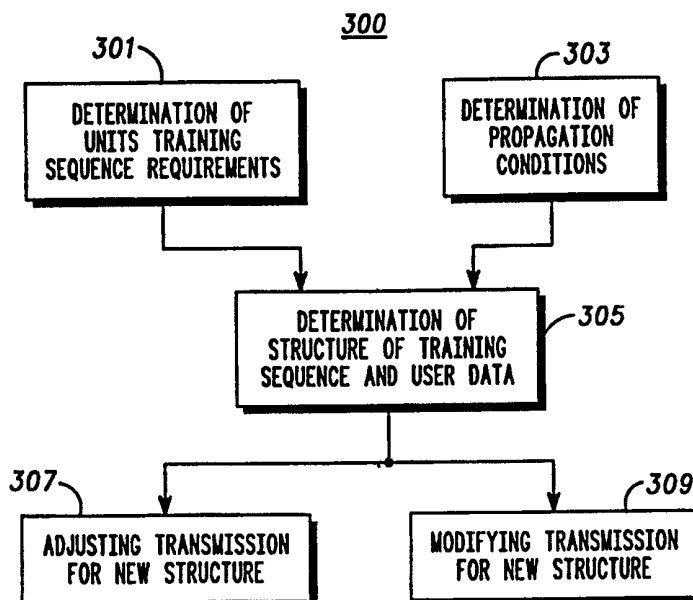




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : H04Q 7/20, H04L 1/12	A3	(11) International Publication Number: WO 99/17563 (43) International Publication Date: 8 April 1999 (08.04.99)
<p>(21) International Application Number: PCT/EP98/06186</p> <p>(22) International Filing Date: 28 September 1998 (28.09.98)</p> <p>(30) Priority Data: 9720587.6 29 September 1997 (29.09.97) GB</p> <p>(71) Applicant (for all designated States except US): MOTOROLA LIMITED [GB/GB]; Jays Close, Viabes Industrial Estate, Basingstoke, Hampshire RG22 4PD (GB).</p> <p>(72) Inventors; and (75) Inventors/Applicants (for US only): JEPSEN, Rene, Phil [DK/GB]; 5 Bancroft Close, Grange Park, Swindon, Wiltshire SN5 6HB (GB). MOHEBBI, Behzad [GB/GB]; 12 Cambridge Park Court, Cambridge Park, Twickenham TW1 2JN (GB). BENN, Howard [GB/GB]; 4 Horseshoe Crescent, Swindon, Wiltshire SN5 5AJ (GB).</p> <p>(74) Agents: IBBOTSON, Harry et al.; Motorola, European Intellectual Property Operations, Midpoint, Alencon Link, Basingstoke, Hampshire RG21 7PL (GB).</p>	<p>(81) Designated States: AU, CN, IL, JP, NO, US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).</p> <p>Published With international search report.</p> <p>(88) Date of publication of the international search report: 3 June 1999 (03.06.99)</p>	

(54) Title: METHOD AND APPARATUS FOR INCREASING DATA RATE BY REDUCTION OF TRAINING DATA



(57) Abstract

A method is provided for improving the data throughput of a communication system (100) operating under different radio propagation conditions and with radio equipment with different training data requirements. The data rate is increased by optimising the training data structure (205) for the individual radio channel (105) rather than globally employing a worst case training data structure (205). The invention is applicable to the GSM cellular communication system where increased data rate is achieved by setting up links with midamble (205) replaced by user data (203) when allowed by the propagation conditions.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 98/06186

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 6 H04Q7/20 H04L1/12

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 H04L

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	EP 0 615 352 A (NOKIA MOBILE PHONES LTD) 14 September 1994 see page 3, line 14 see page 3, line 33 - line 52 see page 4, line 3 - line 7 see page 4, line 19 - line 29 see page 4, line 40 - line 56 see claim 1 ---	1-12
X	US 5 606 580 A (MOUROT ET AL) 25 February 1997 see column 2, line 40 - line 62 see column 10, line 3 - line 13 see figure 4 --- -/--	1-12

Further documents are listed in the continuation of box C.

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

24 March 1999

Date of mailing of the international search report

31/03/1999

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

Ghigliotti, L

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 98/06186

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 97 16046 A (ANDERSON STEVEN E ;GEN INSTRUMENT CORP (US); HOU VICTOR T (US); K0) 1 May 1997 see page 8, line 7 - line 10 see page 12, line 4 - line 19 -----	1-12
A	US 5 416 797 A (GILHOUSEN KLEIN S ET AL) 16 May 1995 see column 36, line 13 - line 19 -----	1,11

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 98/06186

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0615352 A	14-09-1994	FI 931044 A	10-09-1994
		JP 6326642 A	25-11-1994
		US 5479444 A	26-12-1995
US 5606580 A	25-02-1997	FR 2708162 A	27-01-1995
		EP 0635949 A	25-01-1995
		JP 7154361 A	16-06-1995
		NO 942704 A	23-01-1995
WO 9716046 A	01-05-1997	AU 7466596 A	15-05-1997
		CN 1203013 A	23-12-1998
		EP 0857400 A	12-08-1998
		NO 981829 A	23-06-1998
US 5416797 A	16-05-1995	US 5103459 A	07-04-1992
		US 5841806 A	24-11-1998
		AU 652956 B	15-09-1994
		AU 8401691 A	23-01-1992
		BG 61514 B	31-10-1997
		BG 97222 A	27-05-1994
		CA 2085890 A	26-12-1991
		CN 1061312 A	20-05-1992
		CZ 283123 B	14-01-1998
		EP 0536334 A	14-04-1993
		FI 925812 A	21-12-1992
		HU 64657 A	28-01-1994
		IL 98598 A	27-02-1994
		JP 6501349 T	10-02-1994
		KR 134390 B	27-04-1998
		MX 173818 B	29-03-1994
		PT 98079 A	31-08-1993
		SG 52735 A	28-09-1998
		SK 387192 A	10-08-1994
		WO 9200639 A	09-01-1992
		US 5511073 A	23-04-1996
US 5715236 A	03-02-1998		
US 5504773 A	02-04-1996		
US 5659569 A	19-08-1997		
US 5535239 A	09-07-1996		
US 5629955 A	13-05-1997		
US 5568483 A	22-10-1996		
US 5309474 A	03-05-1994		