i_1q_1i_2q_2$ )

FIG. 2

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