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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	I-2-0674.2US
First Inventor	Zhang et al.
Title	SUPPORTING ENHANCED UPLINK TRANSMISSION DURING SOFT HANDOVER
Express Mail Label No.	EV680508966US

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. [X] **Fee Transmittal Form** (e.g., PTO/SB/17) *(Submit an original and a duplicate for fee processing)*
2. [ ] **Applicant claims small entity status.** See 37 CFR 1.27.
3. [X] **Specification** [*Total Pages* 16] Both the claims and abstract must start on a new page *(For information on the preferred arrangement, see MPEP 608.01(a))*
4. [X] **Drawing(s)** (*35 U.S.C. 113*) [*Total Sheets* 4]
5. **Oath or Declaration** [*Total Sheets* 3]
   a. [ ] Newly executed (original or copy)
   b. [X] A copy from a prior application (37 CFR 1.63(d)) *(for continuation/divisional with Box 18 completed)*
      i. [ ] DELETION OF INVENTOR(S) Signed statement attached deleting inventor(s) name in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
6. [X] **Application Data Sheet.** See 37 CFR 1.76
7. [ ] **CD-ROM or CD-R** in duplicate, large table or Computer Program *(Appendix)* [ ] Landscape Table on CD
8. **Nucleotide and/or Amino Acid Sequence Submission** *(if applicable, items a. – c. are required)*
   a. [ ] Computer Readable Form (CRF)
   b. Specification Sequence Listing on:
      i. [ ] CD-ROM or CD-R (2 copies); or
      ii. [ ] Paper
   c. [ ] Statements verifying identity of above copies

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ACCOMPANYING APPLICATION PARTS

9. [ ] **Assignment Papers** (cover sheet & document(s)) Name of Assignee
10. [ ] **37 CFR 3.73(b) Statement** *(when there is an assignee)* [ ] **Power of Attorney**
11. [ ] **English Translation Document** *(if applicable)*
12. [X] **Information Disclosure Statement** (PTO/SB/08 or PTO-1449) [ ] Copies of citations attached
13. [ ] **Preliminary Amendment**
14. [X] **Return Receipt Postcard** (MPEP 503) *(Should be specifically itemized)*
15. [ ] **Certified Copy of Priority Document(s)** *(if foreign priority is claimed)*
16. [ ] **Nonpublication Request** under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent.
17. [ ] Other:

18. If a CONTINUING APPLICATION, *check appropriate box, and supply the requisite information below and in the first sentence of the specification following the title, or in an Application Data Sheet under 37 CFR 1.76:*

[X] Continuation [ ] Divisional [ ] Continuation-in-part (CIP) of prior application No.: 10/962,720

Prior application information: *Examiner* Brian S. Roberts *Art Unit:* 2662

19. CORRESPONDENCE ADDRESS

[X] The address associated with Customer Number: 24374 *OR* [ ] Correspondence address below

Name	VOLPE AND KOENIG, P.C., DEPT ICC				
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Signature		Date	May 15, 2006
Name (Print/Type)	Jeffrey M. Glabicki	Registration No. (Attorney/Agent)	42,584

This collection of information is required by 37 CFR 1.53(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: **Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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FEE TRANSMITTAL
For FY 2006

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT	($)	1,000.00

Complete if Known	
Application Number	Not Yet Known
Filing Date	Not Yet Known
First Named Inventor	Zhang et al.
Examiner Name	Not Yet Known
Art Unit	Not Yet Known
Attorney Docket No.	I-2-0674.2US

METHOD OF PAYMENT (check all that apply)

☐ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): _____

☒ Deposit Account Deposit Account Number: 09-0435 Deposit Account Name: InterDigital Communications Corporation

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

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FEE CALCULATION (All the fees below are due upon filing or may be subject to a surcharge.)

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

	FILING FEES		SEARCH FEES		EXAMINATION FEES		
Application Type	Fee ($)	Small Entity Fee ($)	Fee ($)	Small Entity Fee ($)	Fee ($)	Small Entity Fee ($)	Fees Paid ($)
Utility	300	150	500	250	200	100	1,000.00
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description	Fee ($)	Small Entity Fee ($)
Each claim over 20 (including Reissues)	50	25
Each independent claim over 3 (including Reissues)	200	100
Multiple dependent claims	360	180

Total Claims		Extra Claims	Fee ($)	Fee Paid ($)
8	- 20 =	0	x 50.00	= 0.00

HP = highest number of total claims paid for, if greater than 20.

Indep. Claims		Extra Claims	Fee ($)	Fee Paid ($)
2	- 3 =	0	x 200.00	= 0.00

HP = highest number of independent claims paid for, if greater than 3.

Multiple Dependent Claims	
Fee ($)	Fee Paid ($)

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets		Extra Sheets		Number of each additional 50 or fraction thereof	Fee ($)	Fee Paid ($)
	- 100 =		/ 50 =	(round up to a whole number) x		=

4. OTHER FEE(S)

	Fees Paid ($)
Non-English Specification, $130 fee (no small entity discount)	
Other (e.g., late filing surcharge):	

SUBMITTED BY

Signature		Registration No. (Attorney/Agent) 42,584	Telephone 215-568-6400
Name (Print/Type)	Jeffrey M. Glabicki		Date May 15, 2006

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SUPPORTING ENHANCED UPLINK TRANSMISSION DURING SOFT HANDOVER

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation of U.S. Patent Application No. 10/962,720 filed October 12, 2004 which claims the benefit of U.S. Provisional Application Serial Nos. 60/578,674 filed June 10, 2004; 60/520,692 filed November 17, 2003; 60/519,990 filed November 14, 2003; and 60/517,656 filed November 5, 2003, which are incorporated by reference as if fully set forth.

FIELD OF INVENTION

[0002] The present invention is related to a wireless communication system. More particularly, the present invention is related to a method and apparatus for coordinating Node-Bs and supporting enhanced uplink (EU) transmissions during handover.

BACKGROUND

[0003] Many schemes have been proposed to improve coverage, throughput, and transmission latency for EU transmissions in third generation partnership project (3GPP). One of the developments is to move the functions for scheduling and assigning uplink (UL) physical channel resources from a radio network controller (RNC) to a Node-B. A Node-B can make more efficient decisions and manage UL radio resources on a short-term basis better than the RNC, even if the RNC retains overall control over Node-Bs. A similar approach has already been adopted in downlink for high speed data packet access (HSDPA) in both universal mobile telecommunication system (UMTS) frequency division duplex (FDD) and time division duplex (TDD) modes.

[0004] It has also been recognized that performance is greatly enhanced with the use of medium access control (MAC) level automatic repeat request (ARQ) and hybrid ARQ (H-ARQ). Application of these techniques during soft handover provides

additional significant benefits.

[0005] Figure 1 shows a conventional wireless multi-cell communication system 100 including a wireless transmit/receive unit (WTRU) 105, a Node-B 110, an RNC 115, and at least two cells 120A, 120B. Each of the cells 120A, 120B, is served by the Node-B 110. Node-B 110 is controlled by the RNC 115. When a change in the cell offering the best radio conditions is determined between cells 120A and 120B, a handover process is initiated.

[0006] An "intra-Node-B handover" occurs when a WTRU changes from one cell to another cell controlled by the same Node-B, as shown in Figure 1. An "inter-Node-B handover" occurs when a WTRU changes from one cell to another cell controlled by a different Node-B. In the latter case, the Node-B that controls the cell before the handover is called a source Node-B, and the Node-B that controls the cell after the handover is called a target Node-B.

[0007] During soft handover, a WTRU establishes a plurality of connections with a plurality of Node-Bs in an active set. In this situation, a problem may arise for scheduling and H-ARQ operation. A WTRU may receive conflicting EU transmission scheduling from more than one Node-B. It is also difficult for the WTRU to receive, decode and process H-ARQ positive and negative acknowledgements (ACKs/NACKs) generated by a plurality of Node-Bs. The soft buffer of an H-ARQ process in Node-Bs may be corrupted during soft handover.

[0008] One method to support H-ARQ across multiple Node-Bs, when the WTRU is in soft handover, is to place the ACK/NACK generation function in the RNC, which derives a single ACK/NACK based on the results from the multiple Node-Bs. However, this approach presents a significant delay to the ACK/NACK process, which is highly undesirable for performance reasons.

[0009] When a WTRU undergoes an inter-Node-B hard handover, there is a possibility that a source Node-B, which is a Node-B before hard handover is completed, may not successfully receive EU transmissions for data packets that have been NACKed prior to hard handover activation time. Other WTRUs competing for UL resources may not be provided with enough physical resources in the source cell. If

data blocks that have been NACKed prior to the handover are retransmitted to the source Node-B before the handover activation timer expires, those data blocks can be combined with the previous data blocks for H-ARQ decoding. In this way, the decoding takes the advantage of previous, although failed, transmissions of those data blocks in the source cell. If data blocks that have been NACKed prior to the handover are not retransmitted to the source Node-B before the handover activation timer is expired, they have to be transmitted again in the target cell as new data blocks. In this case, the previous transmissions of those data blocks in the source cell are not utilized.

SUMMARY

[0010] An enhanced uplink user equipment is in soft handover. A radio network controller selects a primary Node-B out of a plurality of Node-Bs supporting the soft handover. The radio network controller receiving successfully received enhanced uplink data packets from the plurality of Node-Bs. The radio network controller reordered the successfully received enhanced uplink data packets for in-sequence deliver. The primary Node-B sends specified scheduling information to the user equipment that the other Node-Bs does not transmit. At least the primary Node-B transmits acknowledgements and negative acknowledgements to the user equipment.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] A more detailed understanding of the invention may be had from the following description, given by way of example and to be understood in conjunction with the accompanying drawings wherein:

[0012] Figure 1 shows a conventional wireless communication system;

[0013] Figure 2 shows a system which uses a UL scheduler located in a primary Node-B during soft handover for EU in accordance with the present invention;

[0014] Figure 3 shows a system which uses an ACK/NACK generation function located in a primary Node-B during soft handover for EU in accordance with the present invention;

[0015] Figure 4 is a flowchart of a process including method steps for

coordinating Node-Bs during soft handover in accordance with one embodiment of the present invention; and

[0016] Figure 5 is a flowchart of a process including method steps for prioritizing the transmission of NACKed data in a source Node-B before hard handover is completed in accordance with a separate embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0017] The present invention will be described with reference to the drawing figures wherein like numerals represent like elements throughout.

[0018] Hereafter, the terminology "WTRU" includes but is not limited to a user equipment (UE), a mobile station, a fixed or mobile subscriber unit, a pager, or any other type of device capable of operating in a wireless environment.

[0019] When referred to hereafter, the terminology "Node-B" includes but is not limited to a base station, a site controller, an access point or any other type of interfacing device in a wireless environment.

[0020] The present invention may be implemented in any type of wireless communication systems, such as UMTS - FDD, TDD, time division synchronous code division multiple access (TDSCDMA), code division multiple access 2000 (CDMA2000) (EV-DO and EV-DV) or any other type of wireless communication system.

[0021] The features of the present invention may be incorporated into an IC or be configured in a circuit comprising a multitude of interconnecting components.

[0022] Figure 2 shows a wireless multi-cell communication system 200 which uses a UL scheduler located in a primary Node-B in accordance with the present invention. The wireless multi-cell communication system 200 includes a WTRU 205, a plurality of Node-Bs 210 (i.e., 210A, 210B), an RNC 215 and a plurality of cells 260 (i.e., 260A, 260B, 260C). Cells 260A and 260C are served by the Node-B 210A. Cells 260B are served by the Node-Bs 210B. All of the Node-Bs 210 are controlled by the RNC 215.

[0023] During soft handover, the WTRU 205 establishes multiple connections with the Node-Bs 210 included in an active set. Each transmission from the WTRU

205 is processed independently at each of the Node-Bs 210. One of the Node-Bs 210 in the active set is designated as a primary Node-B 210A, and the other Node-Bs are designated as non-primary Node-Bs 210B.

[0024] As shown in Figure 2, the primary Node-B 210A includes a MAC entity 250A including a UL scheduler 255. Each of the non-primary Node-Bs 210B also includes a MAC entity 250B. Each of the MAC entities 250A, 250B, handles EU transmissions. The UL scheduler 255 in the MAC entity 250A is responsible for scheduling the EU transmissions.

[0025] In accordance with one embodiment of the present invention, the UL scheduler 255 is implemented only at the primary Node-B 210A during soft handover. The WTRU 205 receives a UL transmission schedule only from the primary Node-B 210A in a primary cell 260A. However, the primary Node-B 210A cannot send the scheduling information to the non-primary Node-Bs 210B in every transmission time interval (TTI). In order to allow the primary Node-B 210A to allocate resources for the WTRU 205 to transmit in cells controlled by the non-primary Node-Bs 210B, those resources scheduled by the primary Node-B 250A in a plurality of cells 260B controlled by the non-primary Node-Bs 210B cannot be assigned by the non-primary Node-Bs 210B. Therefore, some physical resources common to all of the cells in the active EU subset should be assigned and reserved by a particular Node-B for the WTRU 205 during the soft handover, so that those resources can be used only by the primary Node-B 210A.

[0026] The UL scheduler 255 located in the primary Node-B 210A considers the interference level caused by the EU transmission at any cell 260A, 260B, 260C, in the EU active subset to be below a predetermined maximum allowed interference level. Thus, the primary Node-B 250A limits the transmit power level of the WTRU 205 such that the interference levels are also within the maximum allowed interference levels at other cells 260B, 260C. To achieve this, the RNC 215 needs to relay necessary information, such as transmission power level and interference level, of the cells 260B controlled by the non-primary Node-Bs 210B to the primary Node-B 210A, which then uses the information to schedule the UL transmissions.

[0027] The EU scheduling information is transmitted to the WTRU 205 only by the primary Node-B 210A through the primary cell 260A. During soft handover, the WTRU 205 receives EU scheduling information only in the primary cell 260A, although the EU scheduling information is valid in all other cells 260B, 260C.

[0028] In one embodiment, the primary Node-B 250A is selected by either the RNC 215 or the WTRU 205. The RNC 215 may choose a Node-B that has the highest percentage of correctly received data blocks during a predefined time window as a primary Node-B.

[0029] In another embodiment, the RNC 215 generates statistics for each Node-B, such as a bit error rate (BER) or a frame error rate (FER), or the like, over a predetermined time period. Then, the RNC 215 may select a Node-B having the best performance to be the primary Node-B 210A. The RNC 215 then notifies the WTRU 205 and all other Node-Bs about the primary Node-B 210A via radio resource control (RRC) and Iub signaling, respectively.

[0030] In another embodiment, the WTRU 102 may choose a Node-B 210 that has the best downlink pilot power, (i.e., best downlink path loss or highest code power), as a primary Node-B 210A. The WTRU 205 measures the power of pilot signals received from all Node-Bs 210 and selects the Node-B 210 having the highest pilot power to be the primary Node-B 210A. The WTRU 205 then notifies all other Node-Bs about the primary Node-B 210A via fast physical layer signaling.

[0031] The WTRU 205 may report the downlink pilot power of all cells 260 to the RNC 215. The RNC 215 then chooses one Node-B 210 to be the primary Node-B 210a based on the combined uplink and downlink quality. The uplink quality of a cell 260 based on the percentage of correctly received data blocks, (or BER, FER, or the like), during a predefined time window, and the downlink quality of a cell 260is based on the WTRU received downlink pilot power. Then, the RNC 215 notifies the WTRU 205 and all of the Node-Bs 210 about the primary Node-B 210A via RRC and Iub signaling, respectively.

[0032] The present invention is advantageous over prior art systems. Using the present invention, a WTRU does not receive conflicting scheduling of EU transmission

from Node-Bs during soft handover. In addition, EU transmission is scheduled in consideration of an interference level and radio resources in cells controlled by non-primary Node-Bs. Signaling delay from the primary Node-B 210A to the WTRU 205 is much lower as compared to signaling delay from the RNC 215 to the WTRU 205.

[0033] In a separate embodiment, Figure 3 shows a wireless multi-cell communication system 300, similar to the system 200 shown in Figure 2. As shown in Figure 3, the primary Node-B 210A includes a MAC entity 250A including an ACK/NACK generator 305. Only the primary Node-B 210A has the ACK/NACK generator 305. The primary Node-B 210A may perform H-ARQ with incremental redundancy, or only ARQ without implementing incremental redundancy.

[0034] Still referring to Figure 3, the primary Node-B 210A receives at least one data packet from the WTRU 205 through the primary cell 260A and performs an error check on the data packet. Any error checking method, such as a cyclic redundancy check (CRC), may be utilized. If the primary Node-B 210A correctly decodes the data packet, such as passing the CRC, the primary Node-B 210A transmits an ACK to the WTRU 205 and also transmits the correctly decoded data packet to the RNC 215. If the primary Node-B 210A fails to correctly decode the data packet, the primary Node-B 210A transmits a NACK to the WTRU 205.

[0035] The non-primary Node-Bs 210B also perform an error check on the data packet. However, the non-primary Node-Bs 210B do not send ACKs or NACKs to the WTRU 205. Instead, the non-primary Node-Bs send successfully decoded data packets to the RNC 215. During soft handover, only the primary Node-B 210A generates H-ARQ (or ARQ), ACKs and NACKs, and controls retransmissions.

[0036] The MAC layer WTRU identities received by the non-primary Node-Bs 210B may be used for routing of successfully received transmissions in a universal terrestrial radio access network (UTRAN). Since the non-primary Node-Bs 210B are not aware of which WTRUs have been scheduled for EU transmission by the primary Node-B 210A, the non-primary Node-Bs 210B may rely on in-band MAC layer signaling of the WTRU ID to route correctly received transmissions to the correct RNC radio link. Even though the primary Node-B 210A may be aware of which WTRU is

scheduled, the same method may be implemented by the primary Node-B 210A.

[0037] Preferably, the primary Node-B 210A may use soft combining to process transmissions, while the non-primary Node-Bs 210B may process each transmission without soft combining. If the primary Node-B sends a NACK to the WTRU 205, the NACKed data packet is stored in a buffer of the primary Node-B 210A, and the NACKed data packet is combined with a retransmitted data packet. In contrast, the non-primary Node-Bs 210B do not store the NACKed data packets. This eliminates the problem of soft buffer corruption between the Node-Bs 210, and the complexities of multiple independent ACKs and/or NACKs.

