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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
5 August 2004 (05.08.2004)

PCT

(10) International Publication Number
WO 2004/066518 A3

(51) International Patent Classification[7]: H04B 3/56

(21) International Application Number:
PCT/GB2004/000162

(22) International Filing Date: 16 January 2004 (16.01.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
03100477.9 18 January 2003 (18.01.2003) CN
03101986.1 18 March 2003 (18.03.2003) CN

(71) Applicant *(for all designated States except US)*: **BROADBAND 21 LIMITED** [GB/GB]; 2nd Floor, sixty Circular Road, Douglas, Isle of Man, IM1 1SA (GB).

(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: **LEE, Kwong, Wang** [CN/CN]; 15A, Grand Bowen, 11B Bowen Road, Mid-Levels, Hong Kong (CN).

(74) Agents: **BUCKS, Teresa, Anne** et al.; Boult Wade Tennant, Verulam Gardens, 70 Gray's inn Road, London WC1X 8BT (GB).

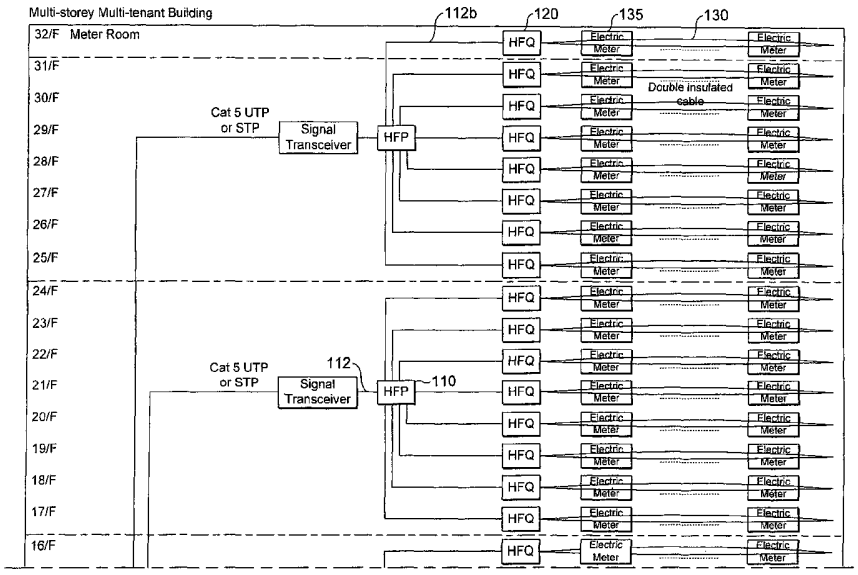
(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR,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

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, 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, IT, LU, MC, NL, 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: POWER LINE COMMUNICATION SYSTEM AND METHOD



(57) Abstract: A power line communication system that contains a signal coupling device containing an input to receive a communication signal from a communication network; and an output to transmit the communications signal to a high frequency signal transducing means. Each of the high frequency signal transducing means is couplable to a power line in a manner that allows the high frequency communication signal (e.g. 10MHz to 30 MHz) to be transmitted (for example, by electromagnetic coupling) without directly connecting to the standard low voltage (e.g. the 110V or 220V) normal AC electrical power lines.

WO 2004/066518 A3

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

(88) Date of publication of the international search report:
20 January 2005

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.

INTERNATIONAL SEARCH REPORT

In ial Application No
PCT/GB2004/000162

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04B3/56

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)
IPC 7 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, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	WO 01/84806 A (PHONEX BROADBAND CORP) 8 November 2001 (2001-11-08) page 5, line 13 - page 6, line 19; figures 1-4	1,6,16, 20 2,5,21
Y		3,4,7,22
A	FR 2 815 488 A (INFRA SA) 19 April 2002 (2002-04-19) abstract; figures 1,2 page 4, line 17 - line 30	1,2,5,6, 16,20,21
X	page 1, line 9 page 3, lines 23-29 page 4, lines 3,4	8
Y		3,4,9, 10,22

-/--

[X] Further documents are listed in the continuation of box C. [X] Patent family members are listed in 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 document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"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
13 October 2004	11. 11. 04
Name and mailing address of the ISA 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	Authorized officer Bauer, F

