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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
24 May 2012 (24.05.2012)

WIPO | PCT

(10) International Publication Number
WO 2012/068384 A3

(51) **International Patent Classification**:
H04W 52/02 (2009.01)

(21) **International Application Number**:
PCT/US2011/061206

(22) **International Filing Date**:
17 November 2011 (17.11.2011)

(25) **Filing Language**: English

(26) **Publication Language**: English

(30) **Priority Data**:
61/414,872 17 November 2010 (17.11.2010) US
13/298,059 16 November 2011 (16.11.2011) 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) **Inventor; and**

(75) **Inventor/Applicant** *(for US only)*: **WENTINK, Maarten Menzo** [NL/NL]; 5775 Morehouse Drive, San Diego, California 92121 (US).

(74) **Agent**: **VO, Dang M.**; 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, CL, 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, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, 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, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

[Continued on next page]

(54) **Title**: PHYSICAL LAYER POWER SAVE FACILITY WITH RANDOM OFFSET

FIG. 7A

700

VHT-SIG-A1

Bit	Field	Bit Allocation	Description
B0-B1	BW	2	Set to 0 for 20 MHz, 1 for 40 MHz, 2 for 80 MHz, 3 for 160 MHz and 80+80 MHz
B2	Reserved	1	Reserved for possible expansion of BW field. Set to 1.
B3	STBC	1	Set to 1 if all streams have space time block coding and set to 0 otherwise
B4-B9	Group ID	6	A value of 63 (all ones) indicates: A single user transmission A transmission where the group membership has not yet been established A transmission that needs to bypass a group (e.g. broadcast)
B10-B21	N_{STS}	12	For MU: 3 bits/user with maximum of 4 users (user u uses bits B(10+3*u)-B(12−3*u), u=0,1,2,3) Set to 0 for 0 space time streams Set to 1 for 1 space time stream Set to 2 for 2 space time streams Set to 3 for 3 space time streams Set to 4 for 4 space time streams For SU: B10-B12 Set to 0 for 1 space time stream Set to 1 for 2 space time streams Set to 2 for 3 space time streams Set to 3 for 4 space time streams Set to 4 for 5 space time streams Set to 5 for 6 space time streams Set to 6 for 7 space time streams Set to 7 for 8 space time streams B13-B21 Partial AID: 9 LSB bits of AID plus BSS-specific offset
B22-B23	Reserved	2	All ones

(57) **Abstract**: Certain aspects of the present disclosure provide methods and apparatus for using a random offset to achieve power savings. For certain aspects, a Basic Service Set (BSS)-specific offset may be added to the (partial) association identifier (AID) prior to entering the partial AID into a 9-bit field of the physical layer (PHY) header (e.g., bits 13-21 of the NSTS field). The BSS-specific offset may be selected randomly by an access point (AP) and signaled to the associated stations (STAs) through the association response, or the offset may be communicated to the STA via other means. In this manner, the value in the 9-bit field for downlink transmissions may, with high likelihood, be different from one BSS to the next, allowing STAs to remain awake only when a frame is being transmitted to them.

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— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

Published:

— *with international search report (Art. 21(3))*

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

(88) Date of publication of the international search report:
12 July 2012

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2011/061206

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04W52/02
ADD.

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H04W

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 practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2010/260138 A1 (LIU YONG [US] ET AL) 14 October 2010 (2010-10-14) abstract figures 1,2,3,4,8,9A, 9B,13 paragraph [0068] - paragraph [0070] paragraph [0044] - paragraph [0051] paragraph [0072] - paragraph [0078] paragraph [0079] - paragraph [0081] paragraph [0082] - paragraph [0085] paragraph [0109] - paragraph [0111] paragraph [0101] - paragraph [0108] -----	1-23
X	US 2010/046457 A1 (ABRAHAM SANTOSH P [US] ET AL) 25 February 2010 (2010-02-25) the whole document -----	1-23

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
9 May 2012	18/05/2012

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, Fax: (+31-70) 340-3016	Niederholz, Jürgen

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Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2011/061206