[0038] When an incremental combining process is implemented, measures should be taken to avoid soft buffer corruption. Sequence information or a new data indicator is required to enable a Node-B 210 to detect that the WTRU 205 is no longer repeating data for a particular WTRU H-ARQ process, but instead is sending new data. This is specifically required because the Node-B 210 has no other way to learn that a new transmission has started. Alternatively, the non-primary Node-Bs 210B may simply perform an ARQ, without using an incremental combining process. This eliminates the soft buffer corruption problem.

[0039] In the case where non-primary Node-Bs 210B perform simple ARQ without incremental combining, the WTRU 205 must transmit self-decodable data packets to ensure that all of the Node-Bs 210 may decode transmissions, regardless of the result of earlier transmissions. Preferably, the H-ARQ functionality is terminated at the Node-Bs 210. Each of the Node-Bs 210 sends to the RNC 215 successfully decoded data packets with explicit identification of transmission, such as a transmission sequence number (TSN). The RNC 215 may optionally use data packets delivered from the non-primary Node-Bs 210B. A MAC entity 310, located in the RNC 215, is used to implement an in-sequence delivery process for delivering data to higher layers over all of the packets received from the Node-Bs 210. After the RNC MAC entity 310 has completed its re-ordering process, it sends the data to a radio link control (RLC) (not shown). Missed packets are identified at the RNC 215 and the WTRU 205 is informed through RLC messaging.

[0040] Alternatively, EU transmissions may identify WTRU ID, H-ARQ process, transmission sequence and/or new data indication (NDI) to allow for soft combining in the non-primary Node-B's 210B. If this method is used to allow soft combining in the non-primary Node-Bs 210B, the primary Node-B 210A may not have to rely on scheduling and H-ARQ ACK/NACK decisions to determine when combining should be performed.

[0041] There are two options for the transmission of ACK/NACK messages. The first option is a synchronous transmission. The ACK/NACK messages are transmitted after a unique time delay with respect to the corresponding uplink transmission or the EU channel allocation message. The second option is an asynchronous transmission. There is no unique delay between the transmission of ACK/NACK messages and the corresponding uplink transmission or the EU channel allocation message. Explicit information in the ACK/NACK message identifies the corresponding uplink transmission to enable the WTRU 205 to make the correct association between the ACK/NACK message and the transmission. This association is made by either identifying the H-ARQ process number and/or a unique sequence number, such as a TSN with each ACK/NACK feedback message to the WTRU 205.

[0042] In a separate embodiment, preferably implemented for the asynchronous ACK/NACK feedback case, the non-primary Node-Bs 210B may provide H-ARQ ACK/NACK results to the primary Node-B 210A in order to avoid unnecessary retransmissions for transmissions that are not correctly received by the primary Node-B 210A, but are correctly received by the non-primary Node-Bs 210B. A non-primary Node-B 210B does not directly send an ACK or NACK message to the WTRU 205. The non-primary Node-Bs 210B sends ACK/NACK or CRC results to the RNC 215. Then, the RNC 215 sends ACK or CRC results to the primary Node-B 210A.

[0043] In order to speed up H-ARQ processing, the first ACK message from any non-primary Node-B 210B received by the RNC is preferably immediately forwarded to the primary Node-B 210A. The primary Node-B 210A also immediately generates an ACK message if the transmission is received correctly in the primary Node-B 210A without waiting for feedback from the non-primary Node-Bs 210B. The primary Node-

B 210A also generates an ACK message immediately upon reception of a forwarded ACK message from the RNC, even if other ACK messages may be forwarded. Since an ACK is generated if any of the paths are successful, an ACK can be generated as soon as the first successful transmission is found.

[0044] Alternatively, in order to simplify the design of the ACK/NACK generator 205, only a subset of the generating nodes may be used. For example, ACKs may be generated only at the RNC, or at the RNC and the primary Node-B 210A.

[0045] When the WTRU 205 sends an uplink transmission, for each H-ARQ process the WTRU 205 waits at least the time required for the primary Node-B 210A to send ACK/NACK feedback. For each H-ARQ process, if an ACK is received by the WTRU 205, the WTRU 205 may send new data in the next available or assigned opportunity.

[0046] A NACK message can only originate in the RNC 215 since it is the only node that has all of the information necessary in the soft handover to determine that there have been no successful receptions at any Node-B 210. The RNC 215 generates a NACK command if the RNC 215 receives no ACK from the Node-Bs 210 within a predetermined time interval. The RNC 215 forwards the NACK message to the WTRU 205 via the primary Node-B 210A.

[0047] It is also possible that this procedure can be implemented without an explicit NACK command. In this case, the lack of ACK reception within a particular period of time is considered the same as an explicit NACK command at either the primary Node-B 210A and/or the WTRU 205.

[0048] Figure 4 is a flowchart of a process 400 including method steps for coordinating Node-Bs during soft handover in accordance with one embodiment of the present invention. In step 405, the RNC 215 makes a decision to initiate an inter-Node-B soft handover. In step 410, the WTRU 205 establishes connections with at least two Node-Bs 210 in an active set. In step 415, one of the Node-Bs 210 in the active set is designated as a primary Node-B 210A and the one or more Node-B(s) 210 remaining in the active set are designated as a non-primary Node-Bs 210B. In step 420, the primary Node-B 210A controls UL transmissions during soft handover by

performing EU scheduling and H-ARQ operations.

[0049] Figure 5 is a flowchart of a process 500 including method steps for prioritizing the transmission of NACKed data in a source Node-B before hard handover is completed in accordance with a separate embodiment of the present invention. In step 505, the RNC 215 makes a decision to initiate a hard handover for a WTRU 205 connected to a source Node-B 210. In step 510, the RNC 215 informs the source Node-B 210 when the WTRU 205 will stop transmission and reception in the source cell 260. In step 515, the RNC 215 sends an activation timer to the source Node-B 210 to set the time for handover.

[0050] Still referring to Figure 5, if the source Node-B 210 determines that there are data packets that were previously NACKed, as many previously NACKed data packets as possible should be retransmitted before the handover activation timer expires. Otherwise, the system may lose the benefit of incrementally combining the previous transmission with the retransmission. Therefore, the source Node-B scheduler 255 takes the handover activation time into account when it schedules the data packets that have been NACKed. If there is not enough radio resource for the source Node-B 210 to schedule transmission of all the NACKed data packets in time, the source Node-B 210 should manage to schedule transmission of as many NACKed data packets as possible.

[0051] Still referring to Figure 5, in order to transmit as many NACKed data packets as possible before the activation timer expires, the source Node-B 210 adjusts the priority of transmissions (step 525) and, in step 530, the source node-B 210 adjusts the MCS of the transmissions (step 530). Higher priority of scheduling is given to the data packets that have been NACKed. If the radio resources are sufficient, a more robust MCS may be used to increase the probability of successful transmissions from the WTRU 205 to the source Node-B 210. In step 535, the handover is completed at the expiration of the activation timer.

[0052] In order for the WTRU 205 to understand that the scheduled uplink transmission is intended for data blocks with previous transmission failures, the source Node-B 210 uplink scheduler 255 may specify that the scheduled UL transmission is

intended for the data blocks that were previously NACKed. This may be implemented by including H-ARQ process identification in the UL scheduling information that is sent from the source Node-B 210 to the WTRU 205. By receiving the scheduling information from the source Node-B 210, the WTRU 205 knows that the scheduled transmission is for specific data associated with HARQ process identification sent together with the scheduling information.

[0053] While this invention has been particularly shown and described with reference to preferred embodiments, it will be understood by those skilled in the art that various changes in forms and details may be made therein without departing from the scope of the invention as described above.

* * *

CLAIMS

What is claimed is:

1. A wireless universal mobile telecommunication system (UMTS) frequency division duplex (FDD) communication system, the communication system comprising:

a radio network controller (RNC) configured to initiate soft handover of enhanced uplink communications by a user equipment (UE), the RNC configured to select a single primary Node-B out of a plurality of Node-Bs receiving enhanced uplink data packets from the UE during soft handover, the RNC comprising a medium access control (MAC) entity configured to receive successfully received enhanced uplink data packets from the plurality of soft handover Node-Bs, each successfully received enhanced uplink data packet having a transmission sequence number, the MAC entity configured to reorder the successfully received enhanced uplink packets based on the transmission sequence number for in-sequence deliver to a radio link control (RLC) entity;

the primary Node-B configured to transmit to the UE specified scheduling information, the specified scheduling information is not transmitted to the UE by any non-primary Node-Bs of the plurality of Node-B's, the primary Node-B configured to receive the enhanced uplink packets from the UE and transmit an acknowledgement or a negative acknowledgment to the UE in response to the received enhanced uplink data packet, the primary Node-B configured to deliver successfully received enhanced uplink data packets to the RNC;

the non-primary Node-Bs configured to receive the enhanced uplink packets and to deliver successfully received enhanced uplink packets to the RNC; and

the UE configured to transmit enhanced uplink data packets to the plurality of Node-Bs, the UE configured to receive acknowledgments and negative acknowledgements from at least the non-primary Node-B, the UE configured in response to receiving a negative acknowledgement to retransmit an enhanced uplink data packet associated with the negative acknowledgment, the retransmission of the negative acknowledgment is given a higher priority for transmission than other non-negative acknowledgment enhanced uplink data packets for transmission.

2. The system of claim 1 wherein the plurality of Node-Bs are configured to soft combine an initial transmission of an enhanced uplink data packet with a retransmission of the enhanced uplink data packet.

3. The system of claim 1 wherein the UE is configured to change an MCS of an enhanced uplink data packet retransmission.

4. The system of claim 2 wherein the UE is configured to change an MCS of an enhanced uplink data packet retransmission.

5. A method for universal mobile telecommunication system (UMTS) frequency division duplex (FDD) enhanced uplink communication during soft handover, the method comprising:

initiating soft handover of enhanced uplink communications by a radio network controller (RNC) for a user equipment (UE);

selecting by the RNC a single primary Node-B out of a plurality of Node-Bs receiving enhanced uplink data packets from the UE during soft handover;

receiving successfully received enhanced uplink data packets by a medium access control (MAC) entity of the RNC from the plurality of soft handover Node-Bs, each successfully received enhanced uplink data packet having a transmission sequence number;

reordering the received successfully received enhanced uplink data packets by the MAC entity based on the transmission sequence number for in-sequence deliver to a radio link control (RLC) entity;

transmitting to the UE specified scheduling information by the primary Node-B, the specified scheduling information is not transmitted to the UE by any non-primary Node-Bs of the plurality of Node-B's;

receiving the enhanced uplink packets by the primary Node-B from the UE;

transmitting by the primary Node-B an acknowledgement or a negative acknowledgment to the UE in response to the received enhanced uplink data packet, the primary Node-B configured to deliver successfully received enhanced uplink data packets to the RNC;

receiving by the non-primary Node-Bs the enhanced uplink packets;

delivering by the non-primary Node-Bs successfully received enhanced uplink packets to the RNC;

transmitting enhanced uplink data packets by the UE to the plurality of Node-Bs;

receiving acknowledgments and negative acknowledgements by the UE from at least the non-primary Node-B;

in response to receiving a negative acknowledgement, the UE retransmitting an enhanced uplink data packet associated with the negative acknowledgment, the retransmission of the negative acknowledgment is given a higher priority for transmission than other non-negative acknowledgment enhanced uplink data packets for transmission.

6. The method of claim 5 comprising the plurality of Node-Bs soft combining an initial transmission of an enhanced uplink data packet with a retransmission of the enhanced uplink data packet.

7. The method of claim 5 comprising the UE changing an MCS of an enhanced uplink data packet retransmission.

8. The method of claim 6 comprising the UE changing an MCS of an enhanced uplink data packet retransmission.

ABSTRACT

An enhanced uplink user equipment is in soft handover. A radio network controller selects a primary Node-B out of a plurality of Node-Bs supporting the soft handover. The radio network controller receiving successfully received enhanced uplink data packets from the plurality of Node-Bs. The radio network controller reordered the successfully received enhanced uplink data packets for in-sequence deliver. The primary Node-B sends specified scheduling information to the user equipment that the other Node-Bs does not transmit. At least the primary Node-B transmits acknowledgements and negative acknowledgements to the user equipment.

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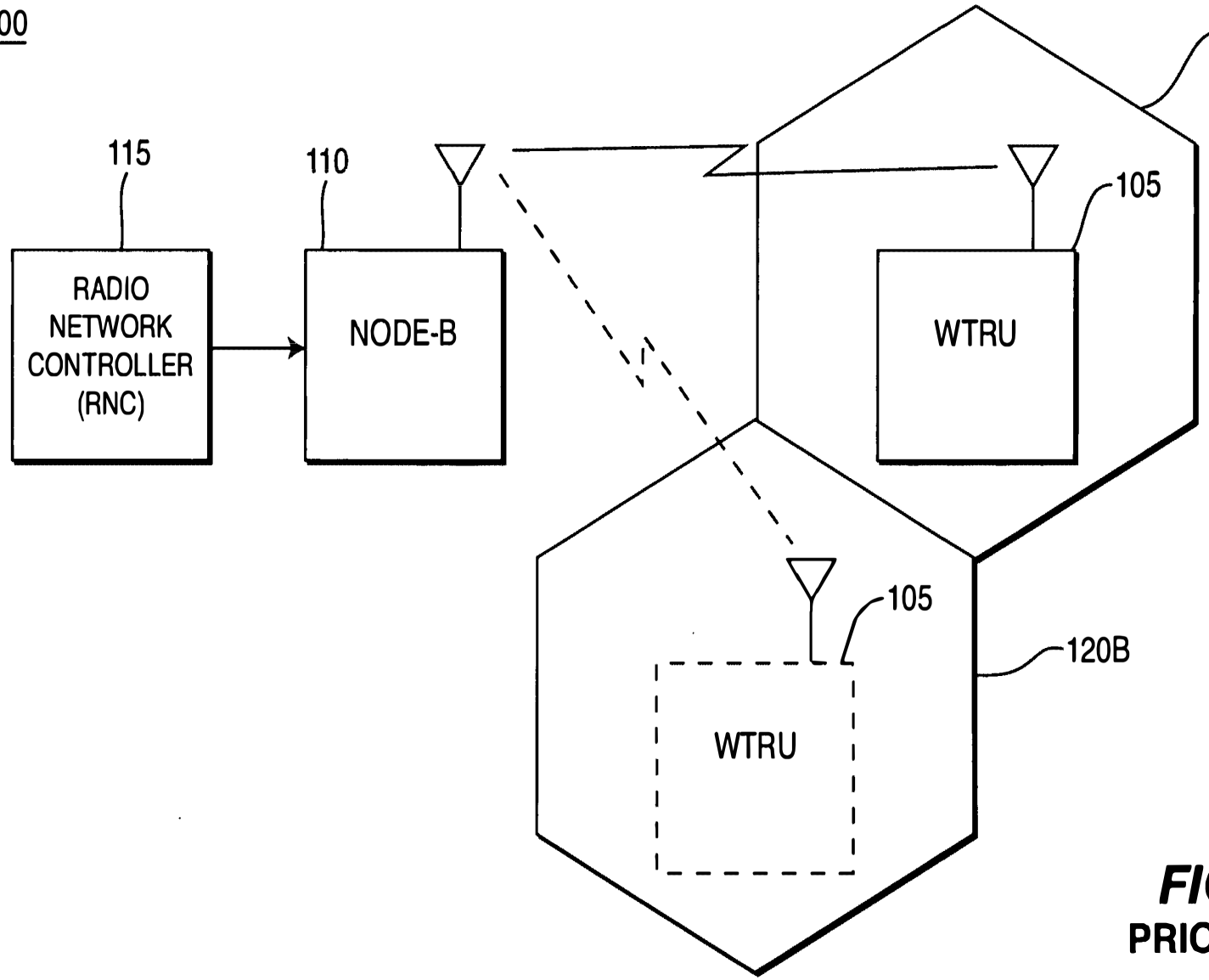


