A transmitter comprises a transmit processor (105), preamble inserters (107, 109) and transmit units (113, 117) which are operable to transmit sub-signals from the antennas (115, 119). A preamble set comprising an individual preamble for each antenna generated by a preamble generator (111). Each of the individual preambles comprise first and second sections. The first section comprises a first data sequence, different for each antenna, and is selected from a predetermined set of preamble sequences. The first data sequence may comprise only time domain symbols belonging to the alphabet [1, -1, i, -i, 0]. The second section comprises repetitions of a predetermined second data sequence where each repetition is weighted by a coefficient that is different for each antenna. Weighting may be by coefficients of different rows of a Walsh Hadamard matrix. The second data sequence may comprise only frequency domain symbols belonging to the alphabet [1, -1, 0].
— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

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.

(88) Date of publication of the international search report:
3 August 2006
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - H04B 1/02 (2006.01)
USPC - 455/103
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)
U.S. : 455/447, 446, 296, 501, 63.1, 63.3, 103, 104, 105; 370/337, 347, 375/142

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PUBWEST—PGPB, USPT, EPAB and JPAB—searched preamble, secticon, training symbol, walsh-Hadamard

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category*</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
</table>

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

Date of the actual completion of the international search
23 March 2006 (23.03.2006)

Name and mailing address of the ISA/US
Mail Stop PCT, Attn: ISAUS, Commissioner for Patents
P.O. Box 1450, Alexandria, Virginia 22313-1450
Facsimile No. 571-273-3201

Date of mailing of the international search report
09 JUN 2006

Authorized officer:
Blaine R. Copenheaver
Telephone No. 571-272-7774

Form PCT/ISA/210 (second sheet) (April 2005)
INTERNATIONAL SEARCH REPORT

Box No. 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.: 6-18
   because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. 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:

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 additional fees, this Authority did not invite payment of additional fees.

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.:

Remark on Protest

□ The additional search fees were accompanied by the applicant’s protest and, where applicable, the payment of a protest fee.

□ The additional search fees were accompanied by the applicant’s protest but the applicable protest fee was not paid within the time limit specified in the invitation.

□ No protest accompanied the payment of additional search fees.

Form PCT/ISA/210 (continuation of first sheet (2)) (April 2005)