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Declarations under Rule 4.17:

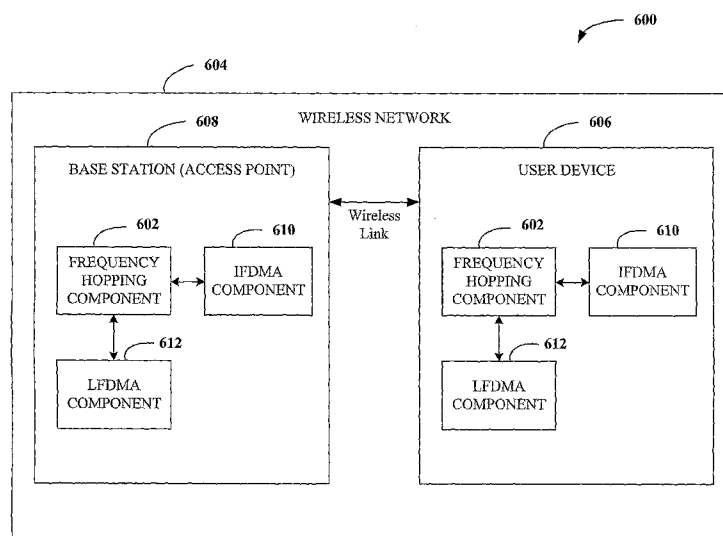
- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

Published:

- with international search report

[Continued on next page]

(54) Title: FREQUENCY HOPPING DESIGN FOR IFDMA , LFDMA AND OFDMA SYSTEMS



(57) Abstract: Systems and methodologies are described that facilitate frequency hopping in a single carrier FDMA wireless environment by dynamically altering user offsets with time to obtain interference diversity. A channel tree can be utilized with nodes that are assigned values. User devices can be assigned to such nodes, a path between an assigned node and a root node in the channel tree can be evaluated, and a table lookup can be performed to determine an identity of a subcarrier set to assign to the user device assigned to a given node, as well as a number of subcarriers to be assigned to the user device. Additionally, node values can be dynamically varied during a communication event to alter path values and thus alter subcarrier set assignments.

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— *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:

8 March 2007

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2006/014879

A. CLASSIFICATION OF SUBJECT MATTER

INV. H04B1/713

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)

H04B

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, INSPEC, PAJ, COMPENDEX

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 887 023 A (MABUCHI ET AL) 23 March 1999 (1999-03-23)	1,32,50
Y	abstract; figure 5 column 4, line 57 - column 6, line 13	2
Y	US 6 584 140 B1 (LEE PAUL K) 24 June 2003 (2003-06-24) abstract; figure 1A column 2, line 11 - line 19 column 5, line 26 - line 67	2

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"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)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than 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

Date of the actual completion of the international search

31 July 2006

Date of mailing of the international search report

15. 01. 07

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2006/014879

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5887023	A	23-03-1999	NONE	

US 6584140	B1	24-06-2003	NONE	

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2006/014879

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.:

1, 2, 32, 50

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: 1,2,32,50

Claims 1, 32 and 50 refer to generating transmission symbols , comprising:

- generating at least one single-carrier FDMA symbol;
- assigning a set of subcarriers to transmit the at least one symbol;
- generating at least one other single-carrier FDMA symbol; and
- varying subcarrier set assignments according to a predetermined pattern for transmission of the at least one other single-carrier FDMA symbol.

Claim 2 further refers to changing an assignment of at least one offset in a predetermined set of offsets.

2. claims: 18-31, 38-43 and 44-49

Claims 18-31, 38-43 and 44-49 further refer to assigning and varying an offset to and for a user device.

3. claims: 3-6 and 17

Claims 3-6 and 17 further refer to the pattern being delineated according to different events.

4. claims: 7 and 15-16

Claims 7 and 15-16 further refer to transmitting symbols using IFDMA or LFDMA.

5. claims: 8-14, 33-37 and 51-56

Claims 8-14, 33-37 and 51-56 further refer to the subcarrier sets being chosen using a tree or a look-up table.
