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[Continued on next page]

(54) Title: METHODS AND APPARATUS FOR INTELLIGENT RECEIVER OPERATION

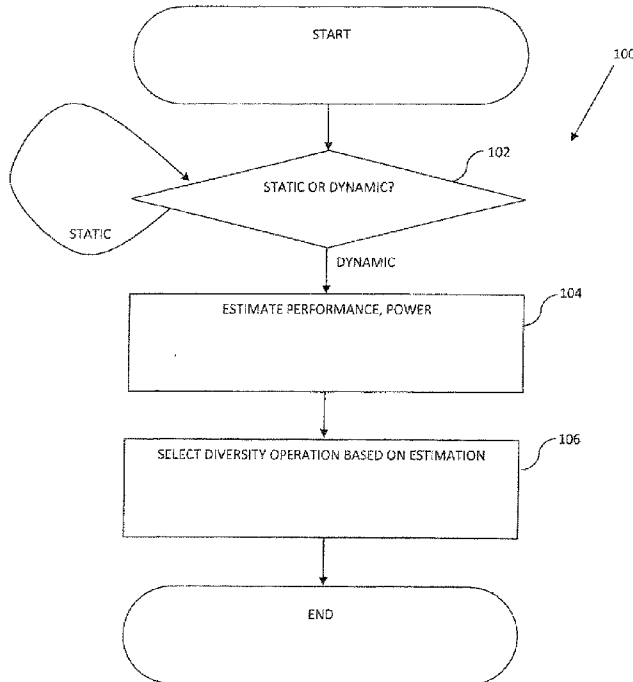


FIG. 1A

(57) Abstract: Methods and apparatus for adaptively adjusting receiver operation for e.g., power optimization. In one embodiment, operation during diversity operation is adaptively adjusted. Diversity techniques consume significantly more power than non-diversity operation. However, the performance gain from receiver diversity is not always predictable. Consequently, in one embodiment, a device evaluates the overall performance gain contributed by diversity operation and, where the performance gain is insignificant or inadequate, the device disables diversity operation. In one implementation, the device can operate in a static single antenna mode, a dynamic single antenna mode and a dynamic multiple antenna mode.

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INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER
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ADD.
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B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
H04B H04W

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 practicable, search terms used)
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C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-----------|--|----------------------------|
| X | US 6 965 788 B1 (BARRATT CRAIG H [US] ET AL) 15 November 2005 (2005-11-15) column 5, line 49 - column 8, line 38 column 9, line 28 - column 11, line 12 claim 1 figures 1, 3-7 | 1,7-11, 15,21, 24,25 |
| X | US 2004/219959 A1 (KHAYRALLAH ALI [US] ET AL) 4 November 2004 (2004-11-04) abstract paragraphs [0038] - [0055] figures 1-8b | 1,7-11, 15,21, 24,25 |

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 application or patent 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

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| Date of the actual completion of the international search 20 June 2013 | Date of mailing of the international search report 17/09/2013 |
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| Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016 | Authorized officer Helms, Jochen |
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2013/025978

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date | |
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2013/025978

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 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 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, 7-11, 15, 21, 24, 25

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.

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, 7-11, 15, 21, 24, 25

Independent claim 1 relates to a method for adaptively adjusting wireless receiver operation during diversity operation, the method comprising: estimating a performance of one or more diversity configurations and one or more corresponding power consumptions; comparing the one or more performance and corresponding one or more power consumptions; and selecting a diversity configuration based on at least the comparison.

Independent claims 11 and 21 correspond to claim 1.

2. claims: 2-6, 12-14, 16, 22, 23

A mobile device comprising a wireless transceiver configured to transition between a static single antenna state and a dynamic state based on one or more of: (i) a Channel Quality Indication (CQI) value, and/or (ii) a scheduled resources value.

3. claims: 17-20, 26-28

Operating a mobile device capable of switching between a diversity and non-diversity states of operation comprising: calculating a performance gain based on a known spatial correlation between a plurality of antennas of the mobile device, the calculating contingent upon the mobile device switching to the diversity state.