Form PCT/ISA/210 (second sheet) (January 2004)

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB2004/000162

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0 417 542 A (SIEMENS AG ALBIS ;SIEMENS AG (DE)) 20 March 1991 (1991-03-20) abstract; figure 1	2,5,21
Y	US 4 745 391 A (GAJJAR JAGDISH T) 17 May 1988 (1988-05-17) figure 1	9,10
X	PATENT ABSTRACTS OF JAPAN vol. 2000, no. 04, 31 August 2000 (2000-08-31) & JP 2000 032687 A (TOKO ELECTRIC CORP), 28 January 2000 (2000-01-28)	11-15, 17-19
Y	abstract; figure 1	7
X	US 4 903 006 A (BOOMGAARD DIRK J) 20 February 1990 (1990-02-20) abstract; figure 1	11-15, 17-19
X	US 4 188 619 A (PERKINS WILLIAM C) 12 February 1980 (1980-02-12) abstract; figure 1	11-15, 17-19
Y	WO 97/50193 A (ELCOM TECH CORP) 31 December 1997 (1997-12-31) page 8, line 11 - line 18; figures 2-4	7
A	US 2002/186699 A1 (KWOK TIMOTHY CHUNG HING) 12 December 2002 (2002-12-12) the whole document	11-15, 17-19

INTERNATIONAL SEARCH REPORT

national application No.
PCT/GB2004/000162

Box 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 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 fee, this Authority did not invite payment of any additional fee.

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.

☒ 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, 2, 5, 6, 16, 20-21

   Claims 1, 2, 5, 6, 16, 20-21 refer to a PLC system and method with a coupling device and a HF transducing device couplable to a power line without direct contact therewith comprising a pair of ferrites.

---

2. claims: 1, 3, 4, 8-10,20, 22

   Claims 1, 3, 4, 8-10,20, 22 refer to a PLC system and method with a coupling device and a HF transducing device couplable to a power line without direct contact therewith comprising a connector configured to connect to a communication cable.

---

3. claims: 11-15, 16-19

   Claims 11-15, 16-19 refer to a passive signal distribution device for a PLC system with an input port coupled to a plurality of output ports.

---

4. claims: 1,7

   Claims 1, 7 refer to a PLC system and method with a coupling device and a HF transducing device couplable to a power line without direct contact therewith with the transducer adapted for two way signal communication.

INTERNATIONAL SEARCH REPORT

In ial Application No
PCT/GB2004/000162

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 0184806 A	08-11-2001	AU 5931001 A	12-11-2001
		WO 0184806 A2	08-11-2001
		US 2002031226 A1	14-03-2002
FR 2815488 A	19-04-2002	FR 2815488 A1	19-04-2002
EP 0417542 A	20-03-1991	WO 9104564 A1	04-04-1991
		EP 0417542 A1	20-03-1991
		NO 911832 A	10-05-1991
US 4745391 A	17-05-1988	NONE	
JP 2000032687 A	28-01-2000	JP 3460186 B2	27-10-2003
US 4903006 A	20-02-1990	DE 4003653 A1	23-08-1990
		DK 40190 A	17-08-1990
		FR 2643199 A1	17-08-1990
		JP 2241233 A	25-09-1990
US 4188619 A	12-02-1980	AT 366213 B	25-03-1982
		AT 556979 A	15-07-1981
		AU 525935 B2	09-12-1982
		AU 4981579 A	19-02-1981
		CA 1136727 A1	30-11-1982
		DE 2933473 A1	28-02-1980
		DK 340479 A	18-02-1980
		FR 2433863 A1	14-03-1980
		GB 2028065 A ,B	27-02-1980
		IL 58085 A	31-03-1982
		NZ 191226 A	10-05-1983
		SE 7906860 A	18-02-1980
		US 4481501 A	06-11-1984
WO 9750193 A	31-12-1997	WO 9750193 A1	31-12-1997
		AU 6401496 A	14-01-1998
		DE 69632793 D1	29-07-2004
		EP 0965181 A1	22-12-1999
US 2002186699 A1	12-12-2002	WO 02101990 A1	19-12-2002