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[Continued on next page]

(54) Title: METHOD AND APPARATUS FOR CODEBOOK EXCHANGE IN A MULTIPLE ACCESS WIRELESS COMMUNICATION SYSTEM

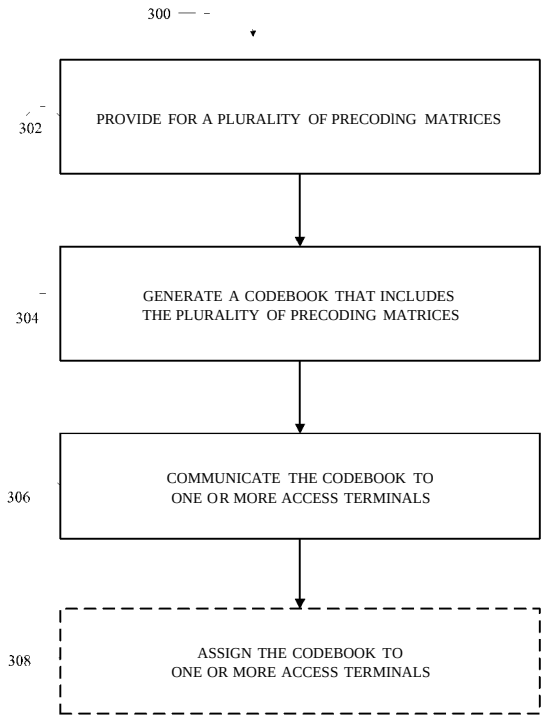

FIG. 3

(57) Abstract: Methods and apparatus are disclosed for generating and exchanging codebooks in a multiple access wireless communication system, such as Space Division Multiple Access (SDMA). The codebooks include a plurality of preferred precoding matrices. The codebooks are generated at an access network. Generating a codebook may further include generating a codebook identifier assigned by the access network. The codebooks are communicated to access terminals. Communicating the codebooks may further include querying the access terminals to determine an identity of codebooks currently stored at each access terminal, receiving a codebook status response from each of the access terminals indicating the identity of codebooks stored at each of the access terminals. The codebooks may also be assigned to access terminals for a predetermined sector in the active set of communication links. Generating a codebook may further include generating a codebook that includes identification of clusters. The clusters identify a set of the precoding matrices and, as such, a set of beams in the cluster. Thus, the clusters may identify a starting beam index and an ending beam index. The codebook may further include an overlap cluster map that indicates clusters authorized to potentially overlap.

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PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

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H04L H04B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical search terms used)

EPO-Internal, INSPEC, COMPENDEX, WPI Data

C. DCXUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No
X	WO 2006/018710 A (NOKIA CORP [FI]; VAN WAES N [US] ET AL) 23 February 2006 (2006-02-23) abstract; figures 1,5 page 2, line 29 - page 3, line 10 page 3, line 32 - page 4, line 21 page 11, line 16 - line 27 page 13, line 8 - line 14 page 14, line 3 - page 15, line 25 page 24, line 2 - line 26 ----- -/-	1,2, 12-15, 25,26, 36-40

X Further documents are listed in the continuation of Box C

X See patent family annex

* Special categones of cited documents

'A' document defining the general state of the art which is not considered to De or particular relevance

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[1]L" document which may throw doubts on priority c)aim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

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'&' document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
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Name and mailing address of the ISA/	Authorized officer
European Patent Office, P B 5818 Patentlaan 2 NL ~ 2280 HV Rijswijk Tel (+31-70) 340-2040 Tx 31 651 epo nl. Fax (+31-70) 340-3016	Faber, Thomas

