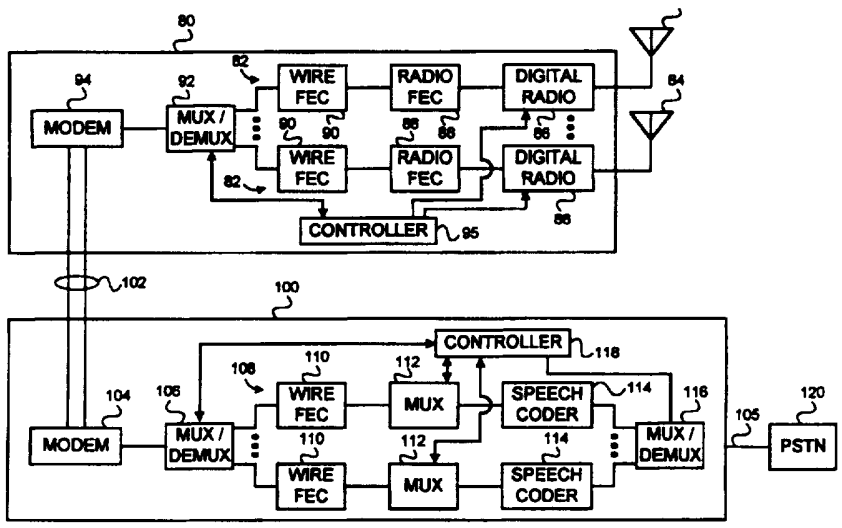




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification ⁶ : H04Q 7/22, H04L 1/00, H03M 1/13/00, H04Q 7/24, 7/32, H04M 1/72</p>	<p>A3</p>	<p>(11) International Publication Number: WO 96/27963 (43) International Publication Date: 12 September 1996 (12.09.96)</p>
<p>(21) International Application Number: PCT/US96/03027 (22) International Filing Date: 6 March 1996 (06.03.96) (30) Priority Data: 08/400,169 7 March 1995 (07.03.95) US (71) Applicant: DIVA COMMUNICATIONS, INC. [US/US]; 2150 Shattuck Avenue, Berkeley, CA 94704 (US). (72) Inventors: HAQUI, Amine; 1572 Olympus Avenue, Berkeley, CA 94708 (US). FAWAZ, Ayman; 785 Cragmont Avenue, Berkeley, CA 94708 (US). KAVALER, Robert; 244 Columbia Avenue, Kensington, CA 94708 (US). (74) Agent: DURANT, Stephen, C.; Wilson, Sonsini, Goodrich & Rosati, 650 Page Mill Road, Palo Alto, CA 94304-1050 (US).</p>	<p>(81) Designated States: AM, AU, BB, BG, BR, BY, CA, CN, CZ, EE, FI, GE, HU, JP, KG, KP, KR, KZ, LK, LR, LT, LV, MD, MG, MN, MX, NO, NZ, PL, RO, RU, SG, SI, SK, TJ, TM, TT, UA, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), 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).</p> <p>Published <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p> <p>(88) Date of publication of the international search report: 17 October 1996 (17.10.96)</p>	

(54) Title: METHOD AND APPARATUS TO IMPROVE PSTN ACCESS TO WIRELESS SUBSCRIBERS USING A LOW BIT RATE SYSTEM



(57) Abstract

A method of cellular communication among a subscriber unit, a base station and a switch controller is provided which comprises the steps of digitally encoding speech signals at the subscriber unit; generating radio forward error correction (FEC) at the subscriber unit to protect the encoded speech signals during transmission; transmitting the encoded speech signals together with the radio FEC by radio from the subscriber unit to the base station; error correcting the transmitted encoded speech signals at the base station using the radio FEC; generating wire FEC to protect the encoded speech signals during transmission; transmitting the encoded speech signals together with the wire FEC from the base station to the controller; error correcting the transmitted encoded speech signals at the controller using the wire FEC; and decoding the digitally encoded speech signals at the controller.

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.