FIG. 1
PRIOR ART

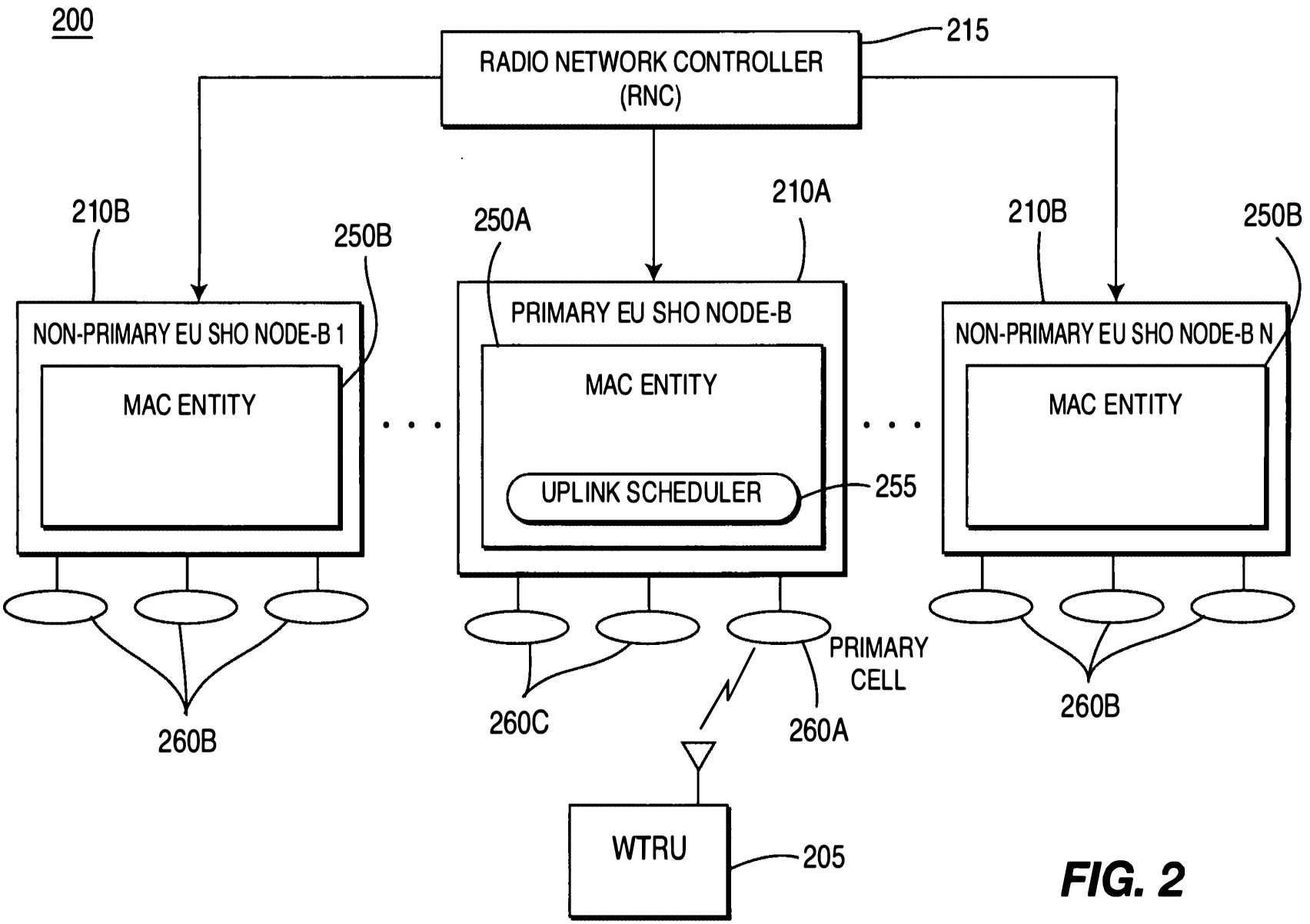


FIG. 2

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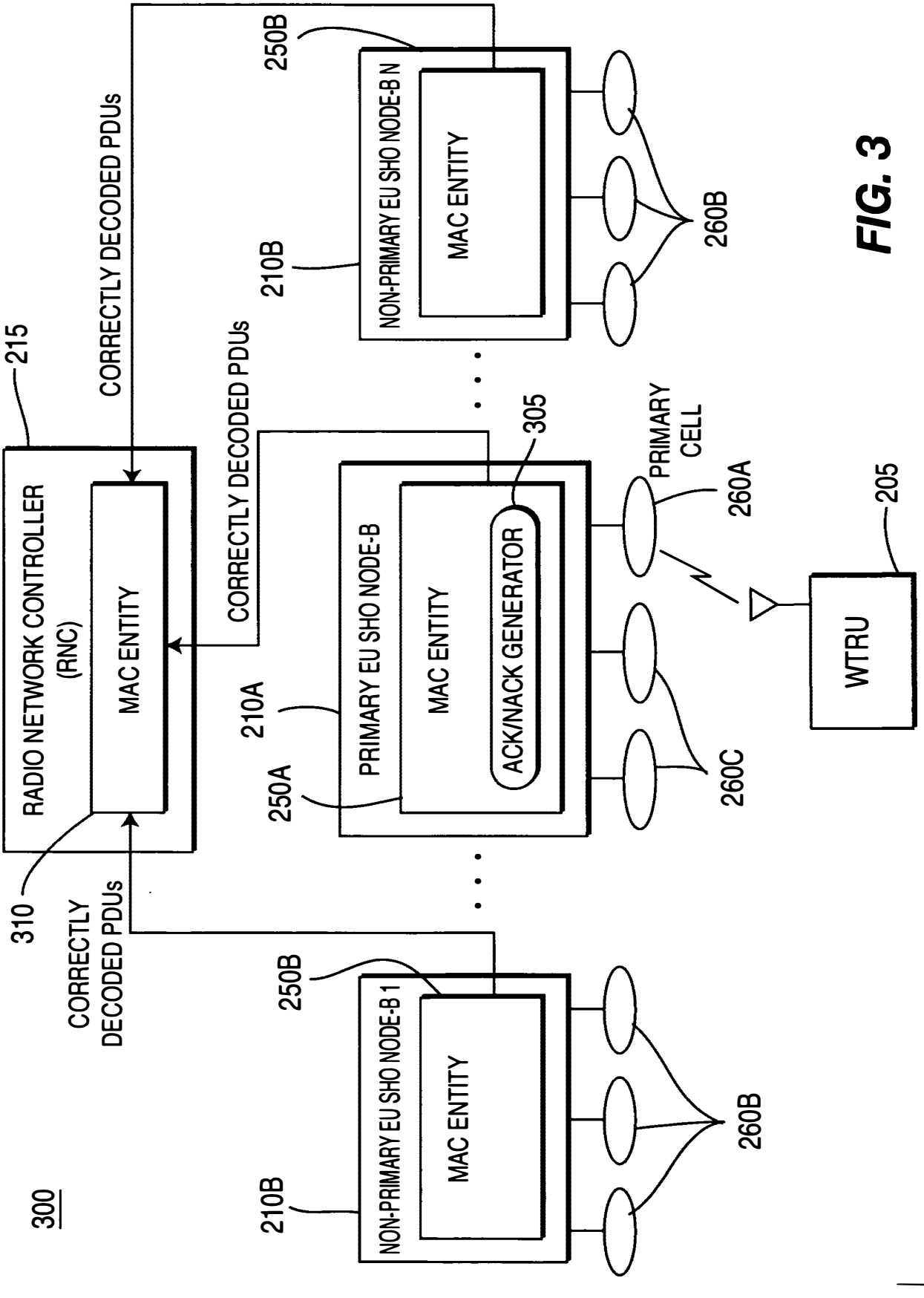

300
RADIO NETWORK CONTROLLER (RNC)
MAC ENTITY
215
310
CORRECTLY DECODED PDUs
CORRECTLY DECODED PDUs
CORRECTLY DECODED PDUs
PRIMARY EU SHO NODE-B
MAC ENTITY
ACK/NACK GENERATOR
305
210A
250A
NON-PRIMARY EU SHO NODE-B 1
MAC ENTITY
210B
250B
NON-PRIMARY EU SHO NODE-B N
MAC ENTITY
210B
250B
PRIMARY CELL
260A
260C
260B
260B
WTRU
205

FIG. 3

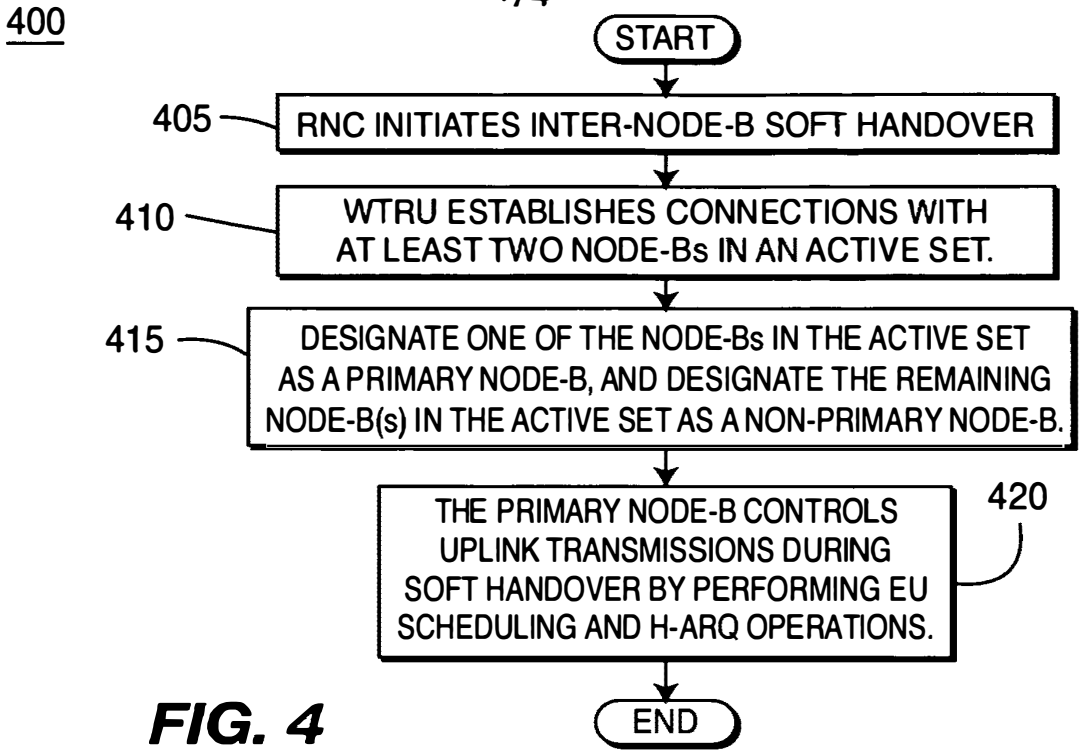

400
START
405
RNC INITIATES INTER-NODE-B SOFT HANDOVER
410
WTRU ESTABLISHES CONNECTIONS WITH AT LEAST TWO NODE-Bs IN AN ACTIVE SET.
415
DESIGNATE ONE OF THE NODE-Bs IN THE ACTIVE SET AS A PRIMARY NODE-B, AND DESIGNATE THE REMAINING NODE-B(s) IN THE ACTIVE SET AS A NON-PRIMARY NODE-B.
420
THE PRIMARY NODE-B CONTROLS UPLINK TRANSMISSIONS DURING SOFT HANDOVER BY PERFORMING EU SCHEDULING AND H-ARQ OPERATIONS.
END

FIG. 4

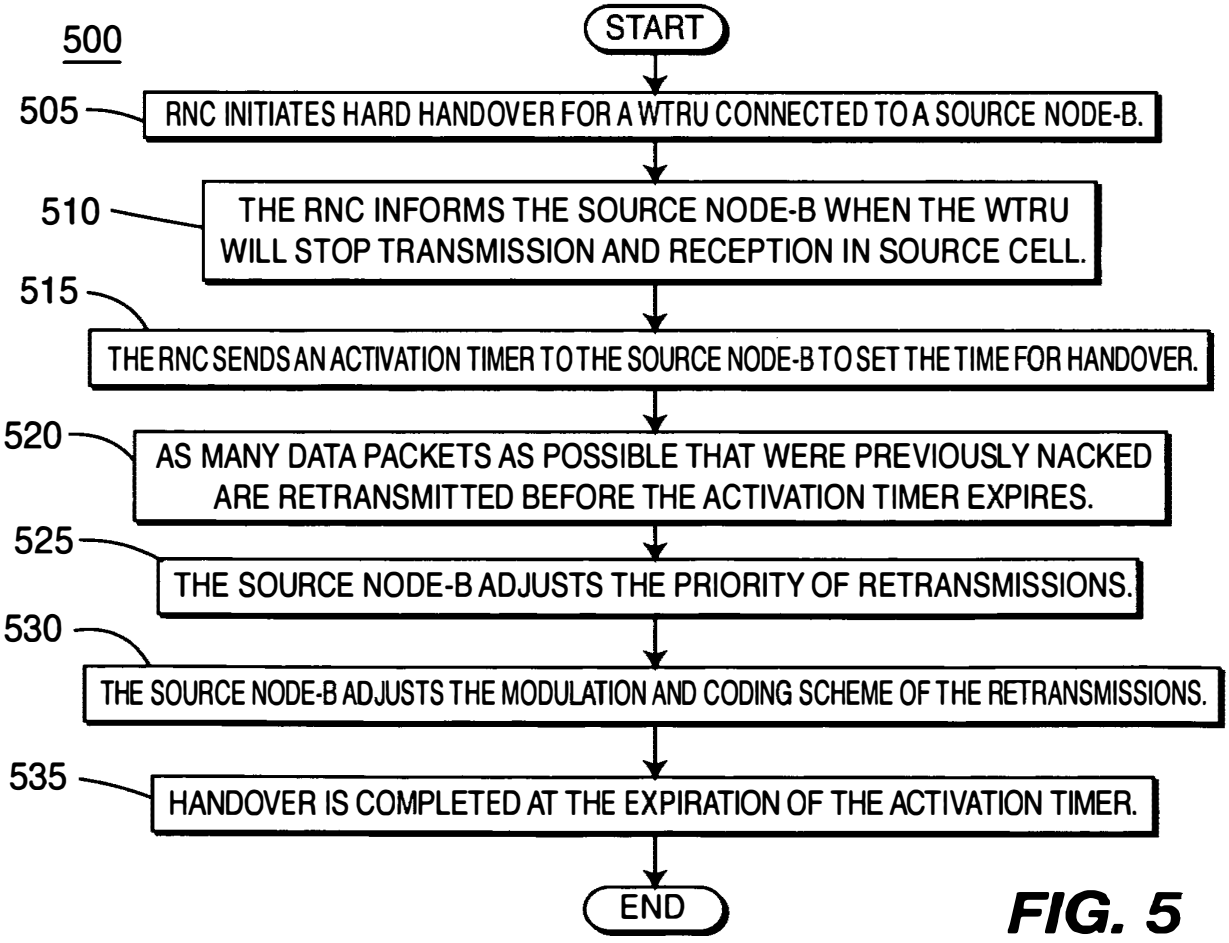

500
START
505
RNC INITIATES HARD HANDOVER FOR A WTRU CONNECTED TO A SOURCE NODE-B.
510
THE RNC INFORMS THE SOURCE NODE-B WHEN THE WTRU WILL STOP TRANSMISSION AND RECEPTION IN SOURCE CELL.
515
THE RNC SENDS AN ACTIVATION TIMER TO THE SOURCE NODE-B TO SET THE TIME FOR HANDOVER.
520
AS MANY DATA PACKETS AS POSSIBLE THAT WERE PREVIOUSLY NACKED ARE RETRANSMITTED BEFORE THE ACTIVATION TIMER EXPIRES.
525
THE SOURCE NODE-B ADJUSTS THE PRIORITY OF RETRANSMISSIONS.
530
THE SOURCE NODE-B ADJUSTS THE MODULATION AND CODING SCHEME OF THE RETRANSMISSIONS.
535
HANDOVER IS COMPLETED AT THE EXPIRATION OF THE ACTIVATION TIMER.
END

FIG. 5

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DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)

☒ Declaration Submitted with Initial Filing OR ☐ Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)

Attorney Docket Number	I-2-0674.1US
First Named Inventor	Zhang et al.
COMPLETE IF KNOWN	
Application Number	Not Yet Known
Filing Date	Not Yet Known
Group Art Unit	Not Yet Known
Examiner Name	Not Yet Known

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

WIRELESS COMMUNICATION METHOD AND APPARATUS FOR COORDINATING NODE-B'S AND SUPPORTING ENHANCED UPLINK TRANSMISSIONS DURING HANDOVER

(Title of the Invention)

the specification of which
☒ is attached hereto
OR
☐ was filed on (MM/DD/YYYY) [ ] as United States Application Number or PCT International Application Number [ ] and was amended on (MM/DD/YYYY) [ ] (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT International application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached? YES	NO
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto:

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)
60/517,656	11/5/2003
60/519,990	11/14/2003
60/520,692	11/17/2003
60/578,674	06/10/2004

☐ Additional provisional application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

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DECLARATION — Utility or Design Patent Application

I hereby claim the benefit under 35 U.S.C. 120 of any United States application(s), or 365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT international application in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

U.S. Parent Application or PCT Parent Number	Parent Filing Date (MM/DD/YYYY)	Parent Patent Number (if applicable)

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As a named inventor, I hereby appoint the following registered practitioner(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith: ☒ Customer Number 24374 → Place Customer Number Bar Code Label here

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☐ Registered practitioner(s) name/registration number listed below

Name	Registration Number	Name	Registration Number
Namely, the Attorneys of Volpe and Koenig, P.C.			

☐ Additional registered practitioner(s) named on supplemental Registered Practitioner Information sheet PTO/SB/02C attached hereto.

Direct all correspondence to: ☒ Customer Number or Bar Code Label 24374 OR ☐ Correspondence address below

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Address					
Address					
City		State		ZIP	
Country		Telephone		Fax	

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Name of Sole or First Inventor: ☐ A petition has been filed for this unsigned inventor

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Post Office Address							
City	Farmingdale	State	NY	ZIP	11735	Country	USA

☐ Additional inventors are being named on the ___ supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto

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DECLARATION

ADDITIONAL INVENTOR(S)
Supplemental Sheet
Page 3 of 4

Name of Additional Joint Inventor, if any:	☐ A petition has been filed for this unsigned inventor		
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Mailing Address			
City Northvale	State NJ	ZIP 07647	Country USA

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Inventor's Signature [signature]			Date 9/27/05
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Mailing Address			
City Northport	State NY	ZIP 11768	Country USA

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Inventor's Signature [signature]			Date 10-11-04
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Mailing Address			
City Verona	State NJ	ZIP 07044	Country USA

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DECLARATION

ADDITIONAL INVENTOR(S)
Supplemental Sheet
Page 4 of 4

Name of Additional Joint Inventor, if any:	☐ A petition has been filed for this unsigned inventor		
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Name of Additional Joint Inventor, if any:	☐ A petition has been filed for this unsigned inventor		
Given Name (first and middle [if any])	Family Name or Surname		
Inventor's Signature			Date
Residence: City	State	Country	Citizenship
Mailing Address			
Mailing Address			
City	State	ZIP	Country

Name of Additional Joint Inventor, if any:	☐ A petition has been filed for this unsigned inventor		
Given Name (first and middle [if any])	Family Name or Surname		
Inventor's Signature			Date
Residence: City	State	Country	Citizenship
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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875 Effective December 8, 2004

Application or Docket Number: 11/134,430

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	150.00		N/A	300.00
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A	$250		N/A	$500
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	$100		N/A	$200
TOTAL CLAIMS (37 CFR 1.16(i))	8 minus 20 =	*	X$ 25 =		OR	X$50 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2 minus 3 =	*	X100 =			X200 =	
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))			+180=			+360=	
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	100

APPLICATION AS AMENDED – PART II

		(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDI-TIONAL FEE ($)		RATE ($)	ADDI-TIONAL FEE ($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	X$ 25 =		OR	X$50 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X100 =		OR	X200 =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					+180=		OR	+360=	
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDI-TIONAL FEE ($)		RATE ($)	ADDI-TIONAL FEE ($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	X$ 25 =		OR	X$50 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X100 =		OR	X200 =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					+180=		OR	+360=	
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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05/18/2006 MBELETE1 00000092 090435 11434330

01 FC:1011 300.00 DA
02 FC:1111 500.00 DA
03 FC:1311 200.00 DA

PTO-1556
(5/87)

*U.S. Government Printing Office: 2002 — 489-267/69033

Express Mail Label No. EV680508966US

APPLICATION DATA SHEET
UNDER 37 CFR §1.76

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Name Line One::	Jeffrey M. Glabicki
Name Line Two::	Volpe and Koenig, P.C., DEPT ICC
Telephone No.::	215-568-6400

(4) Application Information

Title Line One::	SUPPORTING ENHANCED UPLINK
Title Line Two::	TRANSMISSION DURING SOFT HANDOVER
Total Drawing Sheets::	Four (4)
Drawing Type::	Formal
Application Type::	Utility
Docket No.::	I-2-0674.2US

(5) Representative Information

Representative Customer No.:: 24374

(6) Domestic Priority Information

This application is a::	Continuation
>Application One::	10/962,720
Filing Date::	October 12, 2004
This application is a::	Non Prov. of Provisional
>Application Two::	60/578,674
Filing Date::	June 10, 2004
This application is a::	Non Prov. of Provisional
>Application Three::	60/520,692
Filing Date::	November 17, 2003
This application is a::	Non Prov. of Provisional
>Application Four::	60/519,990
Filing Date::	November 14, 2003
This application is a::	Non Prov. of Provisional
>Application Five ::	60/517,656
Filing Date::	November 5, 2003

Express Mail Label No. EV680508966US

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the **PATENT APPLICATION** of:	
Zhang et al.	
Application No.: Not Yet Known	
Filed: Not Yet Known	
For: SUPPORTING ENHANCED UPLINK TRANSMISSION DURING HANDOVER	
Group: Not Yet Known	
Examiner: Not Yet Known	

Our File: I-2-0674.2US

Date: May 15, 2006

INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Further to Applicants' Duty of Disclosure pursuant to 37 C.F.R. §1.56, Applicants wish to bring to the Examiner's attention the material cited on the enclosed PTO-1449 form.

