

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
14 August 2008 (14.08.2008)

PCT

(10) International Publication Number
WO 2008/098225 A3

(51) International Patent Classification:
H04L 1/06 (2006.01) **H04L 25/03** (2006.01)

(21) International Application Number:
PCT/US2008/053512

(22) International Filing Date: 8 February 2008 (08.02.2008)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/889,255 9 February 2007 (09.02.2007) US
12/027,921 7 February 2008 (07.02.2008) US

(71) Applicant (for all designated States except US): **QUALCOMM INCORPORATED** [US/US]; Attn: International IP Administration, 5775 Morehouse Drive, San Diego, California 92121 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **KIM, Byoung-Hoon** [KR/US]; 5775 Morehouse Drive, San Diego, California 92121 (US). **XU, Hao** [CN/US]; 5775 Morehouse Drive, San Diego, California 92121 (US).

(74) Agents: **BACHAND, Richard, A.** et al.; Attn: International IP Administration, 5775 Morehouse Drive, San Diego, California 92121 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, 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, ME, 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, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL,

[Continued on next page]

(54) Title: MIMO TRANSMISSION WITH RANK-DEPENDENT PRECODING

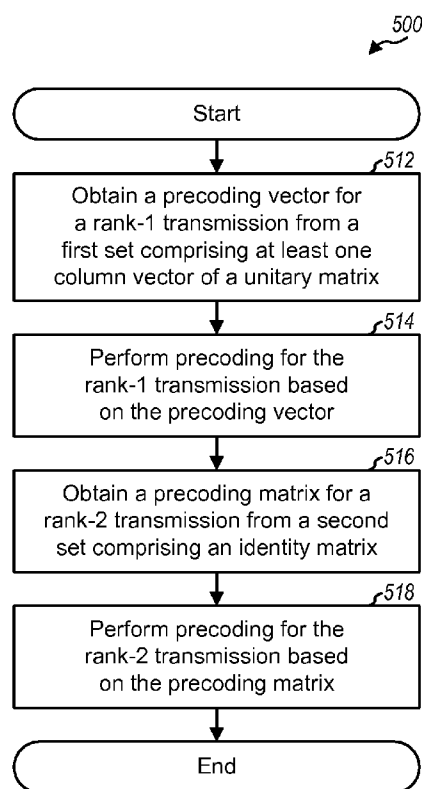


FIG. 5

(57) Abstract: Techniques for performing rank-dependent precoding for a MIMO transmission are described. Each rank may be associated with a set of at least one precoding vector or matrix that can provide good performance for that rank. A transmitter may obtain a precoding vector for a rank-1 transmission from a first set containing at least one column vector of a unitary matrix, e.g., a Fourier matrix. The transmitter may perform precoding for the rank-1 transmission based on the precoding vector. The transmitter may obtain a precoding matrix for a rank-2 transmission from a second set containing an identity matrix. The transmitter may perform precoding for the rank-2 transmission based on the precoding matrix. For the rank-2 transmission, the transmitter may select the identity matrix as the precoding matrix if a MIMO channel resembles a diagonal channel (which may be determined based on antenna configurations) and may select the unitary matrix otherwise.

WO 2008/098225 A3



NO, 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*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

Declarations under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

(88) Date of publication of the international search report:

11 December 2008