(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
1 November 2007 (01.11.2007)

PCT

(10) International Publication Number
WO 2007/123904 A1

(51) International Patent Classification:
H04L 1/18 (2006.01) *H04L 1/06* (2006.01)

(21) International Application Number:
PCT/US2007/009373

(22) International Filing Date: 17 April 2007 (17.04.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/792,765 18 April 2006 (18.04.2006) US

(71) Applicant *(for all designated States except US)*: **INTERDIGITAL TECHNOLOGY CORPORATION** [US/US]; 3411 Silverside Road, Concord Plaza, Suite 105, Hagley Building, Wilmington, Delaware 19810 (US).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **LI, Yingxue** [CN/US]; 45 Granville Way, Exton, pa 19341 (US). **SHIN, Sung-Hyuk** [US/US]; 104 Eidner Way, Northvale, New Jersey 07647 (US). **ZHANG, Guodong** [CN/US]; 490 Main Street, Apt. C8, Farmingdale, New York 11735 (US). **GRIECO, Donald, M.** [US/US]; 18 Shore Road, Manhassett, NY 11030 (US).

(74) Agent: **BALLARINI, Robert, J.**; Volpe And Koenig, P.c., United Plaza, Suite 1600, 30 S. 17th Street, Philadelphia, Pennsylvania 19103 (US).

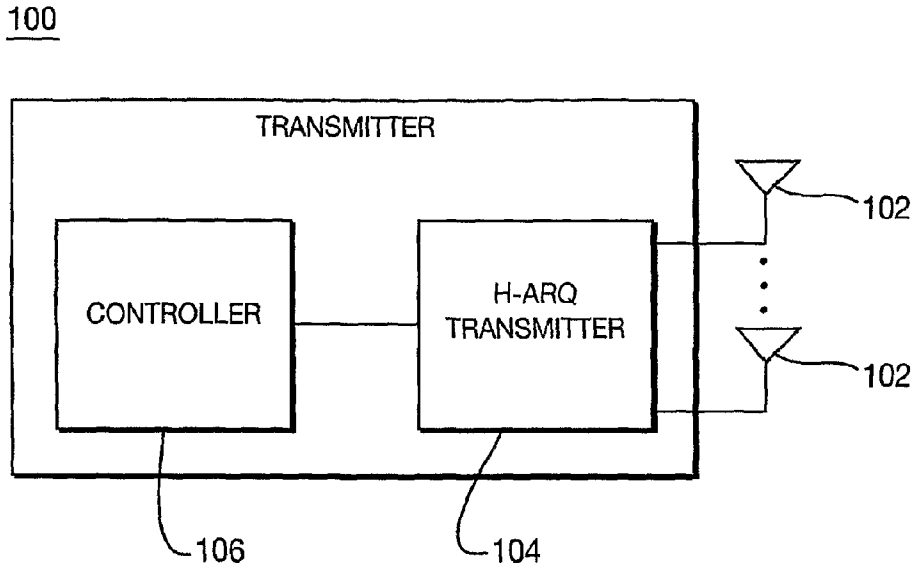
(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*

[Continued on next page]

(54) **Title:** METHOD AND APPARATUS FOR IMPLEMENTING H-ARQ IN A MIMO WIRELESS COMMUNICATION SYSTEM



(57) **Abstract:** A method and apparatus for implementing hybrid automatic repeat request (H-ARQ) in a multiple-input multiple-output (MIMO) wireless communication system are disclosed. A transmitter transmits at least two data packets via two or more antennas. If at least one of the data packets is not successfully transmitted, the transmitter retransmits the data packets while rearranging the data packets in an orthogonal spreading manner. Alternatively, the transmitter may retransmit only the unsuccessfully transmitted data packet along with a new data packet which replaces a successfully transmitted data packet. The unsuccessfully transmitted data packet may simply be repeated without changing its format. When only the unsuccessfully transmitted data packet is retransmitted along with the new data packet, the transmissions may be combined to recover the retransmitted data packet and the new data packet simultaneously.

WO 2007/123904 A1

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.