This application is a continuation of Application No. 10/962,720 filed on October 12, 2004, which claims the benefit of U.S. Provisional Application Serial Nos. 60/578,674 filed June 10, 2004; 60/520,692 filed November 17, 2003; 60/519,990 filed November 14, 2003; and 60/517,656 filed November 5, 2003, which are incorporated by reference as if fully set forth.

Pursuant to 37 C.F.R. §1.98(d) copies of documents cited in the parent application are not enclosed, but copies will be provided upon request. These documents are identified on the PTO-1449 form by an asterisk (*).

It is respectfully requested that the Examiner consider these documents and return an initialed copy of the PTO-1449 form indicating his consideration of the cited materials.

Respectfully submitted,

Zhang et al.

By _____
Jeffrey M. Glabicki
Registration No. 42,584
(215) 568-6400

Volpe and Koenig, P.C.
United Plaza, Suite 1600
30 South 17th Street
Philadelphia, PA 19103

JMG/pf
Enclosure

FORM PTO-1449 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use several sheets if necessary)	ATTY. DOCKET NO. I-2-0674.2US	SERIAL NO. Not Yet Known
	APPLICANT Zhang et al.	
	FILING DATE Not Yet Known	GROUP Not Yet Known

U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	*	6,892,071	05/2005	Park et al.			
	*	2003/0081692	05/2003	Kwan et al.			
	*	2003/0161284	08/2003	Chen			
	*	2003/0210668	11/2003	Malladi et al.			
	*	2004/0072567	04/2004	Cao et al.			
	*	2004/0085934	05/2004	Balachandran et la.			
	*	2004/0202129	10/2004	Kolding et al.			
	*	2004/0203991	10/2004	Chen et al.			
	*	2004/0219917	11/2004	Love et al.			
	*	2004/0219919	11/2004	Whinnett et al.			
	*	2004/0219920	11/2004	Love et al.			
	*	2004/0228313	11/2004	Cheng et al.			
	*	2005/0041694	02/2005	Liu			
	*	2005/0047354	03/2005	Zeira et al.			
	*	2005/0048920	03/2005	Liu			
	*	2005/0083888	04/2005	Smee et al.			

EXAMINER	DATE CONSIDERED

EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

FORM PTO-1449 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use several sheets if necessary)	ATTY. DOCKET NO. I-2-0647.2US	SERIAL NO. Not Yet Known
	APPLICANT Zhang et al.	
	FILING DATE Not Yet Known	GROUP Not Yet Known

		OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)
	*	GPP2 C.S0002-C, "Physical Layer Standard for cdma2000 Spread Spectrum Systems", 3rd Generation Partnership Project 2 "3GPP2", Version 2.0, Revision C, July 23, 2004.
	*	3GPP2 C.20003-C, "Medium Access Control (MAC) Standard for cdma2000 Spread Spectrum Systems", 3rd Generation Partnership Project 2 "3GPP2", Version 2.0, Release C, August 2004.
	*	3GPP2 C.S0004-C, "Signaling Link Access Control (LAC) Standard for cdma2000 Spread Spectrum Systems", 3rd Generation Partnership Project 2 "3GPP2", Version 2.0, Revision C, July 23, 2004.
	*	3GPP2 C.S0005-C, "Upper Layer (Layer 3) Signaling Standard for cdma2000 Spread Spectrum Systems", 3rd Generation Partnership Project 2 "3GPP2", Version 2.0, Revision c, July 23, 2004.

EXAMINER	DATE CONSIDERED

EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

17581 U.S. PTO 051506

PTO/SB/05 (09-04)
Approved for use through 07/31/2006.
U.S. Patent and Trademark Office. U.S. DEPARTMENT OF COMMERCE

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11/211 U.S. PTO 11734330 051506

UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	I-2-0674.2US
First Inventor	Zhang et al.
Title	SUPPORTING ENHANCED UPLINK TRANSMISSION DURING SOFT HANDOVER
Express Mail Label No.	EV680508966US

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. [X] **Fee Transmittal Form** (e.g., PTO/SB/17) *(Submit an original and a duplicate for fee processing)*
2. [ ] **Applicant claims small entity status.** See 37 CFR 1.27.
3. [X] **Specification** [*Total Pages* 16] Both the claims and abstract must start on a new page *(For information on the preferred arrangement, see MPEP 608.01(a))*
4. [X] **Drawing(s)** (*35 U.S.C. 113*) [*Total Sheets* 4]
5. **Oath or Declaration** [*Total Sheets* 3]
   a. [ ] Newly executed (original or copy)
   b. [X] A copy from a prior application (37 CFR 1.63(d)) *(for continuation/divisional with Box 18 completed)*
      i. [ ] DELETION OF INVENTOR(S) Signed statement attached deleting inventor(s) name in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
6. [X] **Application Data Sheet.** See 37 CFR 1.76
7. [ ] **CD-ROM or CD-R** in duplicate, large table or Computer Program *(Appendix)* [ ] Landscape Table on CD
8. **Nucleotide and/or Amino Acid Sequence Submission** *(if applicable, items a. – c. are required)*
   a. [ ] Computer Readable Form (CRF)
   b. Specification Sequence Listing on:
      i. [ ] CD-ROM or CD-R (2 copies); or
      ii. [ ] Paper
   c. [ ] Statements verifying identity of above copies

ADDRESS TO: **Commissioner for Patents, P.O. Box 1450, Alexandria VA 22313-1450**

ACCOMPANYING APPLICATION PARTS

9. [ ] **Assignment Papers** (cover sheet & document(s)) Name of Assignee
10. [ ] **37 CFR 3.73(b) Statement** *(when there is an assignee)* [ ] **Power of Attorney**
11. [ ] **English Translation Document** *(if applicable)*
12. [X] **Information Disclosure Statement** (PTO/SB/08 or PTO-1449) [ ] Copies of citations attached
13. [ ] **Preliminary Amendment**
14. [X] **Return Receipt Postcard** (MPEP 503) *(Should be specifically itemized)*
15. [ ] **Certified Copy of Priority Document(s)** *(if foreign priority is claimed)*
16. [ ] **Nonpublication Request** under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent.
17. [ ] Other:

18. If a CONTINUING APPLICATION, *check appropriate box, and supply the requisite information below and in the first sentence of the specification following the title, or in an Application Data Sheet under 37 CFR 1.76:*

[X] Continuation [ ] Divisional [ ] Continuation-in-part (CIP) of prior application No.: 10/962,720

Prior application information: *Examiner* Brian S. Roberts *Art Unit:* 2662

19. CORRESPONDENCE ADDRESS

[X] The address associated with Customer Number: 24374 *OR* [ ] Correspondence address below

Name	VOLPE AND KOENIG, P.C., DEPT ICC				
Address					
City		State		Zip Code	
Country		Telephone		Fax	

Signature		Date	May 15, 2006
Name (Print/Type)	Jeffrey M. Glabicki	Registration No. (Attorney/Agent)	42,584

This collection of information is required by 37 CFR 1.53(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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17581 U.S. PTO 051506

Express Mail No. EV680508966US

PTO/SB/17 (01-06)
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Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).

FEE TRANSMITTAL
For FY 2006

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT	($)	1,000.00

Complete if Known	
Application Number	Not Yet Known
Filing Date	Not Yet Known
First Named Inventor	Zhang et al.
Examiner Name	Not Yet Known
Art Unit	Not Yet Known
Attorney Docket No.	I-2-0674.2US

METHOD OF PAYMENT (check all that apply)

☐ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): _____

☒ Deposit Account Deposit Account Number: 09-0435 Deposit Account Name: InterDigital Communications Corporation

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☒ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, **except for the filing fee**

☒ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17 ☒ Credit any overpayments

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

FEE CALCULATION (All the fees below are due upon filing or may be subject to a surcharge.)

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

	FILING FEES		SEARCH FEES		EXAMINATION FEES		
Application Type	Fee ($)	Small Entity Fee ($)	Fee ($)	Small Entity Fee ($)	Fee ($)	Small Entity Fee ($)	Fees Paid ($)
Utility	300	150	500	250	200	100	1,000.00
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description	Fee ($)	Small Entity Fee ($)
Each claim over 20 (including Reissues)	50	25
Each independent claim over 3 (including Reissues)	200	100
Multiple dependent claims	360	180

Total Claims		Extra Claims	Fee ($)	Fee Paid ($)
8	- 20 =	0	x 50.00	= 0.00

HP = highest number of total claims paid for, if greater than 20.

Indep. Claims		Extra Claims	Fee ($)	Fee Paid ($)
2	- 3 =	0	x 200.00	= 0.00

HP = highest number of independent claims paid for, if greater than 3.

Multiple Dependent Claims	
Fee ($)	Fee Paid ($)

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets		Extra Sheets		Number of each additional 50 or fraction thereof		Fee ($)		Fee Paid ($)
	- 100 =		/ 50 =		(round up to a whole number) x		=	

4. OTHER FEE(S)

	Fees Paid ($)
Non-English Specification, $130 fee (no small entity discount)	
Other (e.g., late filing surcharge):	

SUBMITTED BY

Signature		Registration No. (Attorney/Agent) 42,584	Telephone 215-568-6400
Name (Print/Type)	Jeffrey M. Glabicki		Date May 15, 2006

This collection of information is required by 37 CFR 1.136. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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OIPE IAP23
JAN 25 2007
PATENT & TRADEMARK OFFICE

FW

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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission

Application Number	11/434,330
Filing Date	May 15, 2006
First Named Inventor	Zhang et al.
Art Unit	2616
Examiner Name	Not Yet Known
Attorney Docket Number	I-2-0674.2US

ENCLOSURES *(Check all that apply)*

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☐ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☒ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
  - ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) _____
  - ☐ Landscape Table on CD
- ☐ After Allowance Communication to TC
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☐ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
- ☐ Status Letter
- ☒ Other Enclosure(s) (please Identify below):

Form PTO-1449, Copy of Foreign Search Report, and Four References Enclosed.

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	VOLPE AND KOENIG, P.C.		
Signature			
Printed name	Jeffrey M. Glabicki		
Date	January 23, 2007	Reg. No.	42,584

CERTIFICATE OF TRANSMISSION/MAILING

I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below:

Signature			
Typed or printed name	Jeffrey M. Glabicki	Date	January 23, 2007

This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and1.14. This collection is estimated to 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the **PATENT APPLICATION** of:	
	Zhang et al.
Application No.:	11/434,330
Confirmation No.: 5166	
Filed:	May 15, 2006
For: SUPPORTING ENHANCED UPLINK TRANSMISSION DURING SOFT HANDOVER	
Group:	2616
Examiner:	Not Yet Known

Our File: I-2-0674.2US

Date: January 23, 2007

INFORMATION DISCLOSURE STATEMENT

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Further to Applicants' Duty of Disclosure pursuant to 37 C.F.R. §1.56, Applicants wish to bring to the Examiner's attention the material cited on the enclosed PTO-1449 form. Newly cited documents are indicated by a n asterisk (*). Copies of the cited documents are enclosed, and pursuant to 37 C.F.R. §1.98(a)(2)(ii), copies of the cited U.S. publications and/or patent documents have not been included.

It is respectfully requested that the Examiner consider these documents and return an initialed copy of the PTO-1449 form indicating his consideration of the cited materials.

Respectfully submitted,

Zhang et al.

By _____
Jeffrey M. Glabicki
Registration No. 42,584
(215) 568-6400

Volpe and Koenig, P.C.
United Plaza, Suite 1600
30 South 17th Street
Philadelphia, PA 19103

JMG/akg
Enclosures (6)

FORM PTO-1449 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use several sheets if necessary)	ATTY. DOCKET NO. I-2-0674.2US	SERIAL NO. 11/434,330
	APPLICANT Zhang et al.	
	FILING DATE May 15, 2006	GROUP 2616

JAN 25 2007 PATENT & TRADEMARK OFFICE

U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
		6,892,071	05/2005	Park et al.			
	*	2002/095635	07/2002	Wagner et al.			
		2003/0081692	05/2003	Kwan et al.			
		2003/0161284	08/2003	Chen			
		2003/0210668	11/2003	Malladi et al.			
		2004/0072567	04/2004	Cao et al.			
		2004/0085934	05/2004	Balachandran et la.			
		2004/0202129	10/2004	Kolding et al.			
		2004/0203991	10/2004	Chen et al.			
		2004/0219917	11/2004	Love et al.			
		2004/0219919	11/2004	Whinnett et al.			
		2004/0219920	11/2004	Love et al.			
		2004/0228313	11/2004	Cheng et al.			
		2005/0041694	02/2005	Liu			
		2005/0047354	03/2005	Zeira et al.			
		2005/0048920	03/2005	Liu			
		2005/0083888	04/2005	Smee et al.			

FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES	TRANSLATION NO
	*	2353439	02/2001	GB				
	*	02/001893	03/2002	WO				
	*	03/053087	06/2003	WO				
	*	03/067953	08/2003	WO				

EXAMINER	DATE CONSIDERED

EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

FORM PTO-1449 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use several sheets if necessary)	ATTY. DOCKET NO. I-2-0674.2US	SERIAL NO. 11/434,330
	APPLICANT Zhang et al.	
	FILING DATE May 15, 2006	GROUP 2616

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)		
		GPP2 C.S0002-C, "Physical Layer Standard for cdma2000 Spread Spectrum Systems", 3rd Generation Partnership Project 2 "3GPP2", Version 2.0, Revision C, July 23, 2004.
		3GPP2 C.20003-C, "Medium Access Control (MAC) Standard for cdma2000 Spread Spectrum Systems", 3rd Generation Partnership Project 2 "3GPP2", Version 2.0, Release C, August 2004.
		3GPP2 C.S0004-C, "Signaling Link Access Control (LAC) Standard for cdma2000 Spread Spectrum Systems", 3rd Generation Partnership Project 2 "3GPP2", Version 2.0, Revision C, July 23, 2004.
		3GPP2 C.S0005-C, "Upper Layer (Layer 3) Signaling Standard for cdma2000 Spread Spectrum Systems", 3rd Generation Partnership Project 2 "3GPP2", Version 2.0, Revision c, July 23, 2004.

EXAMINER	DATE CONSIDERED

EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

(12) UK Patent Application (19) GB (11) 2 353 439 (13) A

(43) Date of A Publication 21.02.2001

(21) Application No 9919731.1

(22) Date of Filing 20.08.1999

(51) INT CL[7]
H04B 7/06 7/005

(52) UK CL (Edition S)
H4L LDDSX LDTP L213

(56) Documents Cited
EP 1039658 A

(58) Field of Search
UK CL (Edition R) H4L LDDSX LDH LFNX
INT CL[7] H04B 7/005 7/02 7/04 7/06
On-line: WPI, EPODOC, JAPIO

(71) Applicant(s)
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(72) Inventor(s)
Kiran Anandrao Thakare

(74) Agent and/or Address for Service
TELECOM MODUS Limited
Cleeve Road, LEATHERHEAD, Surrey, KT22 7SA,
United Kingdom

(54) Abstract Title
Power or interference control for mobile communications

(57) In a Mobile telecommunications system operating a power or interference control strategy of the type Site Selection Diversity transmission (SSDT), means are given to code cell site identities with several degrees of protection against error corruption combined with means to set-up different levels of reception quality thresholds for the decoding of the cell site identities. The system includes signalling means to identify situations where radio links originate from cells with different capabilities in order to activate or deactivate the power or interference control.

