(19) World Intellectual Property Organization

International Bureau





(43) International Publication Date 3 January 2003 (03.01.2003)

PCT

(10) International Publication Number WO 03/001692 A3

(51) International Patent Classification⁷: H03D 7/00, H03J 5/02

(22) International Filing Date:

H04B 1/30,

(21) International Application Number: PCT/EP02/06073

3 June 2002 (03.06.2002)

- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:

01401670.3 25 June 2001 (25.06.2001) E

- (71) Applicant (for all designated States except US): MOTOROLA INC. [US/US]; 1303 E. Algonquin Road, Schaumburg, IL 60196 (US).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): KHLAT, Nadim [FR/FR]; 24, rue Pierre de Fermat, F-31270 Cugnaux (FR).
- (74) Agent: GIBSON, Sarah; Motorola European Intellectual Property Operations, Midpoint, Alencon Link, Basingstoke, Hampshire RG21 7PL (GB).

- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

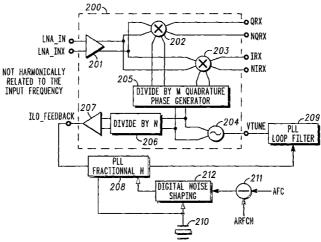
Published:

with international search report

(88) Date of publication of the international search report: 18 December 2003

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: LOW LEAKAGE LOCAL OSCILLATOR SYSTEM



(57) Abstract: Local oscillator apparatus comprising communication signal terminals (LNA IN, LNA INX; RF OUT,RF OUTN) for a communication signal, especially in a receiver or a transmitter, and a controlled frequency oscillator (204; 404) for producing a local oscillator signal. The local oscillator also includes a reference frequency generator (210; 410) and a feedback loop (208;408) for selecting and adjusting the frequency (fVCO) of the local oscillator signal relative to the frequency (fxtal) of said reference frequency signal. A first frequency divider (205; 405) divides the frequency of the local oscillatr signal by a first division factor (M) to produce a conversion signal, where the frequency (FILO) of said conversion signal is at least approximately equal to the frequency (fRF) of the communication signal, and conversion means (202,203; 402, 403) responsive to the conversion signal converts between said communication signal and a base-band signal. A second frequency divider (206;406) divides the frequency of the local oscillator signal by a second division factor (N) and is connected in the feedback loop, where the first division factor (N) is different to the second division factor (M) and the ratios between said first and second division factors (M/N, N/M) are fractional.



O 03/001692

INTERNATIONAL SEARCH REPORT

Internati **Application No** PCT/L. 02/06073

A. CLASSIFICATION OF SUBJECT MATTER IPC 7 H04B1/30 H03D7/00 H03J5/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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, PAJ

WO 00 31885 A (NOKIA MOBILE PHO			
;KALTIOKALLIO KIM (FI); VAEISAE 2 June 2000 (2000-06-02) page 2, line 6 -page 3, line 31 page 6, line 15 -page 11, last figures	NEN RISTO)	1-5,8, 10-13	
PATENT ABSTRACTS OF JAPAN vol. 2000, no. 02, 29 February 2000 (2000-02-29) -& JP 11 331011 A (SHARP CORP), 30 November 1999 (1999-11-30) abstract; figures 2,4,6,8,10	-/	1-13	
er documents are listed in the continuation of box C.	X Patent family members are listed	in annex.	
nt defining the general state of the art which is not ered to be of particular relevance locument but published on or after the international ate in which may throw doubts on priority claim(s) or is cited to establish the publication date of another or other special reason (as specified) enterering to an oral disclosure, use, exhibition or means int published prior to the international filing date but an 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 		
actual completion of the international search	Date of mailing of the international se	arch report	
3 June 2003	24/06/2003		
nailing 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,	Authorized officer		
the late rish or this a	page 2, line 6 -page 3, line 31 page 6, line 15 -page 11, last figures PATENT ABSTRACTS OF JAPAN vol. 2000, no. 02, 29 February 2000 (2000-02-29) -& JP 11 331011 A (SHARP CORP), 30 November 1999 (1999-11-30) abstract; figures 2,4,6,8,10 er documents are listed in the continuation of box C. egories of cited documents: Int defining the general state of the art which is not ered to be of particular relevance ocument but published on or after the international atternation to the stabilish the publication date of another or other special reason (as specified) Int referring to an oral disclosure, use, exhibition or reans and published prior to the international filling date but an the priority date claimed and the priority date claimed an	page 2, line 6 -page 3, line 31 page 6, line 15 -page 11, last line; figures PATENT ABSTRACTS OF JAPAN vol. 2000, no. 02, 29 February 2000 (2000-02-29) -& JP 11 331011 A (SHARP CORP), 30 November 1999 (1999-11-30) abstract; figures 2,4,6,8,10 -/ er documents are listed in the continuation of box C. X	

INTERNATIONAL SEARCH REPORT

Internaty Application No
PCT/EP 02/06073

Category ° (
Jalogoly	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 530 929 A (LINDQVIST BJOERN ET AL) 25 June 1996 (1996-06-25) cited in the application column 1, line 8 - line 13 column 2, line 31 - line 39 column 3, line 33 -column 4, line 17; figure 2	1-13
X	### Tiggre 2	1-7,10

INTERNATIONAL SEARCH REPORT

In hation on patent family members

Internation No PCT/E. 32/06073

	nt document n search report		Publication date		Patent family member(s)	Publication date
WO 0	0031885	A	02-06-2000	FI	982559 A	27-05-2000
				AU	1562800 A	13-06-2000
				CN	1328723 T	26-12-2001
				EP	1133831 A1	19-09-2001
			WO	0031885 A1	02-06-2000	
				JP	2002530995 T	17-09-2002
JP 1	1331011	Α	30-11-1999	NONE		
US 5	 5530929	A	25-06-1996	SE	502599 C2	20-11-1995
				AU	676933 B2	27-03-1997
				AU	7283794 A	23-03-1995
			CN	1111857 A ,B	15-11-1995	
				DE	69432004 D1	20-02-2003
			EP	0643494 A1	15-03-1995	
			FΙ	944167 A	10-03-1995	
			JP	7245568 A	19-09-1995	
			KR	214365 B1	02-08-1999	
			NZ	264412 A	26-11-1996	
			·	SE	9302934 A	10-03-1995
US 5	5140703	A	 18-08-1992	NONE		