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

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 96/03027

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 H04Q7/22 H04L1/00 H03M13/00 H04Q7/24 H04Q7/32
H04M1/72

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 H04Q H04L H03M H04M

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	WO,A,94 05104 (NOKIA TELECOMMUNICATIONS OY) 3 March 1994 see abstract see page 2, line 2 - line 14 see page 2, line 30 - page 3, line 32 see page 6, line 21 - page 8, line 1; claims; figures	1-26
A	WO,A,94 05114 (NOKIA TELECOMMUNICATIONS OY) 3 March 1994 see page 2, line 10 - page 3, line 15; figures see abstract	3,8

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

12 August 1996

Date of mailing of the international search report

27.08.96

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

Gries, T

INTERNATIONAL SEARCH REPORT

 International Application No
 PCT/US 96/03027

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO,A,91 07044 (INTELLIGENCE TECHNOLOGY CORPORATION) 16 May 1991 see abstract see page 3, line 15 - page 5, paragraph 1 see page 12, paragraph 2 - page 13, paragraph 1 ---	1-26
A	WO,A,95 03667 (MOTOROLA INC) 2 February 1995 see abstract see page 3, line 4 - line 19 see claims 1-10; figures 3,4 ---	1-26
A	US,A,4 654 867 (LABEDZ ET AL.) 31 March 1987 see abstract see figure 8 see column 2, line 5 - line 65 see column 5, line 3 - line 35 ---	1-26
A	EP,A,0 634 840 (AT & T CORP.) 18 January 1995 see abstract see column 2, line 36 - column 3, line 20 see column 4, paragraph 3 - column 5, paragraph 40 see column 8, line 53 - column 9, line 1; claims; figures 1,5 ---	1-26
A	EP,A,0 564 697 (ROBERT BOSCH GMBH) 13 October 1993 see abstract see column 1, paragraph 2 - paragraph 3 see column 2, paragraph 2 - column 4, line 9; claims; figures 2,4 ---	1-26
A	GB,A,2 275 393 (NORTHERN TELECOM LIMITED) 24 August 1994 see abstract; figures 1,2,4 see page 3, paragraph 1 ---	1,6,11, 19,24,25
A	JOURNAL OF THE INSTITUTION OF ELECTRONIC AND RADIO ENGINEERS, MAY-JUNE 1987, UK, vol. 57, no. 3, ISSN 0267-1689, pages 129-134, XP002010644 FRAZER E L ET AL: "CDLC-a data transmission standard for cellular radio" see the whole document ---	1-26
	-/--	

INTERNATIONAL SEARCH REPORT

 International Application No
 PCT/US 96/03027

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	MICROWAVE JOURNAL, vol. 38, no. 7, 1 July 1995, page 90, 92, 94, 96 XP000524891 MURCH A ET AL: "CELLULAR DATA SERVICES OVER GSM" see page 90, middle column, paragraph 2 - right-hand column, paragraph 2; figures 1,2 see page 92, right-hand column, paragraph 2 - page 94, right-hand column, paragraph 2 ---	1
P,X	EP,A,0 663 785 (NOKIA MOBILE PHONES LTD.) 19 July 1995 see page 8, line 10 - line 15; claims; figures 2,5 see page 7, line 27 - line 37 see page 5, line 38 - line 58 see page 4, line 35 - page 5, line 4 see abstract -----	1-26

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 96/03027

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO-A-9405104	03-03-94	FI-A- 923682	18-02-94
		AU-B- 665857	18-01-96
		AU-B- 4711393	15-03-94
		EP-A- 0616746	28-09-94
		JP-T- 7500467	12-01-95
		NO-A- 941331	16-06-94

WO-A-9405114	03-03-94	FI-A- 923683	18-02-94
		AU-B- 663223	28-09-95
		AU-B- 4711493	15-03-94
		EP-A- 0608405	03-08-94
		JP-T- 7500468	12-01-95
		US-A- 5537458	16-07-96

WO-A-9107044	16-05-91	EP-A- 0450062	09-10-91

WO-A-9503667	02-02-95	CA-A- 2143762	02-02-95
		EP-A- 0666008	09-08-95
		FI-A- 951317	21-03-95
		JP-T- 8501919	27-02-96

US-A-4654867	31-03-87	AU-B- 577742	29-09-88
		AU-B- 4634585	10-02-86
		CA-A- 1230648	22-12-87
		DK-B- 168976	18-07-94
		EP-A- 0188554	30-07-86
		JP-T- 61502720	20-11-86
		WO-A- 8600775	30-01-86

EP-A-634840	18-01-95	US-A- 5463641	31-10-95
		CA-A- 2124707	17-01-95

EP-A-564697	13-10-93	DE-A- 4210489	07-10-93

GB-A-2275393	24-08-94	NONE	

EP-A-663785	19-07-95	JP-A- 7221773	18-08-95
