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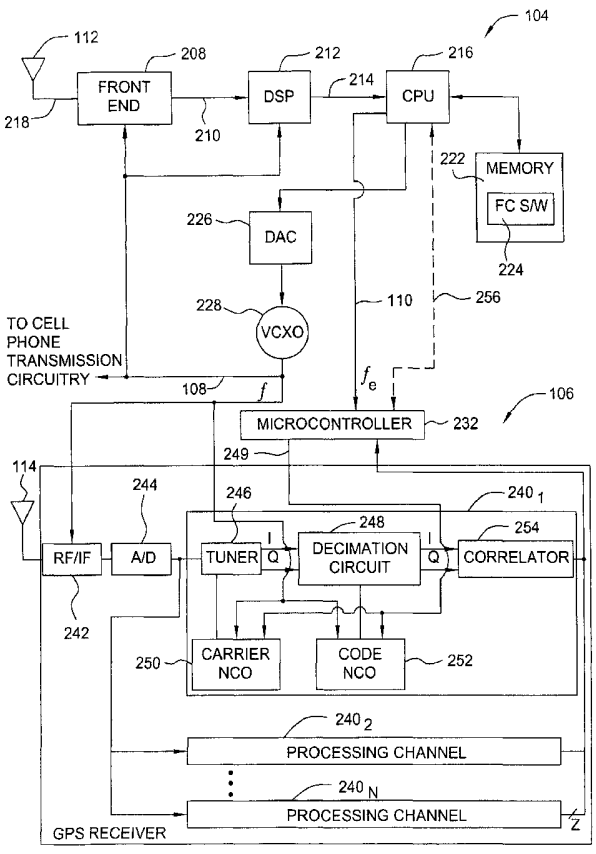
[Continued on next page]

(54) Title: METHOD AND APPARATUS FOR ADJUSTING REFERENCE OSCILLATOR FREQUENCY IN A MOBILE WIRELESS DEVICE



(57) Abstract: A method and apparatus for using a conventional oscillator in a cellular telephone transceiver as a source of a reference signal for a GPS receiver. In one embodiment, the method comprises using a voltage-controlled oscillator ("VCXO") within a cellular telephone transceiver to generate a reference frequency signal for the GPS receiver. Circuitry within the telephone transceiver generates a frequency error signal. Both of these signals are coupled to GPS circuitry and used to control a carrier numerically controlled oscillator ("NCO") and a code NCO. The NCOs produce a tuning signal and a timing signal, respectively. The GPS circuitry uses the NCO generated signals to process GPS signals.

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TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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INTERNATIONAL SEARCH REPORT

International Application No
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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G01S5/02 H04B7/185

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 7 G01S H04B H03D

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, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6 122 506 A (LAU CHUNG Y ET AL) 19 September 2000 (2000-09-19) cited in the application column 2, line 21 - column 8, line 13; figures 1,2	1-10
Y	US 2002/172306 A1 (ABRAHAM CHARLES ET AL) 21 November 2002 (2002-11-21) page 1, paragraph 12 - page 3, paragraph 42 page 7, paragraphs 80,81 page 9, paragraph 93-98; figures 1,10,17	1-10
Y	US 5 663 735 A (ESHENBACH RALPH F) 2 September 1997 (1997-09-02) column 1, lines 7-11 - column 6, line 5; figures 1,3	1-10

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[X] Further documents are listed in the continuation of box C.

[X] 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

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Date of the actual completion of the international search	Date of mailing of the international search report
14 May 2004	26. 08. 2004

Name and mailing address of the ISA	Authorized officer
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	Brosa Gonzalez, A

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6 411 892 B1 (VAN DIGGELEN FRANK) 25 June 2002 (2002-06-25) cited in the application column 2, line 5 - column 10, line 67; figures 1,5-8	1-10
A	US 6 487 499 B1 (ABRAHAM CHARLES ET AL) 26 November 2002 (2002-11-26) column 1, line 61 - column 26, line 17; figures 1-9	1-10
A	US 5 781 156 A (KRASNER NORMAN F) 14 July 1998 (1998-07-14) abstract; figures 1A-7	1-10
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A	US 6 133 874 A (KRASNER NORMAN F) 17 October 2000 (2000-10-17) * The whole document *	1-10

INTERNATIONAL SEARCH REPORT

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Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

see annex

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-10

   Method and apparatus for producing a reference signal for a GPS receiver

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2. claims: 11-14

   Method for processing GPS signals in a mobile device during out-of-network coverage

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