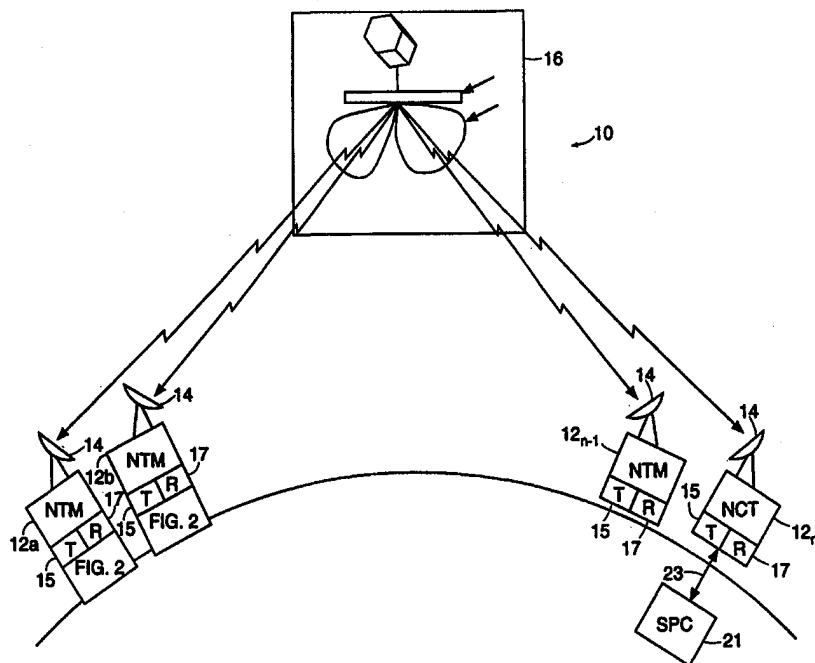




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : H04B 1/713, 7/216	A3	(11) International Publication Number: WO 98/49780 (43) International Publication Date: 5 November 1998 (05.11.98)
(21) International Application Number: PCT/US98/08777 (22) International Filing Date: 29 April 1998 (29.04.98) (30) Priority Data: 08/848,846 30 April 1997 (30.04.97) US (71) Applicant: RAYTHEON COMPANY [US/US]; Patent Dept., 141 Spring Street, Lexington, MA 02173 (US). (72) Inventors: PEZZLO, John; 5 Walkers Way, Framingham, MA 01701 (US). BENNETT, C., Leonard; 304 Reedy Meadow Road, Groton, MA 01450 (US). SHAFFER, Harry, L.; 55 Howard Avenue, Lynnfield, MA 01940 (US). (74) Agent: SHARKANSKY, Richard, M.; 225 Franklin Street, Boston, MA 02110-2804 (US).		(81) Designated States: AU, CA, IL, JP, KR, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i> (88) Date of publication of the international search report: 4 February 1999 (04.02.99)

(54) Title: FREQUENCY HOPPING COMMUNICATION SYSTEM



(57) Abstract

A spread spectrum radio frequency communication system comprising a plurality of transmitters adapted to operate at different carrier frequencies having a preassigned frequency separation, such carrier frequencies randomly changing in accordance with a common pseudo-random code. Each of the transmitters has a predetermined bandwidth and the carrier frequencies of the transmitters are in accordance with the bandwidth of the transmitters.

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/US 98/08777

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H04B1/713 H04B7/216

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

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.
A	US 5 274 666 A (DOWDELL ED ET AL) 28 December 1993 see column 2, line 20 - line 25 see column 3, line 56 - line 59 see column 4, line 49 - line 55 see column 5, line 51 - line 59 ---	1,3-6,10
A	US 4 998 290 A (OLENICK STEPHEN M ET AL) 5 March 1991 see column 1, line 59 - column 2, line 9 see column 3, line 51 - line 53 see column 4, line 55 - line 60 see column 5, line 49 - column 6, line 2 see column 6, line 28 - line 32; claim 5 --- -/--	1,5-8,10



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

14 October 1998

Date of mailing of the international search report

26/10/1998

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

Harris, E

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 98/08777

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 0 719 003 A (ROKE MANOR RESEARCH) 26 June 1996 see column 1, line 36 - line 55 see column 2, line 56 - column 3, line 31 see column 5, line 33 - line 44; claims 1-3</p> <p style="text-align: center;">---</p>	1,3-6,10
A	<p>US 5 596 330 A (MEIMAN YEHOUDA ET AL) 21 January 1997 see column 13, line 24 - line 40 see column 14, line 24 - column 15, line 19</p> <p style="text-align: center;">---</p>	3-6
A	<p>US 5 130 987 A (FLAMMER GEORGE H) 14 July 1992 see abstract see column 3, line 24 - line 48</p> <p style="text-align: center;">-----</p>	1,3-6,10

INTERNATIONAL SEARCH REPORT

Information on patent family members

In. .tional Application No

PCT/US 98/08777

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5274666 A	28-12-1993	NONE	
US 4998290 A	05-03-1991	NONE	
EP 0719003 A	26-06-1996	GB 2296407 A FI 956171 A	26-06-1996 23-06-1996
US 5596330 A	21-01-1997	US 5592180 A US 5583517 A US 5430759 A US 5335246 A US 5379047 A EP 0813689 A WO 9625673 A AU 8114194 A WO 9514936 A AU 8114094 A WO 9514935 A AU 8113994 A EP 0730808 A WO 9515064 A SG 45367 A US 5546422 A US 5499266 A US 5519718 A US 5712867 A AT 160882 T AU 4476093 A AU 4476293 A CA 2104544 A CA 2104555 A DE 69223405 D DE 69223405 T EP 0583522 A EP 0583523 A IL 104264 A IL 104265 A US 5530452 A	07-01-1997 10-12-1996 04-07-1995 02-08-1994 03-01-1995 29-12-1997 22-08-1996 13-06-1995 01-06-1995 13-06-1995 01-06-1995 13-06-1995 11-09-1996 01-06-1995 16-01-1998 13-08-1996 12-03-1996 21-05-1996 27-01-1998 15-12-1997 24-02-1994 03-03-1994 21-02-1994 21-02-1994 15-01-1998 23-04-1998 23-02-1994 23-02-1994 23-07-1996 15-04-1997 25-06-1996
US 5130987 A	14-07-1992	DE 69126164 D	26-06-1997

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 98/08777

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5130987 A		DE 69126164 T	28-08-1997
		DE 69127117 D	11-09-1997
		DE 69127117 T	11-12-1997
		EP 0447987 A	25-09-1991
		EP 0450382 A	09-10-1991
		US 5079768 A	07-01-1992
