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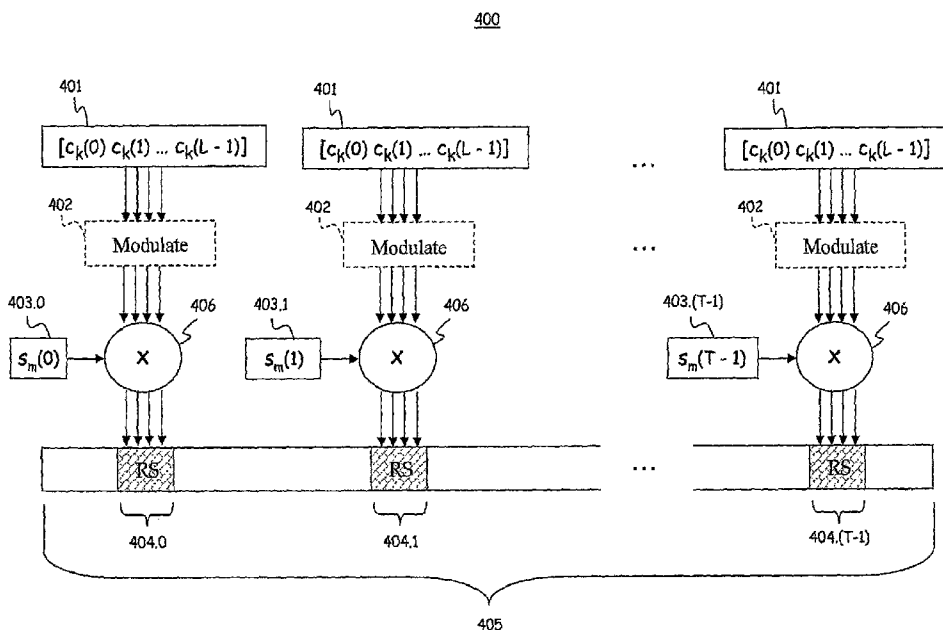
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Declarations under Rule 4.17:

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))

[Continued on next page]

(54) Title: METHOD AND APPARATUS FOR INCREASING THE NUMBER OF ORTHOGONAL SIGNALS USING BLOCK SPREADING



(57) Abstract: Embodiments of the invention apply block spreading to transmitted signals to increase the number of orthogonally multiplexed signals. The principle of the disclosed invention can be applied to reference signals, acknowledgement signals, and channel quality indication signals. In any given time interval (405), the set of transmitted signals is defined by two sequences: the baseline sequence, and the block spreading sequence (403). Different transmitters using the same baseline sequence can be identified by using different block spreading sequences.

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— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US07/61054

<p>A. CLASSIFICATION OF SUBJECT MATTER IPC(8) - H04B 1/00 (2007.10) USPC - 375/142 According to International Patent Classification (IPC) or to both national classification and IPC</p>																				
<p>B. FIELDS SEARCHED</p> <p>Minimum documentation searched (classification system followed by classification symbols) IPC(8) - H04B 7/208; H04J 11/00; H04B 7/216; H04B 1/00 (2007.10) USPC - 370/344, 210, 342, 335; 375/150, 130, 140, 143, 146, 152, 146, 147, 141, 142</p> <p>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched</p> <p>Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) Database: PatBase</p>																				
<p>C. DOCUMENTS CONSIDERED TO BE RELEVANT</p> <table border="1"> <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> <tbody> <tr> <td>X</td> <td>US 2002/0118635 A1 (NEE) 29 August 2002 (29.08.2002) entire document</td> <td>1-5</td> </tr> <tr> <td>A</td> <td>US 6,744,807 B1 (LINDE et al) 01 June 2004 (01.06.2004) entire document</td> <td>1-5</td> </tr> <tr> <td>A</td> <td>US 2004/0252667 A1 (DENT) 16 December 2004 (16.12.2004) entire document</td> <td>1-5</td> </tr> <tr> <td>A</td> <td>US 2004/0252753 A1 (LI et al) 16 December 2004 (16.12.2004) entire document</td> <td>1-5</td> </tr> <tr> <td>A</td> <td>WO 01/13531 A1 (WIDDOWSON et al) 22 February 2001 (22.02.2001) entire document</td> <td>1-5</td> </tr> </tbody> </table>			Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X	US 2002/0118635 A1 (NEE) 29 August 2002 (29.08.2002) entire document	1-5	A	US 6,744,807 B1 (LINDE et al) 01 June 2004 (01.06.2004) entire document	1-5	A	US 2004/0252667 A1 (DENT) 16 December 2004 (16.12.2004) entire document	1-5	A	US 2004/0252753 A1 (LI et al) 16 December 2004 (16.12.2004) entire document	1-5	A	WO 01/13531 A1 (WIDDOWSON et al) 22 February 2001 (22.02.2001) entire document	1-5
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<p><input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/></p>																				
<p>* Special categories of cited documents:</p> <table border="0"> <tr> <td>"A" document defining the general state of the art which is not considered to be of particular relevance</td> <td>"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</td> </tr> <tr> <td>"E" earlier application or patent but published on or after the international filing date</td> <td>"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</td> </tr> <tr> <td>"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)</td> <td>"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</td> </tr> <tr> <td>"O" document referring to an oral disclosure, use, exhibition or other means</td> <td>"&" document member of the same patent family</td> </tr> <tr> <td>"P" document published prior to the international filing date but later than the priority date claimed</td> <td></td> </tr> </table>			"A" document defining the general state of the art which is not considered to be of particular relevance	"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	"E" earlier application or patent but published on or after the international filing date	"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	"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)	"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	"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family	"P" document published prior to the international filing date but later than the priority date claimed									
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<p>Date of the actual completion of the international search 12 December 2007</p>		<p>Date of mailing of the international search report 17 MAR 2008</p>																		
<p>Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201</p>		<p>Authorized officer: Blaine R. Copenheaver PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774</p>																		

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US07/61054

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.:
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:

See Extra Sheet (page 10)

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.:
1-5

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.

INTERNATIONAL SEARCH REPORT

International application No.

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This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claims 1-5, drawn to a method for allocating sequences to a plurality of user equipments in a communication system.

Group II, claims 6-11, 13, drawn to a method and apparatus for transmitting signals.

Group III, claims 12, 14, drawn to method and an apparatus for separating transmitters when receiving signals from the transmitters.

The inventions listed as Groups I-III do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the special technical feature of the Group I invention is allocating to a second user equipment from a plurality of user equipments, a selected sequence for transmission in a first of at least two time periods and allocating to a second user equipment an algebraic opposite (negative) of the selected sequence for transmission in a second of at least two time periods as claimed therein is not present in the invention of Groups II and III; the special technical feature of the Group II invention is altering a first sequence according to each of N elements of a second sequence to produce T third sequences and transmitting a different one of the T third sequences during each of N time periods as claimed therein is not present in the invention of Group I and III; and the special technical feature of the Group III invention is using first and second block-spreading sequences to separate first and second transmitters as claimed therein is not present in the invention of Groups I and II.

Since none of the special technical features of the Group I, II and III inventions is found in more than one of the inventions, unity of invention is lacking.