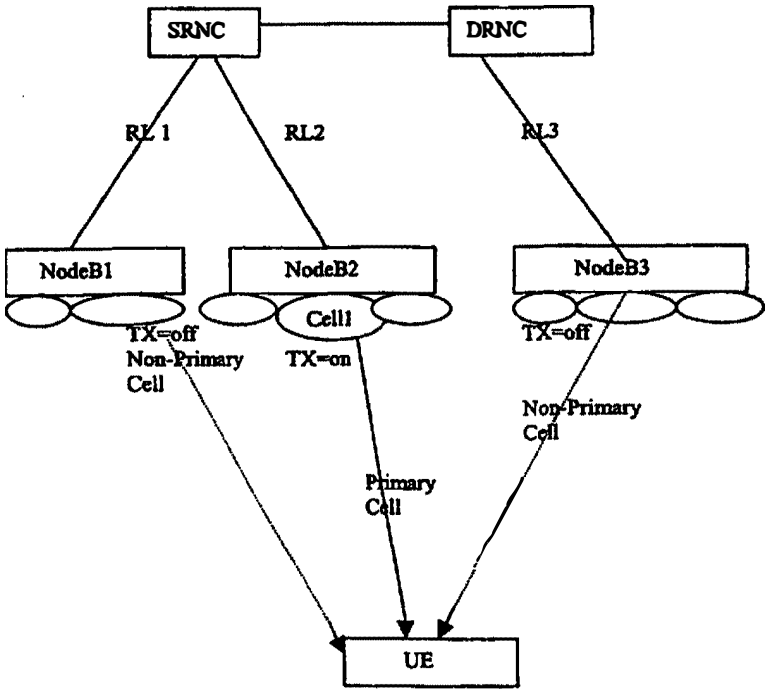


FIG. 1

GB 2 353 439 A

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.
The claims were filed later than the filing date but within the period prescribed by Rule 25(1) of the Patents Rules 1995.
This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 1995

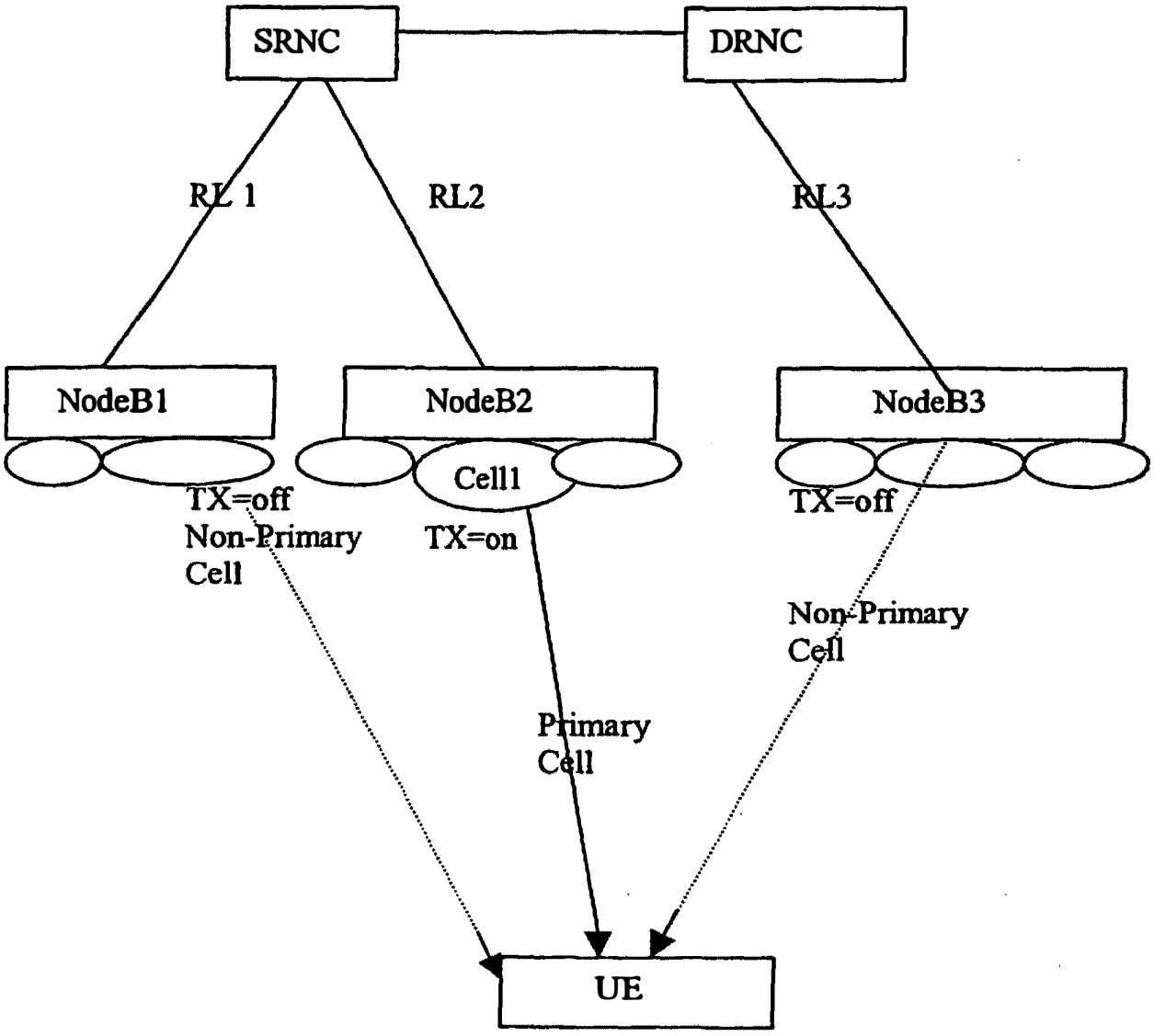

SRNC
DRNC
RL 1
RL2
RL3
NodeB1
NodeB2
NodeB3
Cell1
TX=off
Non-Primary
Cell
TX=on
TX=off
Non-Primary
Cell
Primary
Cell
UE

FIG. 1

POWER CONTROL FOR MOBILE COMMUNICATIONS

The present invention relates to mobile telecommunications systems comprising power control means for diversity transmission and is particularly, but not exclusively, concerned with third generation UMTS systems and diversity transmission communications.

One particular method for power and interference control in communication systems using diversity transmission is SSDT (Site Selection Diversity Transmission). This method switches on and off the power radiated in one or several of the radio-links of a macro-diversity communication, thus reducing interference in the down link by eliminating the contributions of some branches but still keeping the up-links and all other elements of the communication.

To achieve that, the User Equipment (UE) must select the best radio links and transmit the coded information of the sites or cells that should be kept to all the sites or cells that comprise the set of active radio links. This information can be corrupted due to transmission errors and lead to erroneous decisions.

A first aspect of this invention is to provide a method, which assures that the correct set of radio links, is active in every situation.

Telecommunication networks can be composed of equipment provided by different vendors and developed according to different standards or different standard releases. This can make that some of the base stations or nodes located in the different cell sites involved in a macro-diversity transmission are not able to support site selection diversity transmission.

A second aspect of this invention addresses this problem.

According to a first aspect, the invention provides a method of operating a mobile telecommunications system supporting Site Selection Diversity Transmission (SSDT). The method comprising means for coding cell site identities with several degrees of protection against error corruption combined with means to set-up different levels of reception quality thresholds for the decoding of the cell site identities.

Preferably, the method comprises means for controlling the timing and right synchronisation for the activation and deactivation of Site Selection Diversity Transmission.

Preferably, the method further comprises, means to combine SSDT with other power control, interference control or diversity control methods like Transmit Antenna Array TxAA.

According to a second aspect, the invention provides a method of operating a power or interference control system like SSDT in a mobile telecommunications system, characterised in that means are provided to identify situations where radio links originate from cells with different capabilities. The method further comprising means to actuate this power or interference control system accordingly.

The invention extends to User Equipment and network components embodying the methods and preferred features above. The invention further extends to signals for use in the above methods.

In this specification, terms of the art as defined in the UMTS specification are used for ease of understanding. However, these terms are not intended to be limited to any specific system but are intended to encompass any functional equivalents in other systems specially those contemplating macro-diversity or soft handover capabilities, for example based on second generation IS-95 systems or the like.

An embodiment of the invention will now be described, by way of example, with reference to the accompanying drawings in which:

Figure 1 illustrates a macro-diversity situation.

The following description of an embodiment relates to application to a UMTS telecommunications system; as will be explained below, the invention is not so limited.

According to the embodiment, a mechanism is provided to control the operation of SSDT in a UMTS system.

Further information on SSDT can be found in [1], section 5.2.3.4.

SSDT is a power control scheme for the UE in soft hand-over mode whereby the UE selects one of its cells cites from its active set to be 'primary' in the DL, and all others are classed as 'non-primary'.

Operation is summarised as follows. The UE selects one of the cells from its active set to be 'primary,' all other cells are classed as 'non primary'. The main objective is to transmit on the DL from the best cell, thus reducing the interference caused by multiple transmissions in a soft handover mode. A second objective is to achieve fast site selection without network intervention, thus maintaining the advantage of the soft handover. In order to select a primary cell, each cell is assigned a temporary identification (Coded ID: In SRNC, cell ID is mapped to ID label and is mapped to RL ID) and UE periodically informs a primary cell identification to the connecting cells. The non-primary cells selected by UE switch off the transmission power. The primary cell identity code is delivered via UL DPCCH FBI field.

In a situation with three different lengths of coded ID (temp cell ID) available denoted as "long", "medium" and "short". The SRNC decides which length of coded ID is used and notifies it to Node-B and UE. Two FBI settings FBI with one bit and FBI with two bits are supported for UL DPCCH.

When the SRNC makes a decision to enable the SSDT it has to tell node-B which UL DPCCH structure to use. The use of FBI field in UL DPCCH may vary as the other diversity methods such as TxAA may be used in parallel with the SSDT.

Upon receipt of the primary cell ID by all the involved cells, the cells checks its minimum SSDT quality threshold (Min-Qth) value against the received UL quality. If it is above the minimum threshold value and the received Primary ID does not match its own Id (RL) then the non-primary cell switches the transmission power off. Otherwise if the received power is below the Qth then the cells continues to transmit normally. The Decoded temp

Id is only validated / acted upon by the Node-B when the link quality is above the minimum SSDT threshold quality value. This minimum threshold value is used so reliable detection of a frame can be achieved.

The following features are required for the operation of SSDT:

Requirement1: The SSDT function is initiated/terminated by the SRNC.

Requirement2: SSDT once set in one state (ON or OFF) will remain in that state for a considerable period of time and will only be changed as the result of some signaling procedure (for ex. NBAP, RNSAP).

Requirement3: NBAP, RNSAP delays are less than 134ms. A typical user plane delay value is of 134ms. If NBAP and RNSAP delay is more than this then it may cause problems with many signaling procedures.

Requirement4: SSDT identifier is set by SRNC to 'on' in Node B for each radio link. This will be set only when UE has more than or equal to 2 RLs, as a power control mechanism.

Requirement5: SSDT should be on at Node B upon the SSDT activation at UE and SSDT should be off at UE upon the SSDT termination at Node B.

Requirement6: ID label is mapped to RL ID, when RL ID's are created.

Requirement7: LSB field of FBI bits is used for sending temp ID [5].

Requirement8: Temp ID must be terminated within a frame [1].

The Node-B Should act according to the following criteria:

If SSDT mode is activated and the received quality is higher than the quality threshold and the received ID is different than its own ID, then the node B will react switching off the power for the down link.

SSDT activation time:

A proper timing is required in order to change Cell state from SSDT off to SSDT on (or on to off) at exactly the same point in time (i.e. same radio frame number). This will avoid the problem of some Node-B's encountering the unexpected UL DPCCH bits rather than that they used to handle in the previous frame. For example, if Tx-AA was operated before SSDT and UE send the Primary ID and the SSDT is off at node B then the Node-B may decode FBI bits as Tx-AA weight. In another case, Node-B may handle the FBI bits as pilot bit.

Radio Cell Capabilities:

Node-B SSDT capabilities like any other capabilities would be known by RNC through O&M function, and during soft handover, if the radio cell (Node-B) added can not support SSDT, then SRNC would make a decision to switch SSDT off in the previous node-B's (cells) and in UE.

As an example, lets consider the case where a UE has two RL across Node B1 and Node B2, and lets suppose that Node B1 supports SSDT and Node B2 does not support SSDT. In addition, SRNC does not have the prior knowledge whether Node B2 cell supports SSDT or not. In this case SRNC will send a RL configuration message with SSDT on to both Node-Bs. Node B2 would then respond with a RL Reconfiguration Failure message. As a consequence, this SRNC has to set SSDT to off by re-sending a RL Reconfiguration message to Node B1 and an RRC message to the UE.

In a case where SRNC has a prior knowledge of the Node-Bs capabilities, then SRNC will not set SSDT on in this scenario because it has the knowledge that one of its Node-B does not support SSDT.

The SSDT support capability of Node-B can be indicated in the NBAP O&M Message Node-B capability Exchange Message or Node-B Resource Notification message.

Quality Threshold:

The network operators should choose quality threshold values. These values (stated as an example) may be chosen from one of following 8 different Qth settings, (0, -5, -10, -15, -20, -30, -40, -Infinity)[dB]. This values would be chosen with respect to the code word length, such as:

When the ID code word is "long" then the Qth would be set "low" allowing a low quality reception level.

When the ID code word is "medium" then the Qth would be set "medium" allowing a medium quality reception level.

When the ID code word is "Short" then the Qth would be set "High" to fight against a low quality reception level.

Errors in decoding a short ID code word are more likely to occur, than when decoding a long code word. So when using a "long" code word the quality threshold can be set to a low value.

List of parameters to be exchanged across the Iub/Iur interfaces:

SSDT indicator.
Activation time (for e.g. CFN).
ID code length (long, medium, short).
UL DPCCH Structure Indicator: 1bit FBI or 2 bit FBI in FBI field of UL DPCCH.
TxAA mode indicator on/off.

Parameters related with O&M:

Qth: Range of Quality values as discussed above.

ID code and associated Quality level		
"Long ID code"	**"Medium ID code"**	**"Short ID code"**
Small Quality Level	Medium Quality Level	Large Quality Level

TABLES IN NODE-B

The following is an example of ID Code tables stored in Node-B:

Table 1 Settings of ID codes for 1 bit FBI

ID label	ID code "long"	"medium"	"short"
a	000000000000000	0000000(0)	00000
b	111111111111111	1111111(1)	11111
c	000000001111111	0000111(1)	00011
d	111111110000000	1111000(0)	11100
e	000011111111000	0011110(0)	00110
f	111100000000111	1100001(1)	11001

Table 2 Settings of ID codes for 2 bit FBI

ID label	ID code (Column and Row denote slot position and FBI-bit position.) "long"	"medium"	"short"
a	0000000(0) 0000000(0)	000(0) 000(0)	000 000
b	1111111(1) 1111111(1)	111(1) 111(1)	111 111
c	0000000(0) 1111111(1)	000(0) 111(1)	000 111
d	1111111(1) 0000000(0)	111(1) 000(0)	111 000
e	0000111(1) 1111000(0)	001(1) 110(0)	001 100
f	1111000(0) 0000111(1)	110(0) 001(1)	110 011

NBAP / RNSAP USE for SSDT Indication:

The following messages related with SSDT are included in the NBAP, RNSAP protocols:

The required information elements for these messages, namely, RL Reconfiguration Prepare, RL Reconfiguration Commit, and RL Reconfiguration Failure are shown in the following tables:

RL Reconfiguration Prepare		
SSDT Information		O
SSDT Indication	On/off	M
UL DPCCH Structure Indicator	1bit FBI / 2bit FBI	M
ID code length	Short / Long / Medium	M
TxAA Indication	On/off	M

RL Reconfiguration commit		
SSDT Information		O
Activation Time	CFN	M

RL Reconfiguration Failure		
RL ID		M
Cause (SSDT not supported)		M

Using the NBAP protocol to convey messages related to SSDT has its advantages and disadvantages the following is a summary of them:

Merits:

Assured Delivery.

Software impact only.

Easy to keep track of node-b hardware status.

If TxAA and SSDT are combined the use of NBAP simplifies the implementation.

Demerits:

3 NBAP/RNSAP messages for each SSDT setting.

Increase in processing load & hence delay.

A second solution would be to use the DCH control frame protocol to convey messages relating to SSDT:

The following is the simplest DCH Control Frame Protocol for SSDT indication triggered by SRNC:

SSDT INDICATION	
RL ID	I/D
SSDT INDICATION	On/off
ID Code length	Long/medium/short
Activation time	CFN
UL DPCCH Structure Indicator	1bit FBI / 2bit FBI
TxAA indication [FFS]	On/off

Merits:

DCH Control frames are very simple.

Lower layer and faster to process.

DCH C-FP for SSDT does not need to with every DCH data frame.

Demerits:

No assured delivery of DCH C-FP.

Hardware as well as software Impact.

Both "NBAP/RNSAP" or "DCH control frame" protocols could be used for this purpose depending on implementation priorities.

It will be appreciated that the invention can therefore be implemented in virtually all current and telecommunications systems where diversity transmission or soft handover is implemented.

To assist in appreciating how the invention may be extended, a glossary of some term definitions used in the art pertaining to UMTS systems is provided; any of the terms of art may be replaced by functionally equivalent components in a non-UMTS system.

The following documents are incorporated herein by reference:

[1] 3GPP RAN TS 25.214, Physical layer Procedures

[2] 3GPP RAN TS 25.427, UTRAN Iub/Iur Interface User Plane Protocol for DCH Data Streams

[3] 3GPP RAN TS 25.433, NBAP SPECIFICATIONS

[4] 3GPP RAN TS 25.423, RNSAP SPECIFICATIONS

[5] 3GPP RAN TS 25.211, Physical Channel and Mapping of Transport channel onto Physical channel.

Terms and definitions:

Node B: A logical node responsible for radio transmission / reception in one or more cells to /from the UE. It also terminates the Iub interface towards the RNC.

Diversity transmission: Situation where the UE has more than one RL at a time. RLs generated by a single source, but conveyed via several parallel physical channels.

Soft Handover: Situation similar to diversity transmission where one RNC adds RLs to a UE, which already has RL(s).

Abbreviations:

RL	Radio Link
DL	Down Link
UL	Up Link
DPCCH	Dedicated Physical Control Channel
SSDT	Site Selection Diversity Transmission
NBAP	Node B Application Part
RNSAP	Radio Network Subsystem Application Part
SRNC	Serving Radio Network Controller
RNC	Radio Network Controller
UE	User Equipment
FBI	Feed Back Information
TxAA	Transmit Antenna Array
SHO	Soft Handover
Qth	Quality Threshold
O&M	Operation & Maintenance
CFN	Cell Frame Number
IE	Information Element

O	Optional
M	Mandatory
DCH	Dedicated Channel
DCH C FP	DCH Control Frame Protocol
TPC	Transmit Power Control
CW	Code Word
UMTS	Universal Mobile Telecommunications System
LSB	Less Significant Bit
RRC	Radio Resource Control
Iub	Interface between RNC and Node B
Iur	Interface between two RNCs

All features described herein can be independently provided unless otherwise stated.

Claims:

1. Method for operating a power or interference control system like SSDT in a mobile telecommunications system, characterised in that means are provided to identify situations where radio links originate from cells with different capabilities.

2. Method according to claim 1 further comprising means to actuate this power or interference control system according to those capabilities.

3. Method according to claims 1 or 2 where the power or interference capabilities are activated and deactivated by a Serving Radio Network Controller (SRNC).

4. Method according to claim 3 where the node owning the cell (Node B) informs these capabilities to the SRNC by means of a signalling message.

5. Method according to claim 3 where the SRNC knows these capabilities through Operation and Maintenance (O&M) functionality.

