

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
1 December 2005 (01.12.2005)

PCT

(10) International Publication Number
WO 2005/114872 A3

- (51) International Patent Classification:
H04B 7/204 (2006.01) H04B 7/216 (2006.01)
- (21) International Application Number:
PCT/US2005/017972
- (22) International Filing Date: 19 May 2005 (19.05.2005)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
10/851,386 21 May 2004 (21.05.2004) US
- (71) Applicant (for all designated States except US): NEXTEL COMMUNICATIONS, INC. [US/US]; 2001 Edmund Halley Drive, Reston, VA 20191 (US).

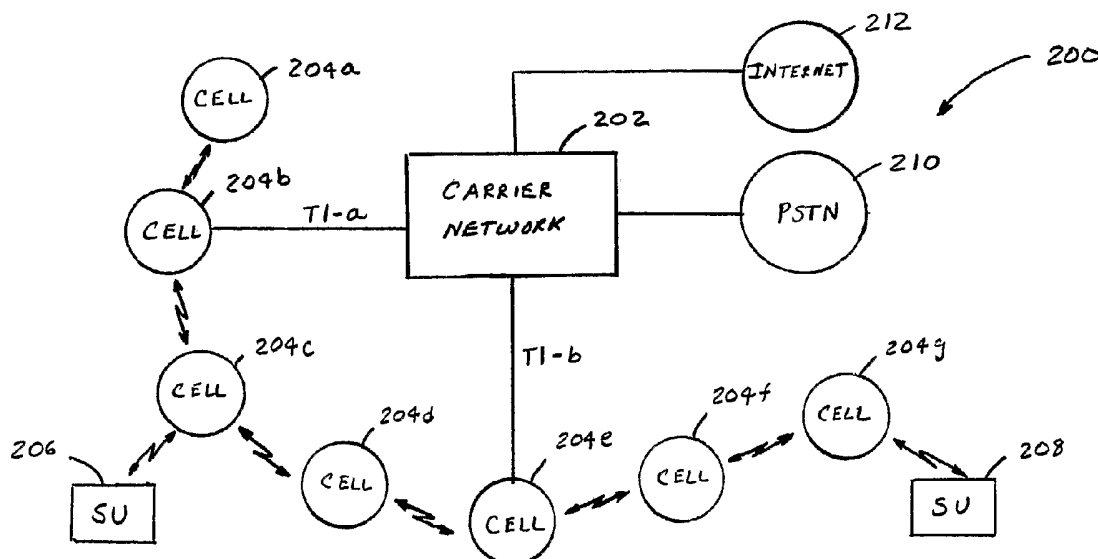
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

- (72) Inventor; and
- (75) Inventor/Applicant (for US only): ORTEGA, Arturo [MX/US]; 43086 Northlake Blvd., Leesburg, VA 20176 (US).
- (74) Agent: FOUNTAIN, George, L.; CROWELL & MORING LLP, Intellectual Property Group, P.O. Box 14300, Washington, DC 20044-4300 (US).

- Published:
— with international search report
- (88) Date of publication of the international search report:
17 August 2006

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.

(54) Title: WIRELESS IP BACKBONE USING BROADBAND RF TECHNOLOGIES



(57) Abstract: A wireless communications system (202) is disclosed including a carrier network (202) and a backbone for facilitating communications between the carrier network (202) and subscriber units (206, 208). The backbone includes one or more "wired" cell sites (204b, 204e) coupled to the carrier network (202) by respective T1 communication line (T1-a, T1-b) and one or more "wireless" cell sites (204a, 204d, 204f, 204g) that receive communications from and transmit communications to the carrier network (202) by way of the one or more "wired" cell sites (204b, 204e). Such wireless communications system, that provides wireless cell-to-cell communications to relay communications, is able to provide wireless services to subscribers with reduced number of T1 communication lines connecting cell sites (204a-204g) to the carrier network (202). Such a reduction in T1 communication lines allows a wireless carrier to substantially reduce its operating costs.

WO 2005/114872 A3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US05/17972

A. CLASSIFICATION OF SUBJECT MATTER
 IPC: H04B 7/204(2006.01);H04B 7/216(2006.01)

USPC: 370/328,335
 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. : 370/328,335

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)
 Please See Continuation Sheet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 2004/0057408 A1 (GRAY) 25 March 2004 (25.03.2004), paragraphs 0018-0026, 0030, 0034, and 0042.	1,3-11,16,20,21 ----- 2
A	US 2002/0197984 A1 (MONIN et al) 26 December 2002 (26.12.2002), abstract.	1-21

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	"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 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	

Date of the actual completion of the international search 12 April 2006 (12.04.2006)	Date of mailing of the international search report 26 MAY 2006
---	--

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	Authorized officer <i>Chi Pham</i> Chi Pham Telephone No. 571.272.2600
---	---

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US05/17972

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:
Please See Continuation 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 additional fees, this Authority did not invite payment of any 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.: 1-21

- 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.
PCT/US05/17972

BOX III. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

1. 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 1-21, are drawn to a wireless communication system comprising first-type and second-type cell sites whereby the second-type cell site transmits and receives communications from a carrier network via the first-type cell site and a wireless medium.

Group II, claims 22-35, are drawn to a method of routing comprising transmitting a communication from a first-type cell site to a target unit via a second-type cell site and a carrier network.

Group III, claims 36-39, are drawn to a cell site for converting, via a first converter and a second converter, communications and routing the communication.

Group IV, claims 40-47, are drawn to a method of routing comprising converting a communication from an RF protocol to a routing protocol, determining routing information for the communication, modifying the communication to include the routing information, converting the modified communication to the RF protocol, and transmitting the modified communication via a wire medium.

2. The inventions listed as Groups I-IV 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: Group I relates to a separate inventive concept for a first-type and second-type cell site system in a wireless environment; Group II relates to a separate inventive concept for a method of routing from cell-sites to a target unit and a carrier network; Group III relates to a separate inventive concept for converting a communications via a plurality of converters and for routing the communications; and Group IV relates to a separate inventive concept for routing and modifying communications to include routing information before transmitting the modified communications via a wire medium.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US05/17972

Continuation of B. FIELDS SEARCHED Item 3:
EAST
search terms: optic\$3, PSTN, CDMA, OFDM, TDMA, cell\$5