

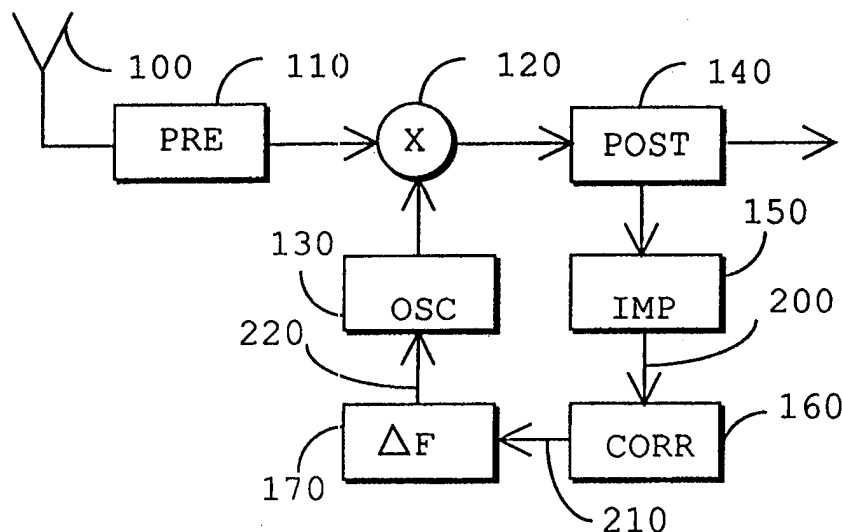


## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification <sup>6</sup> :</b> <b>H04L 7/02, H04B 17/00</b>	<b>A3</b>	<b>(11) International Publication Number:</b> <b>WO 98/24204</b> <b>(43) International Publication Date:</b> 4 June 1998 (04.06.98)
<b>(21) International Application Number:</b> PCT/FI97/00728 <b>(22) International Filing Date:</b> 26 November 1997 (26.11.97) <b>(30) Priority Data:</b> 964733 27 November 1996 (27.11.96) FI 971617 16 April 1997 (16.04.97) FI <b>(71) Applicant (for all designated States except US):</b> NOKIA TELECOMMUNICATIONS OY [FI/FI]; Keilalahdentie 4, FIN-02150 Espoo (FI). <b>(72) Inventor; and</b> <b>(75) Inventor/Applicant (for US only):</b> ZHENGDI, Qin [FI/FI]; Kurjenpolvi 22, FIN-90580 Oulu (FI). <b>(74) Agent:</b> PATENTTITOIMISTO TEKNOPOLIS KOLSTER OY; c/o Kolster Oy Ab, Iso Roobertinkatu 23, P.O. Box 148, FIN-00121 Helsinki (FI).	<b>(81) Designated States:</b> AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), 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).  <b>Published</b> <i>With international search report.</i> <i>In English translation (filed in Finnish).</i>  <b>(88) Date of publication of the international search report:</b> 15 June 2000 (15.06.00)	

**(54) Title:** METHOD OF MEASURING FREQUENCY DIFFERENCE, AND RECEIVER**(57) Abstract**

The invention relates to a method of measuring a frequency difference and to a receiver operating according to the method. In the method, the frequency difference (220) between the tuning frequency of the local oscillator of the receiver and the carrier of a received signal is determined. The determination of the frequency difference (220) is based on the measurement of the phase deviation of a transmitted signal and the spreading code used by the receiver. The phase deviation is measured by comparing estimated impulse responses (200) with one another at different points of time, which is preferably carried out by forming a correlation between the impulse responses (200) estimated in means (160). In another embodiment, the phase deviation is measured directly from the signal at no less than two different points of time. If the phase deviation changes from one point of time to another, the tuning frequency is adjusted.



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# INTERNATIONAL SEARCH REPORT

International application No.

**PCT/FI 97/00728**

**A. CLASSIFICATION OF SUBJECT MATTER**

**IPC6: H04L 7/02, H04B 17/00**  
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)

**IPC6: H04B, H04L**

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

**SE,DK,FI,NO classes as above**

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

**WPI, JAPIO**

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5343498 A (RAYMOND L. TOY ET AL), 30 August 1994 (30.08.94), column 1, line 60 - column 2, line 46; column 9, line 7 - line 33; column 11, line 11 - line 30  --	1,5-7,10, 14-17
X	DE 19516449 A1 (SIEMENS AG), 14 November 1996 (14.11.96), see whole document  --	1,5,10,14
X	EP 0381637 A1 (TELEFONAKTIEBOLAGET LM ERICSSON), 8 August 1990 (08.08.90), column 3, line 5 - line 27, claim 1  --	5,14

Further documents are listed in the continuation of Box C.       See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
<b>15 June 1998</b>	<b>16 -06- 1998</b>

Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer  <b>Viktor Skoog</b> Telephone No. +46 8 782 25 00
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# INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 97/00728

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Information on patent family members

09/06/98

International application No.

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