6. Method of operating a mobile telecommunications system supporting Site Selection Diversity Transmission (SSDT) comprising means for coding cell site identities with several degrees of protection against error corruption combined with means to set-up different levels of reception quality thresholds for the decoding of the cell site identities.

7. Method according to claim 6 where a Serving Radio Network Controller (SRNC) signals to the nodes owning the cells (Node Bs) and to the mobile units (UEs) the coding length of the cell site identities to be used.

8. Method according to claim 7 where a long coding length corresponds to a low reception quality threshold, a medium coding length corresponds to a medium reception quality threshold and where a short coding length corresponds to a high reception quality threshold.

9. Method according to claims 6 to 8 comprising means for controlling the timing and right

synchronisation for the activation and deactivation of Site Selection Diversity Transmission.

10. Method according to claim 9 where the frame number is used for synchronisation purposes.

11. Method according to claims 6 to 8 comprising means to combine SSDT with other power control, interference control or diversity control methods like Transmit Antenna Array (TxAA).

12. Method according to claim 11 where the SRNC signals to the Node B the uplink channel structure to use in order to accommodate the different power/interference/diversity control methods.

13. A Radio Network Controller operating according to a method described in any of claims 1 to 12.

14. A Cell, Node B or Base Station Transceiver operating according to a method described in any of claims 1 to 12.

15. Mobile Station or User Equipment implementing or capable to operate in a telecommunications system implementing any of the methods described in claims 1 to 12 or including equipment as described in claims 13 and 14.

16. Mobile telecommunications system operating a power or interference control strategy of the type Site Selection Diversity transmission (SSDT) in which means are given to code cell site identities with several degrees of protection against error corruption combined with means to set-up different levels of reception quality thresholds for the decoding of the cell site identities, the system further including signalling means to identify situations where radio links originate from cells with different capabilities in order to activate or deactivate the power or interference control.

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Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

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Other: On-line: WPI, EPODOC, JAPIO

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X, E	EP1039658 A (Texas Inst) see description of Figs 5-6	1 at least

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

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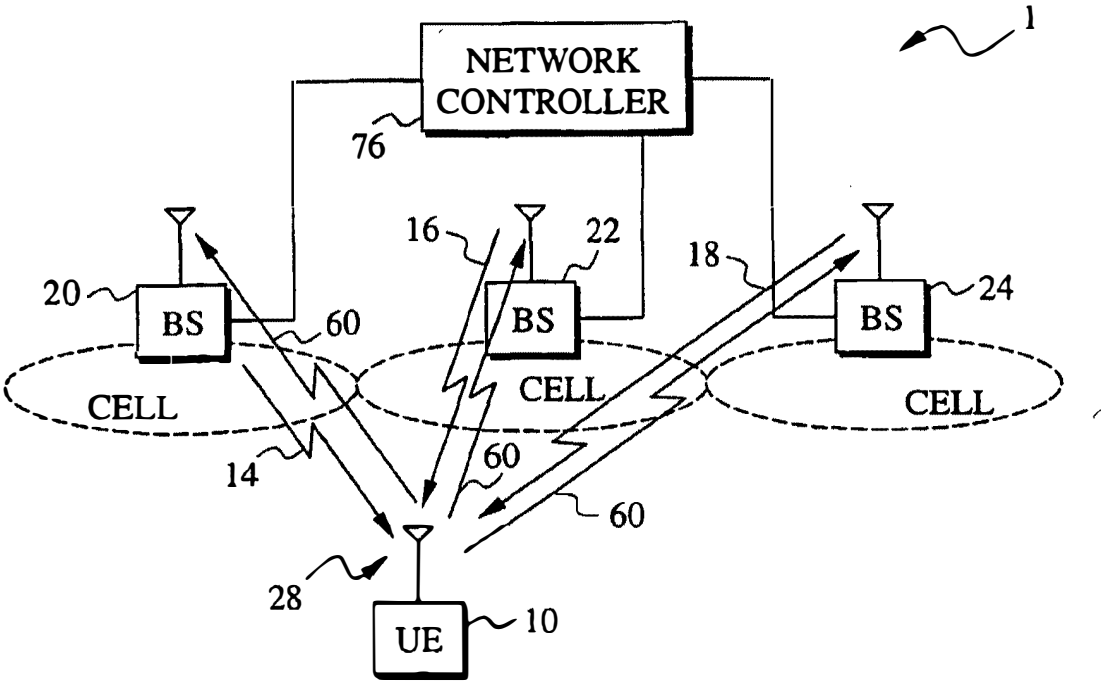
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(54) Title: DOWNLINK SHARED CHANNEL (DSCH) POWER CONTROL IN SOFT HANDOVER



(57) Abstract: The indication given by SSDT in soft handover as to whether a cell is primary or not is used by base stations whether or not the base stations actually use it to configure DSCH transmission power with the principle that if the cell is primary, DSCH power is set based on DCH and, if not then a fixed power level or an offset with respect to DCH is used.

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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.

Downlink Shared Channel (DSCH) Power Control in Soft Handover

BACKGROUND OF THE INVENTION

1. Technical Field

The present invention relates to wireless networks and, more particularly, to power control of a downlink shared channel in the context of downlink transmit diversity.

2. Discussion of Related Art

Universal Mobile Telecommunications System (UMTS) is to be the third generation mobile system, which is to offer higher data rates and a wide range of telecommunications services, including support for multimedia. UMTS will provide high-quality services with efficient use of network resources. UMTS is to be based on the Global System for Mobile communications (GSM) with some major modifications, e.g., a new radio interface. The UMTS network is to support both circuit-switched and packet-switched services. The circuit-switched technology will be based on the current GSM circuit-switched technology and the packet-switched technology on the General Packet Radio Service (GPRS), which is a new packet service for GSM.

The architecture of UMTS is thus to be based on GSM/GPRS. However, the access network part of UMTS will be new and revolutionary compared to GSM. The UMTS Terrestrial Radio Access (UTRA) Network (UTRAN) will be the new radio interface, which will be able to operate in two different modes: Wideband Code Division Multiple Access (WCDMA) and Time Division/Code Division Multiple Access (TD/CDMA). On the core network side, UMTS will consist of enhanced GSM-based circuit-switched and GPRS-based packet-switched core networks. UTRAN will have the ability to support multiple simultaneous connections for one user, i.e., simultaneous packet- and circuit-switched connections, and every connection can have individual properties, e.g., QoS (quality-of-service) parameters. Contrary to GPRS, UTRAN can also guarantee throughput for a packet-switched connection. This property is vital for some multi-media applications. Despite the wider bandwidth available in the UMTS system

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compared to GSM, the radio part of the system will remain the most susceptible to bottlenecks. As always, the design objective is an efficient use of limited resources without compromising versatility.

The UMTS packet network architecture will be highly similar to GPRS. However, the naming of some elements and interfaces has been changed from GPRS. Figure 1 shows the GPRS network architecture, and Figure 2 shows the UMTS packet network architecture. The UMTS packet network consists of the following network elements:

- 3G-SGSN: it will be the third generation version of the serving GPRS support node (SGSN).
- 3G-GGSN: it will be the third generation version of the gateway GPRS support node (GGSN).
- HLR: it will be the GSM home location register (HLR) with some updates.
- Node B: it will correspond to base transceiver station (BTS) in GSM.
- RNC (Radio Network Controller): it will correspond to base station controller (BSC) in GSM.

The core network (CN) part of the packet-switched side will consist of 3G-SGSN, 3G-GGSN and HLR elements. The packet core network will include also the backbone network for connecting core network elements 3G-SGSN and 3G-GGSN together.

Node B and RNC will comprise the radio access network (RAN) part of the UMTS network. RAN will correspond to GSM's BSS (Base Station Subsystem). The responsibility of RAN is the handling of all radio-specific functions, e.g., radio channel ciphering, power control, radio bearer connection setup and release. The basic separation between elements will be that Node B will handle the physical layer functions, and RNC will handle the management functions. However, the separation might be slightly different than in GSM.

As can be seen by comparing Figs. 1 and 2, the biggest architectural difference will be the new interface (Iur) inside RAN. It will reside between RNCs. In this connection, UMTS introduces a new concept called macrodiversity.

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In a macrodiversity situation, data will be sent via multiple Node Bs. Because signals will transferred via multiple routes over the air interface and combined in the MS and RNC, e.g., the fading effect will be less harmful, and thus lower power levels can be used. However, those Node Bs may belong to the area of two or more different RNCs, so the interface, i.e., Iur-interface between RNCs is required. In this situation, as shown in Fig. 3, the RNC can be in two logical roles. the RNC can be logically either a "drift" RNC (DRNC) or a "serving" (SRNC).

The actual termination point of the Iu-interface will be SRNC, as shown for both logical possibilities in Fig. 3. The Iu-interface will connect the radio access network (RAN) and core network (CN), whether it be packet- or circuit-switched. SRNC will control information transfer and request radio resources from appropriate DRNCs. The DRNC will only relay information between the MS and SRNC, which is depicted in Fig. 3.

Cell level mobility issues will be handled within UTRAN. When there exists a dedicated connection to the user equipment, the UTRAN will handle the radio interface mobility of the UE. This includes procedures such as soft handover.

For the new macrodiversity concept for 3G, it will be possible to set up multiple radio links simultaneously between a user equipment, for instance, a mobile station, in a wireless telecommunications system, in order to be in a position to decide which of the wireless links from a plurality of base stations is preferred at any given point in time during a communications session and to switch seamlessly between the radio links during the session depending on which link is preferred. In other words, a switch to a base station with a stronger signal can be made without having to set up a new connection. This means that the user equipment should be in a position to measure the magnitude of at least one parameter of the plural radio links simultaneously established between the user equipment and more than one of the plurality of base stations in order to periodically decide which one of the more than one of the plural radio links is currently preferred for use in the communications session between the user equipment and an end terminal connected to the system.

Thus, a soft handover is a category of handover procedures where the radio links are added and abandoned in such a manner that the user equipment (UE)

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always keeps at least one radio link to the UTRAN. For instance, as shown in Fig. 4, several Node B base stations (BS1, BS2, BS3) are illustrated in several corresponding cells. A user equipment in the form of a mobile station (MS) is shown moving from one cell to another. As the distance from base station 1 (BS1) increases, as illustrated in Fig. 5, the received signal strength from base station 1 at the mobile station decreases, while the received signal strength from base station 2 (BS2) increases. This is particularly noteworthy in a region of base station diversity shown as a distance window, with the signal strengths from base station 1 and base station 2 crossing over inside the window. Within a threshold region of signal strength, a soft handover can be effected, whereby the mobile station always keeps at least one radio link to the UTRAN effective. A This is distinguished from a hard handover, which would be a handover between different frequencies or between WCDMA and GSM (or a switch from FDD (Frequency Division Duplex) to TDD (Time Division Duplex) within UMTS).

It will be important for WCDMA power control to ensure that each user equipment receives and transmits just enough energy to properly convey information while interfering with other users no more than necessary. As shown in Fig. 6, several mobile stations (MS1, MS2, MS3, MS4) are shown communicating with a base station within a cell via corresponding radio links. Fig. 7 shows received power at the base station (BS) without power control, and Fig. 8 shows received power at the base station with optimal power control. In the downlink direction, a single mobile station sees the power levels of the whole transmission from the base station, and the power levels should in the ideal case vary as a function of the path loss in the downlink, and thus the power levels for optimal power control are different at the different observation points. It is proposed in UMTS to provide a group of functions to control the level of transmitted power, in order to minimize interference and keep the quality of the connections. The proposed functions consist of up and downlink outer loop power control, up and downlink inner loop power control, and up and downlink open loop power control for both ordinary and compressed transmit power.

The *open loop power control* for both the uplink (UL) and downlink (DL) sets the initial power of the user equipment (UE), i.e., at random access. The

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function uses UE measurements and broadcasts the cell/system parameters as input. The function is located both in the UTRAN and the UE. The downlink open loop power control receives downlink measurement reports from the UE.

The uplink and downlink *inner loop power control* set the power of the uplink and downlink dedicated physical channels. For the uplink inner loop power control in FDD, it is a closed loop process located in Node B for FDD. It receives the quality target from the uplink outer loop power control (discussed below), and quality estimates of the uplink dedicated physical control channel. The power control commands are sent on the downlink dedicated physical control channel (DPCCH) to the UE. This function is located in both the UTRAN and the UE.

The uplink *outer loop power control* is located in the SRNC and sets the target quality value for the UL inner loop power control (which is located in Node B for FDD). It receives input from quality estimates of the transport channel. The UL outer loop channel is used mainly for a long-term quality control of the radio channel. The target quality value is sent to the UE by the SRNC. In FDD, if the connection involves both an SRNS and a DRNS, the function of UL outer loop power control (located in the SRNC) sets the target quality for the UL inner loop power control function (located in Node B).

Similarly, the downlink inner loop power control sets the power of the downlink dedicated physical channels. It receives the quality target from the DL outer loop power control and quality estimates of the downlink dedicated physical control channel. The power control commands are sent on the uplink dedicated physical control channel to the UTRAN. This function is located in both the UTRAN and the UE. For instance, Fig. 9 shows an uplink inner loop power control for two mobile stations (MS1, MS2) in communication with a base station (BS) on corresponding uplinks (P1, P2). If the SIR (Signal-to-Interference Ratio) detected is greater than the SIR set by the UL outer loop power control, then appropriate "down" TPC (transmit power control) commands are sent on the downlink. On the other hand, if the detected SIR is less than the target, the TPC commands command an up increment of power from the mobile station. Typically, the up or down command would be 1 dB within an approximately 70 dB range (21

dBm to -50 dBm) for the uplink and within an approximately 20 dB range for the downlink.

The power control of the downlink shared channel (DSCH), which is a transport channel shared by several UEs and associated with a dedicated channel, can also be controlled in this way (see 3G TS 25.214 v.3.1.1 (1999-12) at Sec. 5.2.2). But the UMTS specifications do not specify exactly how the DSCH power control is normally to be done. Basically, two alternatives exist. Either the DSCH is made to follow the DCH power variations, or the DSCH power level is fixed. For instance, for common channels the approach of the prior art would be to just use a fixed power level or to control the power level slowly via the RNC to follow the dedicated channel power level (although such an approach is not believed to have yet been specified in the interface specifications). As mentioned above, in the downlink direction, a single mobile station sees the power levels of the whole transmission from the base station, and the power levels should, in the ideal case, vary as a function of the path loss in the downlink, and thus the power levels for optimal power control are different, depending upon the location of the mobile station. If the power level for DSCH is fixed, then the power for all users is the same in the downlink and should be sufficient to reach a mobile station at the cell edge, although some of the users would need much less power in practice. On the other hand, if the DSCH power control is done based on the DCH power control, there will be a problem on soft handover. The reason for this is that the user equipment (UE) selects a primary cell periodically by measuring the RSCP (received signal code power) of CPICHs (common pilot channels) transmitted by the active cells. The cell with the highest CPICH RSCP is detected as a primary cell. Normally when a new base station is added, it is expected that the base station can assume that it is primary or close to the primary in the power level for that UE, especially if DSCH traffic for that terminal is handed over to that base station, but then afterwards information is not given if other base stations are dropped or added to the active set in the soft handover state. The prior art methods have no real means to determine if the signal from the base station is the strongest one the terminal is receiving.

Thus, for power control of DSCH, the problem is that the base station is not continually updated on whether the initially indicated soft handover state is still valid or not. Consequently, it could be the case that the power control of the DSCH is being done based on a non-dominating DCH. This would mean that the DSCH power level would be too low.

A solution would be to add a parallel power control loop for DSCH use. But this would be a problem, because DSCH does not contain any pilot bits, and it also has long periods of silent duration. A parallel power control loop for DSCH use, such as a 100 Hz parallel power control loop, would not necessarily be very well "up-to- date" when the transmission on DSCH is initiated (such a solution might, for instance, borrow n symbols per 10 millisecond frame from the existing power control command stream for DSCH use; if borrowing one symbol per 10 millisecond frame the resulting rate would be 100 Hz). Another possibility would be to add a second, fully parallel stream with separate symbols, also with a rate of 1500 Hz (15 slot frames provided at 1500 Hz rate with one slot per frame for power command) for DSCH. But this would be burdensome and would require more changes to the current specification. Also, controlling DSCH on its own is not feasible, since DSCH is discontinuous and since it does not provide reference (pilot) symbols.

DISCLOSURE OF INVENTION

An object of the present invention is to provide a power control of a downlink shared channel in the context of downlink transmit diversity.

According to a first aspect of the invention, a method for use in a wireless telecommunications system having at least one user equipment (UE) and a plurality of base stations connected to a common network controller, wherein said UE is able to periodically determine the magnitude of at least one parameter of plural radio downlinks simultaneously established from more than one of said plurality of base stations to said UE in order to periodically decide which one of said more than one of said plural radio downlinks is from a currently preferred base station for use in a communications session between said UE and an end terminal in communication with said system, comprises the steps of periodically signaling on

an uplink from said UE to at least one of said more than one of said plurality of base stations that a downlink to said UE from said at least one of said more than one of said plurality of base stations is or is not from said currently preferred base station, and periodically selecting, in response to said periodic signaling on said uplink from said UE, a power control method for at least said downlink to said UE from said at least one of said more than one of said plurality of base stations.

Further in accordance with the first aspect of the invention, a method wherein in response to said signaling step signaling that said downlink to said UE from said at least one of said one or more base stations is not from said currently preferred base station, said step of periodically selecting selects a fixed power level control method for said downlink to said UE from said not currently preferred base station.

Still in accordance with the first aspect of the invention, a method wherein in response to said signaling step signaling that said downlink from said at least one of said one or more base stations to said UE is from said currently preferred base station, said step of periodically selecting selects a power control method based on a power level of another, related downlink to said UE from said currently preferred base station.

According to a second aspect of the invention, an apparatus for use in a wireless telecommunications system having at least one user equipment (UE) and a plurality of base stations connected to a common network controller, wherein said UE is able to periodically determine the magnitude of at least one parameter of plural radio downlinks simultaneously established from more than one of said plurality of base stations to said UE in order to periodically decide which one of said more than one of said plural radio downlinks is from a currently preferred base station for use in a communications session between said UE and an end terminal in communication with said system, comprises means for periodically signaling on an uplink from said UE to at least one of said more than one of said plurality of base stations that a downlink to said UE from said at least one of said more than one of said plurality of base stations is or is not from said currently preferred base station, and means for periodically selecting, in response to said periodic signaling on said uplink from said UE, a power control method for at least

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said downlink to said UE from and said at least one of said more than one of said plurality of base stations.

