



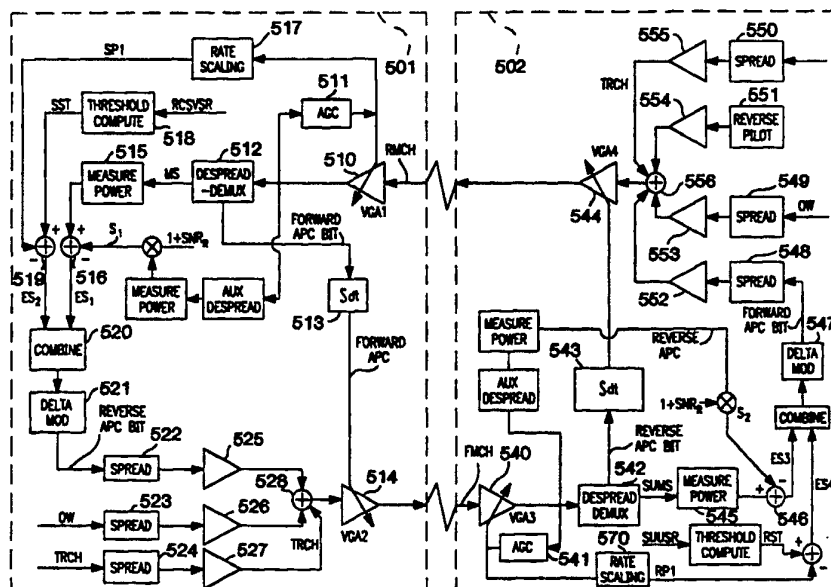
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/US96/11060 (22) International Filing Date: 27 June 1996 (27.06.96) (30) Priority Data: 60/000,775 30 June 1995 (30.06.95) US (71) Applicant: INTERDIGITAL TECHNOLOGY CORPORATION [US/US]; Suite 200, 900 Market Street, Wilmington, DE 19801 (US). (72) Inventors: LOMP, Gary; 130 Washington Drive, Centerpot, NY 11721 (US). OZLUTURK, Fatih; 1474 Middle Neck Road, Port Washington, NY 11050 (US). KOWALSKI, John; 65 Hilbert Street, Hempstead, NY 11550 (US). (74) Agents: NIGON, Kenneth, N. et al.; Ratner & Prestia, One Westlakes, Berwyn, P.O. Box 980, Valley Forge, PA 19482-0980 (US).	(81) Designated States: AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i> (88) Date of publication of the international search report: 20 February 1997 (20.02.97)	

(54) Title: AUTOMATIC POWER CONTROL SYSTEM FOR A CODE DIVISION MULTIPLE ACCESS (CDMA) COMMUNICATIONS SYSTEM

(57) Abstract

An automatic power control (APC) system for a spread-spectrum communications system includes an automatic forward power control (AFPC) system, and an automatic reverse power control (ARPC) system. In the AFPC, each subscriber unit (SU) measures a forward signal-to-noise ratio of a respective forward channel information signal to generate a respective forward channel error signal which includes a measure of the uncorrelated noise in the channel and a measure of the error between the respective forward signal-to-noise ratio and a pre determined signal-to-noise value. A control signal generated from the respective forward channel error signal is transmitted as part of a respective reverse channel information signal. A base unit includes AFPC receivers which receive respective reverse channel information signals and extract the forward channel error signals therefrom to adjust the power levels of the respective forward spread-spectrum signals. In the ARPC system, each base measures a reverse signal-to-noise ratio of each of the respective reverse channel information signals and generates a respective reverse channel error signal which includes a measure of the uncorrelated noise in the channel and a measure of the error between the respective reverse signal-to-noise ratio and a pre determined signal-to-noise value. The base unit transmits a control signal generated from the respective reverse channel error signal as a part of a respective forward channel information signal. Each SU includes an ARPC receiver which receives the forward channel information signal and extracts the respective reverse error signal to adjust the reverse transmit power level of the respective reverse spread-spectrum signal.



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INTERNATIONAL SEARCH REPORT

Intern: il Application No
PCT/US 96/11060

A. CLASSIFICATION OF SUBJECT MATTER IPC H04B7/005 H04B7/26		
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 6 H04B H04J		
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)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 245 629 A (HALL SCOTT M) 14 September 1993 see column 2, line 6 - line 16 see claims 9-12,17 ---	1,2,4-6, 9,10
X	US 5 265 119 A (GILHOUSEN KLEIN S ET AL) 23 November 1993 see column 9, line 17 - line 26 see column 13, line 34 - column 17, line 44; figures 3,4 see column 18, line 19 - column 19, line 53 ---	1,2,4-6, 9,10
A	EP 0 656 716 A (CSELT CENTRO STUDI LAB TELECOM) 7 June 1995 see page 2, line 54 - page 3, line 19; claim 1 -----	1,2,4-6, 9,10
<div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Further documents are listed in the continuation of box C. <input checked="" type="checkbox"/> Patent family members are listed in annex. </div>		
<div style="display: flex;"> <div style="flex: 1;"> <p>* Special categories of cited documents :</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="flex: 1;"> <p>"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</p> <p>"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</p> <p>"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.</p> <p>"&" document member of the same patent family</p> </div> </div>		
Date of the actual completion of the international search <div style="text-align: center; font-size: 1.2em;">24 October 1996</div>		Date of mailing of the international search report <div style="text-align: center; font-size: 1.2em;">14. 01. 97</div>
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 <div style="text-align: center; font-size: 1.2em;">BOSSEN, M</div>

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 96/ 11060

Box I Observations where certain claims were found unsearchable (Continuation of item 1 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 II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

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

1. claims 1-12: automatic power control in a CDMA communication system
2. claims 13,14: automatic maintenance power control

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.:

1-12

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 96/11060

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