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International application No
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C(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate of the relevant passages	Relevant to claim No
X	US 2006/039493 Al (MUKKAVILLI K K [US] ET AL) 23 February 2006 (2006-02-23) figure 7 paragraph [0014] - paragraph [0022] paragraph [0058] - paragraph [0060]	1,2, 12-15, 25,26, 36-40
X	SENHUA HUANG, LING QIU: "A Novel Receiver Aided Beamforming Technique" INTERNATIONAL SYMPOSIUM ON PERSONAL, INDOOR AND MOBILE RADIO COMMUNICATIONS, 11 September 2005 (2005-09-11), pages 2447-2451 , XP010928130 PISCATAWAY, NJ, USA, IEEE ISBN: 978-3-8007-29 abstract; figure 3 sections III .A, III .B, V	1,2, 12-15, 25,26, 36-40
X	US 2005/286663 Al (POON ADA S Y [US]) 29 December 2005 (2005-12-29) abstract; claim 21; figures 3-6 paragraph [0014] - paragraph [0025] paragraph [0034] - paragraph [0043] paragraph [0048] - paragraph [0049]	1-3, 12-16, 25-27, 36-41
X	LOVE D J, HEATH R W JR: "Limited Feedback Unitary Precoding for Spatial Multiplexing Systems" IEEE TRANSACTIONS ON INFORMATION THEORY, vol . 51, no. 8, August 2005 (2005-08), pages 2967-2976, XP011136349 IEEE SERVICE CENTER, PISCATAWAY, NJ, US ISSN: 0018-9448 abstract; figure 4 sections I, II, V.C, VI	1-3, 12-16, 25-27, 36-41
A	US 2006/093065 Al (THOMAS TIMOTHY A [US] ET AL) 4 May 2006 (2006-05-04) paragraph [0002] ; figures 5,12 paragraph [0015] - paragraph [0016] paragraph [0024] paragraph [0032] paragraph [0050]	4,5,17, 18,28, 29,42,43

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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2007/082734

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication where appropriate, of the relevant passages	Relevant to claim No
P, X	US 2007/049218 A1 (GOROKHOV ALEXEI [US] ET AL) 1 March 2007 (2007-03-01) abstract ; figures 4-6 paragraph [0010] - paragraph [0013] paragraph [0034] - paragraph [0038] paragraph [0051] paragraph [0060] - paragraph [0069] paragraph [0074] - paragraph [0077]	1,6-15, 19-25, 30-39, 44-49
P, X	US 2007/115909 A1 (WANG JIBING [US] ET AL) 24 May 2007 (2007-05-24) abstract; figures 3,5,7 paragraph [0017] paragraph [0044] paragraph [0049] paragraph [0053] paragraph- [0061] - paragraph [0062]	1,6,7, 15,19, 20,25, 30,31, 39,44,45
A	US 2006/223449 A1 (SAMPATH HEMANTH [US] ET AL) 5 October 2006 (2006-10-05) paragraph [0013] paragraph [0028] - paragraph [0030] paragraph [0058] paragraph [0077] - paragraph [0078] paragraph [0080] - paragraph [0084] paragraph [0107]	6,7 ,19, 20,30, 31 ,44,45
A	MONDAL B ET AL: "Algorithms for Quantized Precoded MIMO-OFDM Systems" ASILOMAR CONFERENCE ON SIGNALS, SYSTEMS AND COMPUTERS, 28 October 2005 (2005-10-28), pages 381-385, XP010900023 PISCATAWAY, NJ, USA, IEEE ISBN: 978-1-4244-0131-4 abstract sections II, IV. A	8,9,21, 22,32, 33,46,47
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2007/082734

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. [ ] Clams Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. [ ] **Claims Nos.:**
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. [ ] **Claims Nos.:**
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. [X] As all required additional search fees were timely paid by the applicant, this international search report covers allsearchable Haims.

2. [ ] As all searchable claims could be searched without effort Justifying an additional fees, this Authority did not Invite payment of additional fees.

3. [ ] As only some of the required additional search fees were timely paid by the applicant, this international search reportcovers only those claims for which fees were paid, specifically claims Nos.:

4. [ ] No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

[ ] The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee

[ ] The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

[X] No protest accompanied the payment of additional search fees.

FURTHER iNFORMATiON coNTiNUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) Inventions 1n thi s international appl ication, as fol l ows:

1. **claims:** 1-3, 12-16, 25-27, **36-41**

Identifying codebook by assigning codebook identifier.

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2. claims: **1, *A*, 5, 15,** 17, **18, 25,** 28, **29, 39, 42, 43**

Querying codebook status and communicating codebooks.

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3. claims: 1, **6,** 7, 15, 19, **20, 25,** 30, 31, **39,** 44, **45**

Assigning codebook in active set of communication links.

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4. **claims:** 1, 8-11, 15, 21-24, 25, 32-35, 39, **46-49**

Generating codebook including, identification of clusters **and set of beams, and an** overlap **cluster map.**

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2007/082734

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