In accordance with the second aspect of the invention, an apparatus wherein said means for periodically selecting, in response to said signaling step signaling that said downlink to said UE from said at least one of said one or more base stations is not from said currently preferred base station, selects a fixed power level control method for said downlink to said UE from said not currently preferred base station.

Further in accordance with the second aspect of the invention, an apparatus wherein said means for periodically selecting, in response to said signaling step signaling that said downlink from said at least one of said one or more base stations to said UE is from said currently preferred base station, selects a power control method based on a power level of another, related downlink to said UE from said currently preferred base station.

According to a third aspect of the invention, a user equipment (UE) for use in a wireless telecommunications system having at least one said UE and a plurality of base stations connected to a common network controller, wherein said UE is able to periodically determine the magnitude of at least one parameter of plural radio downlinks simultaneously established from more than one of said plurality of base stations to said UE in order to periodically decide which one of said more than one of said plural radio downlinks is from a currently-preferred base station for use in a communications session between said UE and an end terminal in communication with said system, said UE comprises sensing means, responsive to a downlink signal from a plurality of base stations for providing a corresponding plurality of sensed signals, storage means responsive to said plurality of sensed signals for storing said plurality of sensed signals and for providing said plurality of sensed signals from storage upon demand, comparator means responsive to said plurality of sensed signals retrieved from said storage means for comparing a parameter relating to said sensed signals for providing an comparison signal indicative of a comparison between the parameter magnitudes of said sensed signals, selection means responsive to said comparison signal from said comparator means for selecting a preferred base station and for providing a selection signal

indicative thereof, and signaling means responsive to said selection signal for providing an uplink signal indicative of the preferred base station.

According to a fourth aspect of the invention, an apparatus for use in a wireless telecommunications system having at least one user equipment (UE), wherein said system includes a plurality of base stations connected to a common network controller, wherein said UE is able to periodically determine the magnitude of at least one parameter of plural radio downlinks simultaneously established from more than one of said plurality of base stations to said UE in order to periodically decide which one of said more than one of said plural radio downlinks is from a currently-preferred base station for use in a communications session between said UE and an end terminal in communication with said system, wherein said apparatus is responsive to a selection signal from a user equipment indicating an identification of a preferred base station, said apparatus comprises selecting means responsive to said uplink signal for determining whether the base station is preferred or not and providing a selection signal indicative thereof, and power control means responsive to said selection signal, for providing a downlink control signal to said user equipment with a power level selected according to whether or not a preferred base station is determined.

These and other objects, features and advantages of the present invention will become more apparent in light of the detailed description of a best mode embodiment thereof, as illustrated in the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 shows a GPRS infrastructure, according to the prior art.

Fig. 2 shows a UMTS infrastructure, according to the prior art.

Fig. 3 shows two known examples of macrodiversity for UMTS in which a user equipment simultaneously has radio links with two or more UTRAN access points with the aim of improving quality of the radio connection for providing seamless handover.

Fig. 4 shows a user equipment in the form of a mobile station moving between cells in a wireless telecommunications network in which the mobile station

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has the possibility of simultaneously having radio links with two or more of the base stations of the cells in question.

Fig. 5 shows the signal strength of the signals received by the mobile station of Fig. 4 from the base stations in the three cells depicted there as the distance from BS1 increases.

Fig. 6 shows a plurality of base stations situated in a cell served by a base stations, wherein the distances between the various mobile stations and the base station vary.

Fig. 7 shows the various power levels received at the various mobile stations of Fig. 6 from the base station without any power control.

Fig. 8 shows the same situation as shown in Fig. 6, except with optimal power.

Fig. 9 shows a known fast closed loop power control, which is essential in WCDMA.

Fig. 10 shows a wireless telecommunications system having at least one user equipment (UE) and a plurality of base stations connected to a common network controller, wherein the UE is able to periodically determine the magnitude of at least one parameter of plural radio downlinks simultaneously established from more than one of the plurality of base stations to the UE in order to periodically decide which one of the more than one of the plural radio downlinks is from a currently-preferred base station for use in a communications session between the UE and an end terminal in communication with the system.

Fig. 11 shows the UE of Fig. 10 in more detail, according to the present invention.

Fig. 12 shows one of the base stations of Fig. 10 in more detail, according to the present invention.

Fig. 13 shows an improved DSCH power control in soft handover for WCDMA, according to the present invention.

BEST MODE FOR CARRYING OUT THE INVENTION

Fig. 10 shows a user equipment (UE), for instance, in the form of a mobile station 10 having multiple radio links simultaneously established between itself and

plural base stations (BS) in a wireless telecommunications system using the macrodiversity concept. In order to be in a position to decide which of the wireless links from the plurality of base stations is preferred at any given point in time during a communications session and to be able to switch seamlessly between the radio links during the session depending on which link is preferred, the UE should have sensing means 12, such as shown in Fig. 11, responsive to a selected parameter of the various downlinks 14, 16, 18 from respective base stations 20, 22, 24. An interface means 26 may be provided connected to an antenna 28, which provides the sensed downlink signals 14, 16, 18 to the interface means. The interface means receives the downlink signals on a signal line 30 connected to the antenna and provides an output signal on a line 32 to the sensing means 12 indicative of the received downlink signals 14, 16, 18. The interface means 26 may form part of a duplexer 34 which may also include an interface means 36 for providing an uplink signal on a line 38 to the antenna 28.

The sensing means 12 senses the downlink signals on the line 32 and provides a sensed signal on a line 42 having a magnitude indicative of the selected sensed parameter sensed by the sensing means 12. This may be, for instance, signal strength. A storage means 44 is responsive to the sensed signal on the line 42 for temporarily storing the magnitude of the sensed parameter for each of the respective downlinks 14, 16, 18. Once stored, these stored signal magnitudes can be provided on demand as signal outputs on lines 46 to a comparator means 48 for comparison therein. The comparator means 48 can, for instance, determine the downlink 14, 16, 18 with the largest magnitude signal strength. It can then indicate on a signal line 50 which downlink 14, 16, 18 has the largest signal strength magnitude. A selection means 52 responsive to the signal on the line 50 can then select or designate a preferred base station from which the downlink with the largest signal magnitude is currently emanating. It can indicate this selection on a selection signal line 54 to a signaling means 56, which in response thereto signals the identity of the selected base station on a signal line 58 to the interface means 36 which, in turn, provides the identification or selection signal as an uplink on the line 38 to the antenna 28, where it is radiated as an uplink identification or selection signal as indicated on an uplink signal line 60 which may be distinct.

This process is repeated periodically in order to decide as the mobile station moves about in relation to the various base stations, which one of the more than one of the plural radio links is currently preferred for use in the communications session between the user equipment and an end terminal (not shown) connected to the system. Thus, if a particular station loses signal strength and another gains as the mobile station moves in relation to the base station, the user equipment can signal this information upstream and indicate which base station is currently preferred for providing the downlink that actually is currently selected for carrying the session. Portions of the downlinks that are not selected can be shut off, e.g., data carrying portions (as opposed to voice).

It should be realized that the components shown in the UE of Fig. 11 are functional blocks that need not be carried out as discrete entities, as shown. In fact, they are more likely to be carried out as executable software code resident in a permanent memory installed in the UE. Such a configuration is well known and can generally be represented as a general or special purpose signal processor including a central processing unit (CPU), a read-only memory (ROM) for storing the executable code, a random access memory (RAM) for storing temporary computational results, stored data information and the like, various input/output (I/O) devices, timing means including a clock, all interconnected by data, address and control buses. The functions of the blocks shown in Fig. 11 can then be carried out in such software code stored in a ROM, as mentioned, and can be written by any person skilled in the art consulting Fig. 11 or a flowchart, state diagram or the like describing such functions. It will thus be realized that the various functional blocks shown in Fig. 11 can be divided or combined according to the selected algorithm. For instance, the comparator means 48 and selection means 52 can be carried out as a single functional block, whereby the result of the comparison automatically indicates the preferred base station without having to go through an extra selection step. Likewise, the various other blocks shown in both Fig. 11 and Figs. 10, 12 and 13, can be functionally transferred to other blocks or combined with other blocks.

Referring now to Fig. 12, one of the base stations 20 shown in Fig. 10 is illustrated with an antenna 62 for providing the downlink 14 at a power level

controlled according to the invention, as well as for receiving the uplink 60 from the UE. It may include separate antennas but is shown with a duplexer 64 for use with a single antenna. The duplexer is responsive to the uplink signal on the line 60 from the UE from the antenna and provides the downlink signal on a line 66 to a selecting means 68 for providing a selection signal on a line 70 to a power control means 72 which controls the level of power provided on the downlink 14 by means of an output signal on a line 74 to the duplexer 64. The power control means is responsive to a downlink information or voice signal on a line 75 which contains the intelligence to be transmitted on the downlink 14. I.e., the power control means 72 provides the signal on the line 75 as its output on the line 74 at varying power levels depending on the signal on the line 70. In this way, the base station can be responsive to the uplink signal on the line 60, which is indicative of whether or not the base station is preferred for providing the downlink signal on the line 14. The information signal on the line 75 can instead be provided to another, parallel device which is, in turn, controlled by the signal on the line 74 operating as a control signal.

As mentioned, the process of selection at the UE can be based on a parameter of the downlink, such as signal strength. Normally, one of the base stations 20, 22, ..., 24 would be selected as the preferred base station and would be the only one supplying the communications session ongoing between the UE and the not-shown terminal connected to the system. It should also be mentioned that the base stations 20, 22, 24 may be connected to a common network controller 76, which is in turn connected to other, hierarchically higher control devices within the mobile telecommunications system. However, for purposes of illustrating the present invention, it is not necessary to show such other devices. It will be realized that the functional block shown situated in the base station 20 of Fig. 12 could therefore be carried out in whole or in part at different hierarchical levels within the mobile telecommunications system. For instance, all or part of the functions can be carried out at the upstream RNC (see Fig. 2) instead of at the base station (Node B).

A specific application of the present invention will now be described in connection with the DSCH proposed for WCDMA. The DSCH (downlink shared

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channel) is to be used in WCDMA for transmission of packet data in the downlink. The DSCH is a common channel that is operated in such a way as to always be associated with a dedicated channel (DCH). The main reason for the use of DSCH is the saving of the orthogonal code resource when compared to the case that a dedicated channel resource is reserved for all users according to the maximum peak data rate. An example use is to allocate the speech service on a dedicated channel and then the packet data service on the DSCH. In that event, DSCH is most usable for services where delay may vary, such as non-real time packet data (worldwide-web-browsing, etc.). (See "WCDMA for UMTS, Radio Access for Third Generation Mobile Communications", edited by Holma and Toskala, Wiley 2000, Sec. 6.2.2.6 at page 77, and Sec. 6.4.7 at pp. 99-100.)

Considering the macrodiversity problem mentioned above where the DSCH power control for a terminal may suffer when the power level is set according to a non-dominating dedicated channel, reference is made to Fig. 13, which shows an improved DSCH power control in soft handover for WCDMA, according to the present invention.

Currently, site selection diversity transmit (SSDT) power control is defined in the Third Generation (3G) Technical Specification 25.214 Version 3.1.1 (1999-12) at Sec. 5.2.1.4 as an optional macrodiversity method in soft handover mode. The user equipment (UE) selects one cell from its active set to be primary and periodically informs a primary cell ID to the connecting cells via an uplink in an FBI (feedback information) field. Non-primary cells, not selected by the UE as the primary cell, switch off the transmission power of the DPDCH (Dedicated Physical Data Channel) of the particular DCH associated with the corresponding UE.

In SSDT, according to the 3G TS 25.214 specification at Sec. 5.2.1.4.5, a non-primary cell can switch off its DPDCH output (i.e., no transmissions). The cell manages two downlink transmission power levels, P1, P2. Power level P1 is used for downlink DPCCH (dedicated physical control channel) transmission power level, and this level is updated as described above for ordinary transmit power control (or power control in compressed mode) regardless of the selected state (primary or non-primary). The actual transmission power of TFCI (transmit format

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combination indicator), TPC (transmit power control), and pilot fields of DPCCH is set by adding Pl and the offsets P01, P02 and P03, respectively.

It should be realized that the currently proposed downlink transmit power control procedure controls simultaneously the power of a DPCCH (dedicated physical control channel) and its corresponding DPDCHs (dedicated physical data channels). The power control loop adjusts the power of the DPCCH and DPDCHs with the same amount, i.e., the relative power difference between the DPCCH and DPDCHs is not changed. According to Sec. 5.2.1.1 of the above-mentioned 3G TS 25.214, Version 3.1.0, the relative transmit power offset between DPCCH fields and DPDCHs is determined by the network. The TFCI, TPC and pilot fields of the DPCCH are offset relative to the DPDCHs' power by PO1, PO2 and PO3 dB respectively. The power offsets may vary in time.

Referring back to Fig. 13, it shows a user equipment (UE) in the form of a communicator (80) in communication with two base stations (Node Bs in 3G) 82, 84 over two corresponding pairs 86, 88 of up and down links. The Node B on the left 82 and the Node B on the right 84 are hardwired to a common radio network controller (RNC) 90, such as one of the RNCs shown in Fig. 2. In other words, each RNC shown in Fig. 2 is connected to multiple Node B base stations, each occupying a particular cell in a group of cells served by the RNC. Each Node B is connected to the RNC by an Iub interface, as shown in Fig. 2. The RNC 90 of Fig. 10 may be connected to another RNC, as suggested in Fig. 2, over another interface called the Iur interface. In this way, the communicator 80 of Fig. 10 can actually move from a group of cells served by one RNC to a group a cells served by another RNC, while at the same time maintaining an active connection at all times and without having to tear down and build up such connections when making such transitions.

In any event, the exemplary DSCH power control can be residing in the Node B or in the RNC, for instance. Although shown residing most conveniently in the base station in Fig. 12, it should be realized that it could be residing in the RNC, or even further upstream, for instance, in the 3G-SGSN of Fig. 2. The DSCH power control can be fast or slow and can be the same as the associated DCH, but in the proposed 3G, the Node B does continually not have the

information as to when it is in soft handover, and thus as time goes on during a session the DCH power may become too low to be used as a DSCH reference. This is because the Node B does not have information during the connection whether it is the primary or not at any given point in time. Updating this information with the network would be slow and not necessarily always up to date.

The above-mentioned SSDT gives an indication in soft handover whether a cell is primary or not. The base station (Node B) is expected not to transmit data, but only control information, when the cell ID sent by the UE does not match the base station.

According to an embodiment of the present invention, the SSDT signaling is used regardless of whether the base stations actually use it, and the SSDT is used for its signaling information to configure DSCH transmission power with the principle that if the cell is primary, the DSCH power is set based on the DCH, and if not, then a fixed power level or an offset power level with respect to DCH is used.

For a proposed parameterization over Node B, for the RNC interface (Iub) there will be an offset between DCH and DSCH parameterized as a function of primary indications over an averaging period.

For instance, for Node B the following parameters can be used per radio link:

DSCH is offset when (A) primary or (B) non-primary. More specifically, for case (A) the offset would be 0, i.e., offset is a function of data rate only. For case (B), the offset would be a function of, e.g., primary indications over the last ten frames. Thus, for a 10/10 primary indication, the offset would be 0 dB, while if only one out of 10 frames were indicating the base station to be primary, then a 10 dB offset would be given, for example.

CLAIMS

1. Method for use in a wireless telecommunications system (1) having at least one user equipment (UE) (10) and a plurality of base stations (20, 22, 24) connected to a common network controller (76), wherein said UE is able to periodically determine the magnitude of at least one parameter of plural radio downlinks (14, 16, 18) simultaneously established from more than one of said plurality of base stations to said UE in order to periodically decide which one of said more than one of said plural radio downlinks is from a currently preferred base station for use in a communications session between said UE and an end terminal in communication with said system, comprising the steps of:

periodically signaling on an uplink (60) from said UE to at least one of said more than one of said plurality of base stations that a downlink to said UE from said at least one of said more than one of said plurality of base stations is or is not from said currently preferred base station; and

periodically selecting, in response to said periodic signaling on said uplink from said UE, a power control method for at least said downlink to said UE from said at least one of said more than one of said plurality of base stations.

2. The method of claim 1, wherein in response to said signaling step signaling that said downlink to said UE from said at least one of said one or more base stations is not from said currently preferred base station, said step of periodically selecting selects a fixed power level control method for said downlink to said UE from said not currently preferred base station.

3. The method of claim 1, wherein in response to said signaling step signaling that said downlink from said at least one of said one or more base stations to said UE is from said currently preferred base station, said step of periodically selecting selects a power control method based on a power level of another, related downlink to said UE from said currently preferred base station.

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4. Apparatus for use in a wireless telecommunications system (1) having at least one user equipment (UE) (10) and a plurality of base stations (20, 22, 24) connected to a common network controller (76), wherein said UE is able to periodically determine the magnitude of at least one parameter of plural radio downlinks (14, 16, 18) simultaneously established from more than one of said plurality of base stations to said UE in order to periodically decide which one of said more than one of said plural radio downlinks is from a currently preferred base station for use in a communications session between said UE and an end terminal in communication with said system, comprising:

means for periodically signaling (56) on an uplink (60) from said UE to at least one of said more than one of said plurality of base stations that a downlink to said UE from said at least one of said more than one of said plurality of base stations is or is not from said currently preferred base station; and

means for periodically selecting (68), in response to said periodic signaling on said uplink from said UE, a power control method for at least said downlink to said UE from and said at least one of said more than one of said plurality of base stations.

5. The apparatus of claim 4, wherein said means for periodically selecting, in response to said signaling step signaling that said downlink to said UE from said at least one of said one or more base stations is not from said currently preferred base station, selects a fixed power level control method for said downlink to said UE from said not currently preferred base station.

6. The apparatus of claim 4, wherein said means for periodically selecting, in response to said signaling step signaling that said downlink from said at least one of said one or more base stations to said UE is from said currently preferred base station, selects a power control method based on a power level of another, related downlink to said UE from said currently preferred base station.

