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AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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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 (Art. 21(3))

— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

[Continued on next page]

(54) Title: THROTTLING TRANSMIT POWER IN A WWAN DEVICE BASED UPON THERMAL INPUT

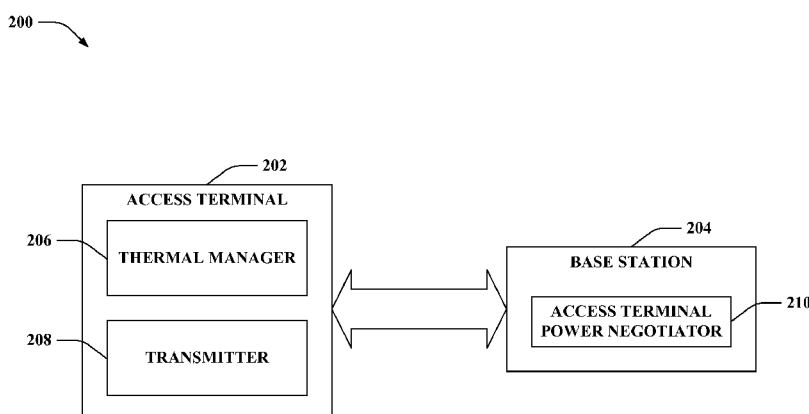


FIG. 2

(57) Abstract: Systems and methodologies are described that facilitate throttling transmit power of a WWAN module based upon thermal input. For instance, the thermal input can be a detected temperature, a signal from a computing device associated with the WWAN module, a signal from an alternate technology module (e.g., WiFi module, WiMax module,) associated with the WWAN module, or the like. A target transmit power of the WWAN module can be reduced (e.g., by a predetermined amount,) upon occurrence of a condition (e.g., the detected temperature exceeding a threshold, the computing device or the alternate technology module requesting a decrease in thermal power,), for example. Moreover, negotiation between the WWAN module and a base station can be effectuated to select an appropriate class (power class or Multi Slot Class) and/or operating mode when the target transmit power of the WWAN module is altered.





(88) Date of publication of the international search report:
29 December 2010

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2010/033718

A. CLASSIFICATION OF SUBJECT MATTER

INV. H04W52/02

ADD.

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)

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 practical, search terms used)

EPQ-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 00/31990 A2 (ERICSSON INC [US]) 2 June 2000 (2000-06-02) the whole document page 1, line 29 - page 2, line 2 page 2, line 29 - page 3, line 16 page 6, line 14 - page 6, line 24 page 7, line 26 - line 27 page 17, line 28 - page 18, line 11	1-5, 13-15, 17,26,31
A	EP 0 800 282 A2 (NEC CORP [JP]) 8 October 1997 (1997-10-08) figure 4	3,15
A	US 5 519 886 A (GILBERT STEPHEN S [US] ET AL) 21 May 1996 (1996-05-21) the whole document	3,15

☐ 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

27 October 2010

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04/11/2010

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2010/033718

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.: 21-25, 32-47
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:
see FURTHER INFORMATION sheet PCT/ISA/210
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.:
1-5, 13-15, 17, 26, 31
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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.2

Claims Nos.: 21-25, 32-47

1. The various definitions of the invention given in independent claims 1, 13, 21, 26, 32, 33, 37, 41, 44 and 47 are such that the claims as a whole are not clear and concise, contrary to Article 6 PCT, making it difficult, if not impossible, to determine the matter for which protection is sought, and placing an undue burden on others seeking to establish the extent of the protection, cf PCT Guidelines 5.42 and A5.42[1] and [2]. The claims should have been drafted to include only the minimum necessary number of independent claims in any category, with dependent claims as appropriate. In the present case, it is considered appropriate to use only one independent claim per category for the WWAN device side. In view of the above objection, it is not at present possible to give an opinion concerning novelty and inventive step of the subject-matter of claims 21-25 and 32, which is redundant with the subject-matter of claims 1-12. 2. Concerning claims 33-47, it is noted that their subject-matter lack clarity (Art 6 PCT), because they relate to the base station side, but the only differentiating feature from a common base station is the fact that the target power level is negotiated based on a function of a temperature related input obtained by the WWAN module. It is totally obscure how this input is handled in the base station. From the description, it seems that the base station does not consider the reason why the WWAN module has sent a request to negotiate the target power level.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.2), should the problems which led to the Article 17(2) declaration be overcome.

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, 13, 14

Claims 1 and 13 relate to method and apparatus that facilitates throttling transmit power of a WWAN module in a wireless communication environment, comprising:
determining a target transmit power to be utilized by a WWAN module as a function of an obtained temperature related input;
negotiating with a base station to coordinate a transition to the target transmit power;
sending data via the WWAN module at or below the target transmit power.
Claims 2 and 14 further relate to the WWAN module being at least one of included in a computing device or remove ably connectable to the computing device.

2. claims: 3-5, 15, 17, 26, 31

Claims 3-5, 15, 17, 26, 31 further relate to the obtained temperature related input being a detected temperature.

3. claims: 6-8, 18

Claims 6-8, 18 further relate to the obtained temperature related input being a temperature related input from an external source.

4. claims: 9, 19, 27, 28

Claims 9, 19, 27, 28 further relate to negotiating with the base station to cooperatively select a second class for the WWAN module.

5. claims: 10, 20, 29, 30

Claims 10, 20, 29, 30 further relate to negotiating with the base station to cooperatively select an operating mode for the WWAN module.

6. claim: 11

Claim 11 further relates to dynamically adjusting a class of the WWAN module based upon the obtained temperature related input; transmitting a UE CAPABILITY INFORMATION command to inform the base station as to the adjustment in the class; and receiving a TRANSPORT FORMAT COMBINATION CONTROL command that enables selecting a corresponding data rate based upon

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

the adjustment in the class, wherein the corresponding data rate correlates to an output thermal power.

7. claim: 12

Claim 12 further relates to sending data below the target transmit power when the WWAN module is located within close proximity of the base station; and sending data at the target transmit power when the WWAN module is located at an edge of a cell associated with the base station.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2010/033718

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 0031990	A2	02-06-2000	AT 295024 T 15-05-2005
		AU 3097900 A 13-06-2000	
		CA 2350528 A1 02-06-2000	
		CN 1411638 A 16-04-2003	
		DE 69925153 D1 09-06-2005	
		DE 69925153 T2 17-11-2005	
		EP 1131906 A2 12-09-2001	
		HK 1053205 A1 07-04-2006	
		JP 2002531023 T 17-09-2002	
		RU 2231223 C2 20-06-2004	
		TR 200101370 T2 21-11-2001	
		US 6760311 B1 06-07-2004	
		US 2004174833 A1 09-09-2004	
		US 2004160901 A1 19-08-2004	
		ZA 200104027 A 22-11-2001	
EP 0800282	A2	08-10-1997	AU 714919 B2 13-01-2000
			AU 1664297 A 09-10-1997
			US 5848062 A 08-12-1998
US 5519886	A	21-05-1996	NONE