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(54) Title: METHOD AND APPARATUS FOR CONTROLLING TRANSMISSIONS OF A COMMUNICATIONS SYSTEM

(57) Abstract: In some aspects, each cell in the communications system can be designed to operate in accordance with a set of back-off factors that identify the reductions in peak transmit power levels for the channels associated with the back-off factors. The back-off factors are defined to provide the required power to a large percentage of the users while reducing the amount of interference. In some other aspects, the cells operate using an adaptive reuse scheme that allows the cells to efficiently allocate and reallocate the system resources to reflect changes in the system. A reuse scheme is initially defined and resources are allocated to the cells. During operation, changes in the operating conditions of the system are detected and the reuse scheme is redefined as necessary based on the detected changes. For example, the loading conditions of the cells can be detected, and the resources can be reallocated and/or the reuse scheme can be redefined. In yet other aspects, techniques are provided to efficiency schedule data transmissions and to assign channels to users. Data transmissions can be scheduled based on user priorities, some fairness criteria, system requirements, and other factors. Users are assigned to available channels based on a number of channel assignment schemes. Channel metrics are also provided, which can be used to prioritize users and for channel assignments.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 01/09325

A. CLASSIFICATION OF SUBJECT MATTER IPC 7 H04B7/005 H04Q7/36 H04Q7/38		
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 H04Q		
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		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 245 629 A (HALL SCOTT M) 14 September 1993 (1993-09-14) abstract column 1, line 12 - line 22 column 1, line 60 -column 2, line 5 column 4, line 36 -column 5, line 37; figures 4-6 --- -/--	1-9, 11, 14, 15, 18-22, 32, 40-46, 102, 112-115, 118-120
<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C. <input checked="" type="checkbox"/> 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 7 May 2002		Date of mailing of the international search report 31.05.2002
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 Sieben, S

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 01/09325

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>EP 0 869 626 A (ALSTHOM CGE ALCATEL) 7 October 1998 (1998-10-07)</p> <p>abstract column 1, line 1 - line 23 column 4, line 20 -column 5, line 34; figures 1,2 column 6, line 28 - line 35 column 7, line 4 - line 16; figure 3 ---</p>	<p>1-9,14, 15, 17-22, 32, 37-43, 102, 112-115, 118-120</p>
A	<p>WO 99 65158 A (RAAF BERNHARD ;SIEMENS AG (DE)) 16 December 1999 (1999-12-16)</p> <p>page 1, line 12 -page 2, line 5 page 8, line 27 -page 9, line 8 page 9, line 15 - line 23 claims 1,9-12 ---</p>	<p>1,10, 27-32, 102,103, 113, 118-120</p>
A	<p>BINGHAM J A C: "MULTICARRIER MODULATION FOR DATA TRANSMISSION: AN IDEA WHOSE TIME HAS COME" IEEE COMMUNICATIONS MAGAZINE, IEEE SERVICE CENTER. PISCATAWAY, N.J, US, vol. 28, no. 5, 1 May 1990 (1990-05-01), pages 5-8,11-14, XP000132491 ISSN: 0163-6804 cited in the application page 5, left-hand column, line 1 - line 40 ---</p> <p style="text-align: center;">-/--</p>	<p>1,3,4, 32,40, 113,115</p>

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 01/09325

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	<p>KATZELA I ET AL: "CHANNEL ASSIGNMENT SCHEMES FOR CELLULAR MOBILE TELECOMMUNICATION SYSTEMS: A COMPREHENSIVE SURVEY" IEEE PERSONAL COMMUNICATIONS, IEEE COMMUNICATIONS SOCIETY, US, vol. 3, no. 3, 1 June 1996 (1996-06-01), pages 10-31, XP000593925 ISSN: 1070-9916</p> <p>page 12, right-hand column, line 4 -page 14, right-hand column, last line page 15, left-hand column, line 1 -page 19, right-hand column, line 9 page 22, left-hand column, line 25 -right-hand column, line 7 page 28, right-hand column, last paragraph -page 29, left-hand column, line 35</p>	<p>48, 51-53, 56-63, 65-75, 78,79, 116,117</p> <p>49,50, 54,55, 64,76,77</p>
X A	<p>US 5 448 750 A (ANDERSSON HAKAN C ET AL) 5 September 1995 (1995-09-05)</p> <p>abstract column 4, line 44 -column 5, line 3 column 6, line 27 -column 7, line 45; figures 2A,2B column 8, line 38 - last line</p>	<p>48-56, 64-82, 86-89, 91-94, 116,117 99-101</p>
A	<p>WO 98 33339 A (ERICSSON TELEFON AB L M) 30 July 1998 (1998-07-30)</p> <p>page 1, line 17 -page 2, line 20</p>	<p>48, 51-53, 57-63, 65-75, 78,79, 116,117</p>
X A	<p>WO 98 35514 A (QUALCOMM INC) 13 August 1998 (1998-08-13) cited in the application</p> <p>page 14, line 3 -page 15, line 4; figures 1,2,6 page 22, line 30 -page 26, line 16 page 52, line 31 -page 55, line 22</p> <p style="text-align: center;">-/--</p>	<p>80-98</p> <p>48-50, 54,55, 64,69, 70,73, 76,77, 99-101</p>

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 01/09325

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	ISHIKAWA Y ET AL: "AN ADAPTIVE CHANNEL ALLOCATION STRATEGY USING MULTIPLE OVERLAID PRIORITY FOR CELLULAR SYSTEMS" ELECTRONICS & COMMUNICATIONS IN JAPAN, PART I - COMMUNICATIONS, SCRIPTA TECHNICA. NEW YORK, US, vol. 80, no. 2, 1 February 1997 (1997-02-01), pages 90-99, XP000689841 ISSN: 8756-6621	80-82, 87-89, 91-93
A	section 2.1 figures 1,2	99-101
A	WO 99 57925 A (ERICSSON TELEFON AB L M) 11 November 1999 (1999-11-11) abstract claims 1-4,7	80,99

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 01/09325

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:

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.

INTERNATIONAL SEARCH REPORT

International Application No. PCT/US 01 09325

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-47,102-115,118-120

Control of transmit power in a communication system by defining back-off factors for each communication channel of the system, each back-off factor identifying a reduction from peak transmit power.

2. Claims: 48-79,116,117

Adaptive allocation of channels to each cell in the reuse pattern of a communication system.

3. Claims: 80-101

Assignment of data transmissions in a communication system to available channels based on priorities set for the data transmissions.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 01/09325

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