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 2010/260159 A1 (ZHANG HONGYUAN [US] ET AL) 14 October 2010 (2010-10-14) the whole document	1-23
X	US 2010/177757 A1 (KIM YUN-JOO [KR] ET AL) 15 July 2010 (2010-07-15) the whole document	1-23
X	US 2010/177656 A1 (KIM YUN-JOO [KR] ET AL) 15 July 2010 (2010-07-15) the whole document	1-23
X	EP 1 821 419 A2 (MITSUMI ELECTRIC CO [JP]) 22 August 2007 (2007-08-22) abstract figures 1-7 paragraph [0022] - paragraph [0095]	24-49
X	WO 00/16491 A1 (MOTOROLA INC [US]) 23 March 2000 (2000-03-23) the whole document	24-49
X	WO 90/06566 A1 (MOTOROLA INC [US]) 14 June 1990 (1990-06-14) the whole document	24-49
A	WO 2008/075179 A2 (NOKIA CORP [FI]; NOKIA INC [US]; JOKELA JARI [FI]) 26 June 2008 (2008-06-26) the whole document	24-49
A	US 2003/169769 A1 (HO JIN-MENG [US] ET AL) 11 September 2003 (2003-09-11) the whole document	24-49
A	"IEEE Standard for Information technology--Telecommunications and information exchange between systems--Local and metropolitan area networks--Specific requirements Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications Amendment 5: Enhancements for Higher Throughput", IEEE STANDARD, IEEE, PISCATAWAY, NJ, USA, 29 October 2009 (2009-10-29), pages C1-502, XP017604244, ISBN: 978-0-7381-6046-7 the whole document	1-49

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2011/061206

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. ☐ Claims 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. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

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 report covers 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.

☒ 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 in this international application, as follows:

1. claims: 1-23

   Message transmission

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2. claims: 24-49

   Message reception and determination of intended addressed apparatus

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2011/061206

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2010260138 A1	14-10-2010	US 2010260138 A1	14-10-2010
		WO 2010118383 A1	14-10-2010
US 2010046457 A1	25-02-2010	CN 102124662 A	13-07-2011
		EP 2342835 A1	13-07-2011
		JP 2012500605 A	05-01-2012
		KR 20110076885 A	06-07-2011
		TW 201021603 A	01-06-2010
		US 2010046457 A1	25-02-2010
		WO 2010022255 A1	25-02-2010
US 2010260159 A1	14-10-2010	EP 2420023 A1	22-02-2012
		US 2010260159 A1	14-10-2010
		WO 2010120692 A1	21-10-2010
US 2010177757 A1	15-07-2010	KR 20100084141 A	23-07-2010
		US 2010177757 A1	15-07-2010
US 2010177656 A1	15-07-2010	KR 20100084138 A	23-07-2010
		US 2010177656 A1	15-07-2010
EP 1821419 A2	22-08-2007	EP 1821419 A2	22-08-2007
		JP 2007221393 A	30-08-2007
		US 2007188340 A1	16-08-2007
WO 0016491 A1	23-03-2000	DE 69929907 T2	17-08-2006
		EP 1114521 A1	11-07-2001
		JP 4539944 B2	08-09-2010
		JP 2002525903 A	13-08-2002
		JP 2010166613 A	29-07-2010
		US 6072987 A	06-06-2000
		WO 0016491 A1	23-03-2000
WO 9006566 A1	14-06-1990	AT 142804 T	15-09-1996
		CA 2001018 A1	01-06-1990
		CN 1043235 A	20-06-1990
		DE 68927178 D1	17-10-1996
		EP 0446248 A1	18-09-1991
		JP 7079506 B	23-08-1995
		US 4996526 A	26-02-1991
		WO 9006566 A1	14-06-1990
WO 2008075179 A2	26-06-2008	CN 101595687 A	02-12-2009
		EP 2103044 A2	23-09-2009
		US 2008144591 A1	19-06-2008
		WO 2008075179 A2	26-06-2008
US 2003169769 A1	11-09-2003	US 2003169769 A1	11-09-2003
		US 2010034164 A1	11-02-2010
		US 2011019750 A1	27-01-2011