7. User equipment (UE) for use in a wireless telecommunications system having at least one said UE and a plurality of base stations connected to a common network controller, wherein said UE is able to periodically determine the magnitude of at least one parameter of plural radio downlinks simultaneously established from more than one of said plurality of base stations to said UE in order to periodically decide which one of said more than one of said plural radio downlinks is from a currently-preferred base station for use in a communications session between said UE and an end terminal in communication with said system, said UE comprising:

sensing means (12), responsive to a downlink signal (32) from a plurality of base stations for providing a corresponding plurality of sensed signals (42);

storage means (44), responsive to said plurality of sensed signals for storing said plurality of sensed signals and for providing said plurality of sensed signals (46) from storage upon demand;

comparator means (48), responsive to said plurality of sensed signals retrieved from said storage means for comparing a parameter relating to said sensed signals for providing an comparison signal (50) indicative of a comparison between the parameter magnitudes of said sensed signals;

selection means (52), responsive to said comparison signal from said comparator means for selecting a preferred base station and for providing a selection signal (54) indicative thereof; and

signaling means, responsive to said selection signal for providing an uplink signal (58) indicative of the preferred base station.

8. Apparatus for use in a wireless telecommunications system having at least one user equipment (UE), wherein said system includes a plurality of base stations connected to a common network controller, wherein said UE is able to periodically determine the magnitude of at least one parameter of plural radio downlinks simultaneously established from more than one of said plurality of base stations to said UE in order to periodically decide which one of said more than one of said plural radio downlinks is from a currently-preferred base station for use in a communications session between said UE and an end terminal in communication with said system, wherein said apparatus is responsive to a selection signal from a user equipment indicating an identification of a preferred base station, said apparatus comprising:

selecting means (68), responsive to said uplink signal for determining whether the base station is preferred or not and providing a selection signal (70) indicative thereof; and

power control means (72), responsive to said selection signal, for providing a downlink control signal (74, 14) to said user equipment with a power level selected according to whether or not a preferred base station is determined.

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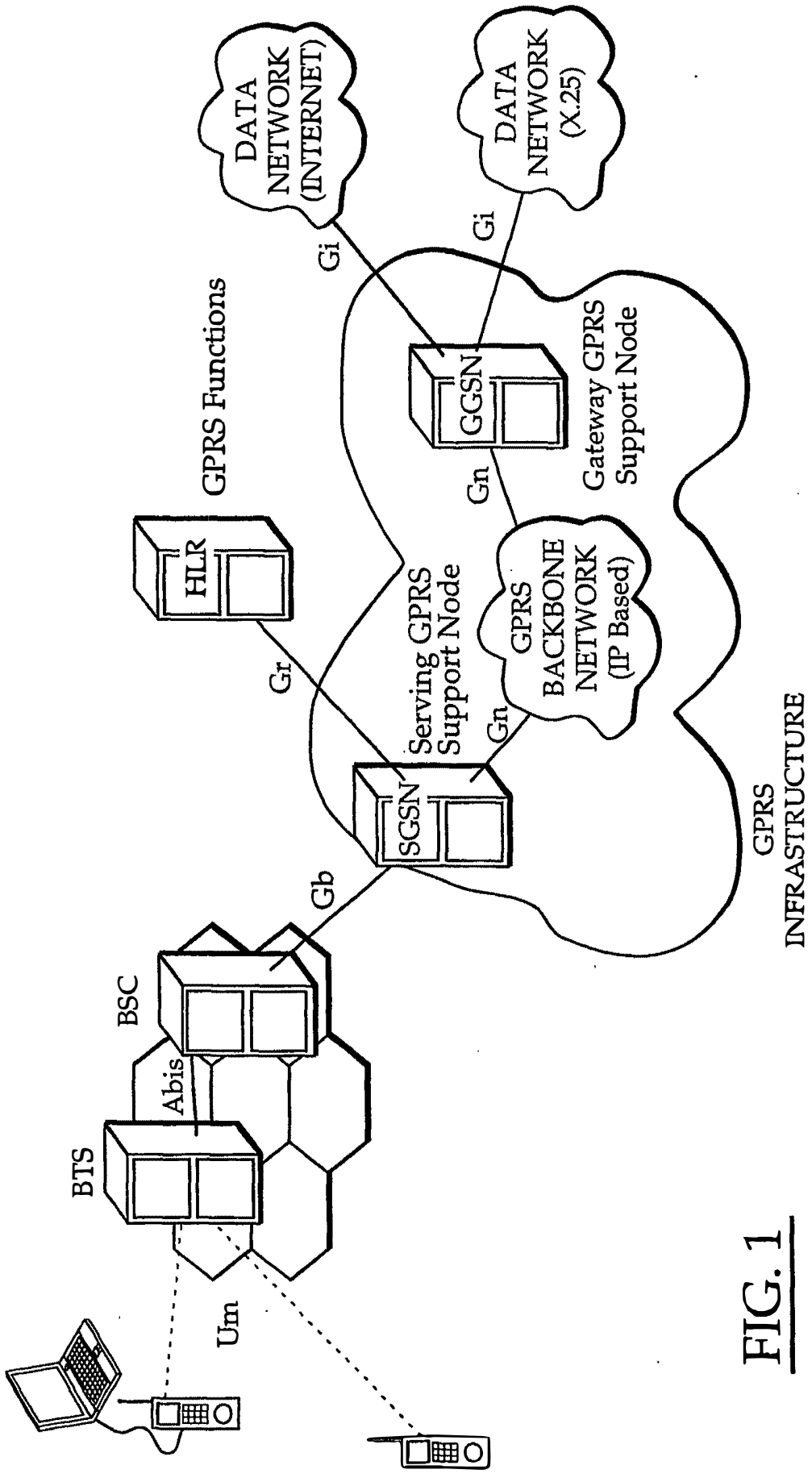

DATA NETWORK (INTERNET)
DATA NETWORK (X.25)
Gi
Gi
GPRS Functions
GGSN
Gateway GPRS Support Node
Gn
HLR
GPRS BACKBONE NETWORK (IP Based)
Gr
Serving GPRS Support Node
Gn
SGSN
Gb
GPRS INFRASTRUCTURE
BSC
Abis
BTS
Um

FIG. 1

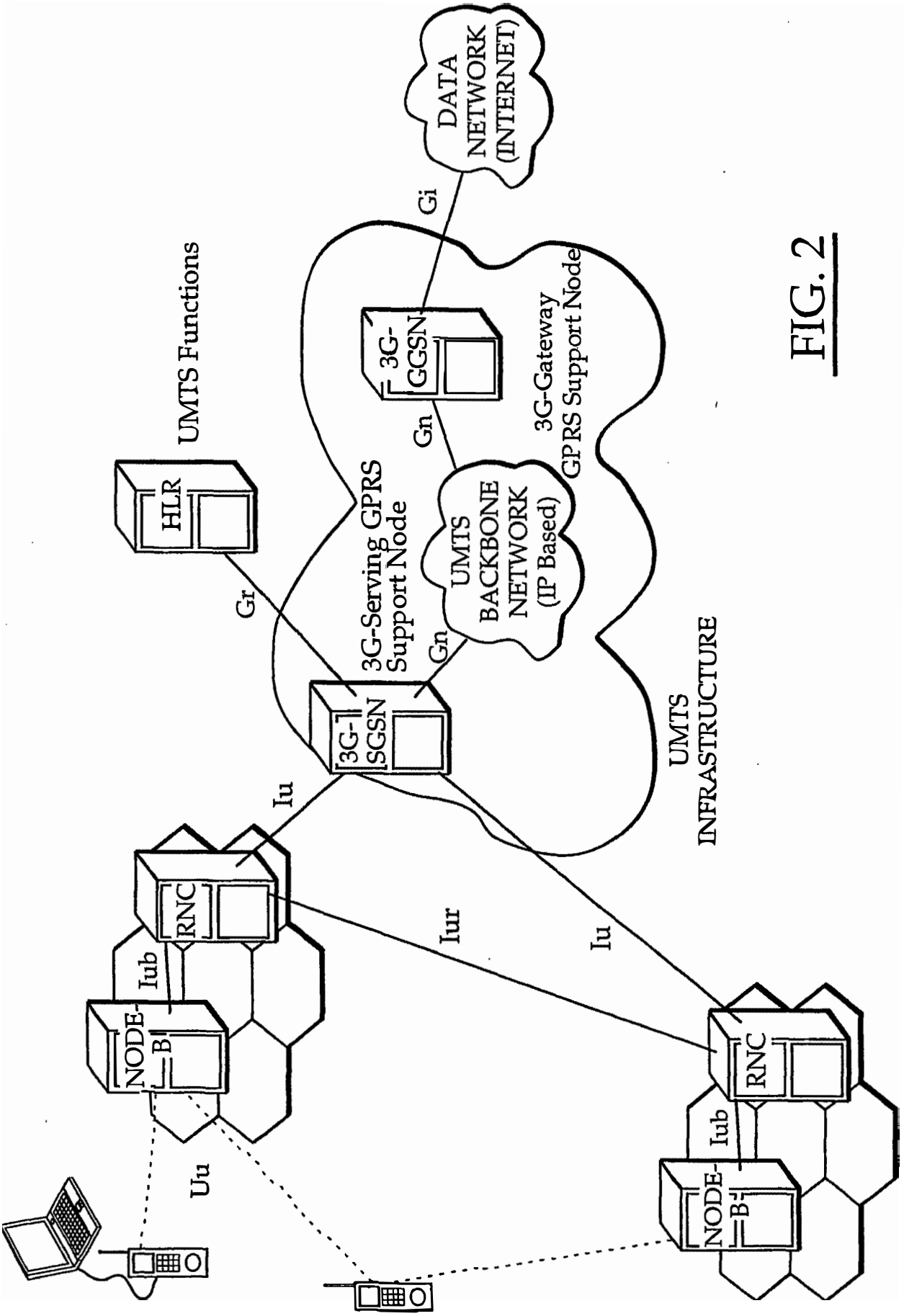

DATA NETWORK (INTERNET)
Gi
3G-GGSN
Gn
3G-Gateway GPRS Support Node
UMTS BACKBONE NETWORK (IP Based)
UMTS Functions
HLR
Gr
3G-Serving GPRS Support Node
Gn
3G-SGSN
UMTS INFRASTRUCTURE
Iu
Iur
Iu
RNC
Iub
NODE-B
Uu
RNC
Iub
NODE-B

FIG. 2

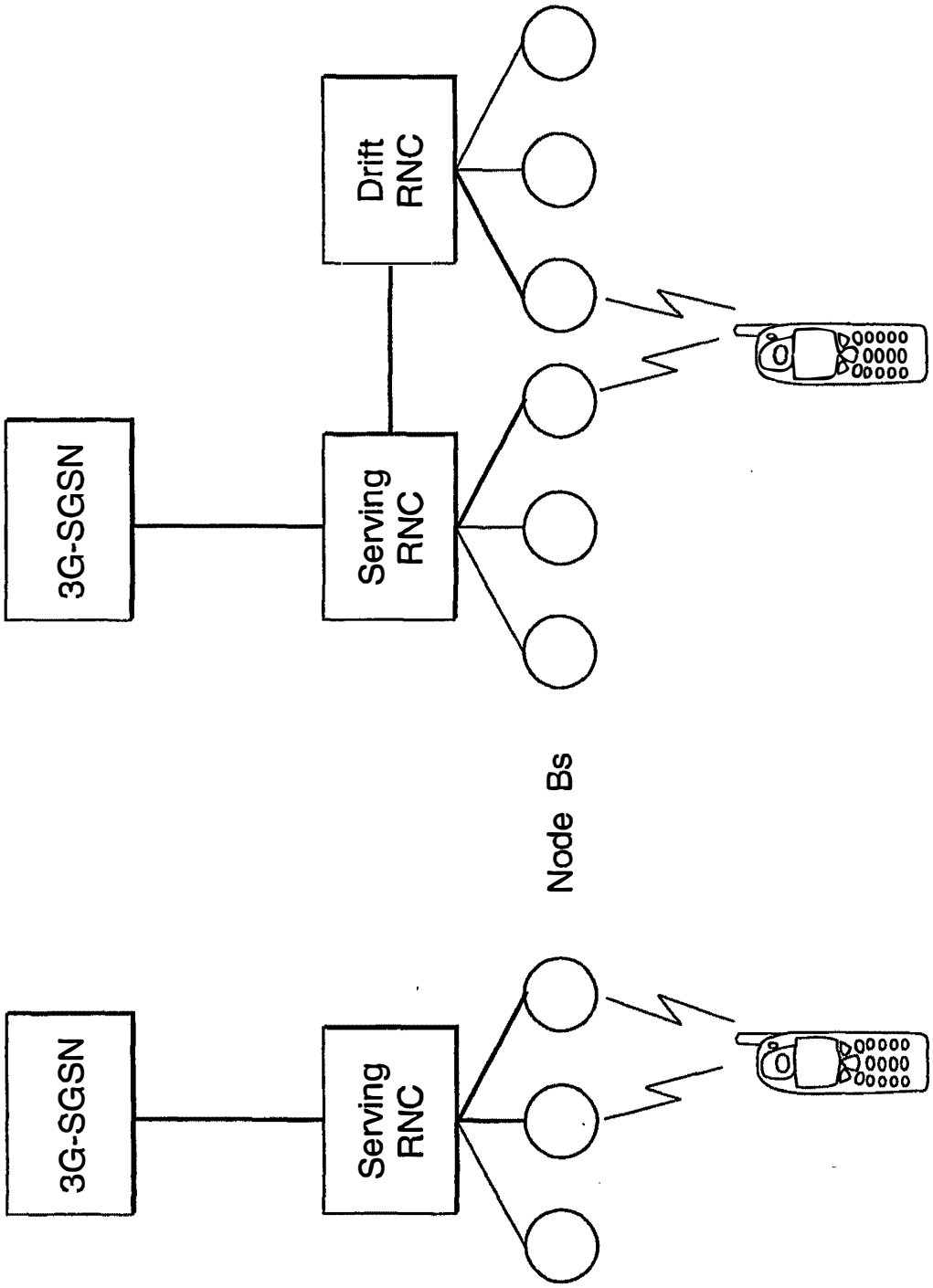


FIG.3

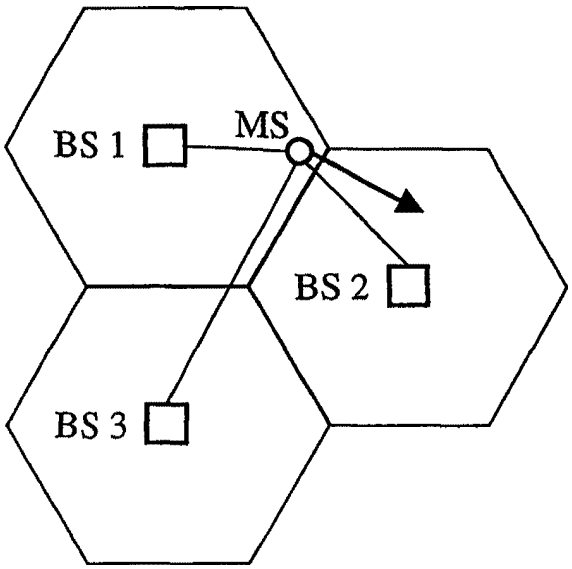


FIG. 4

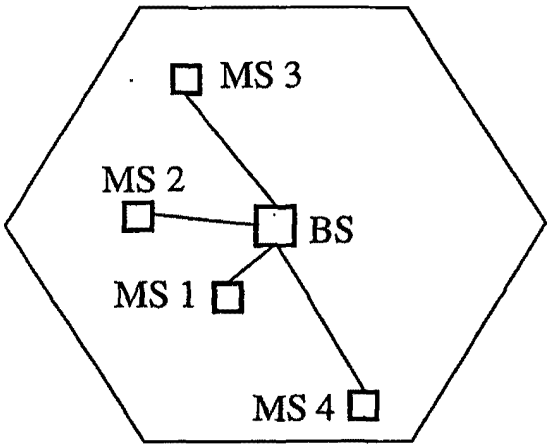


FIG. 6

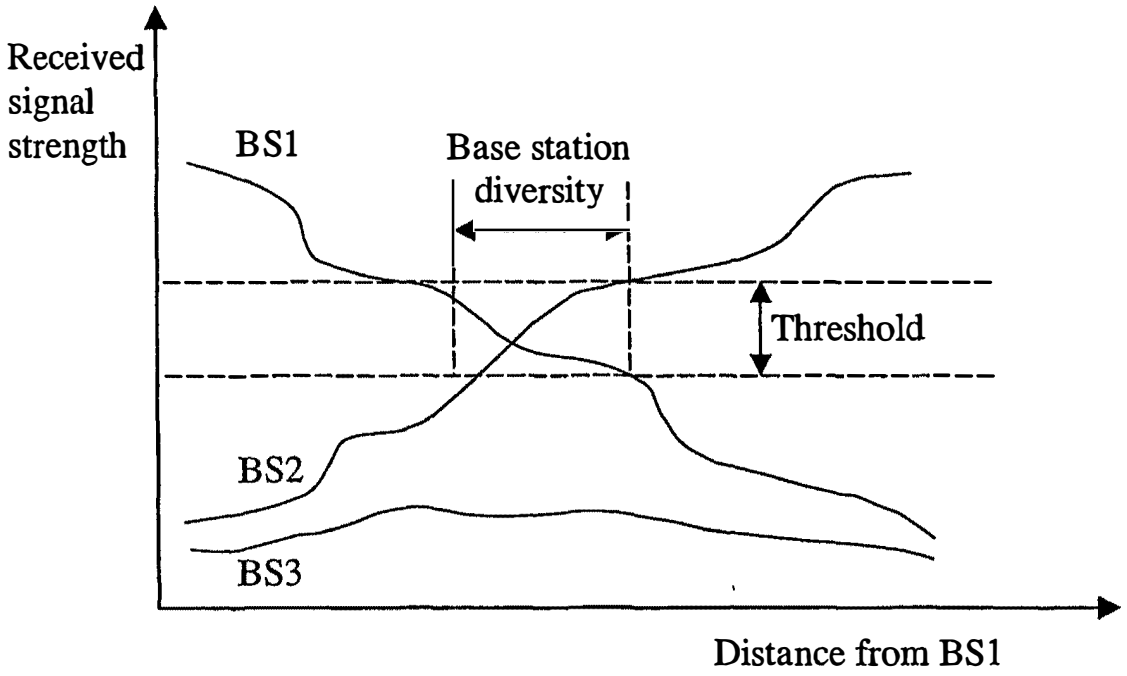

Received signal strength
BS1
Base station diversity
Threshold
BS2
BS3
Distance from BS1

FIG. 5

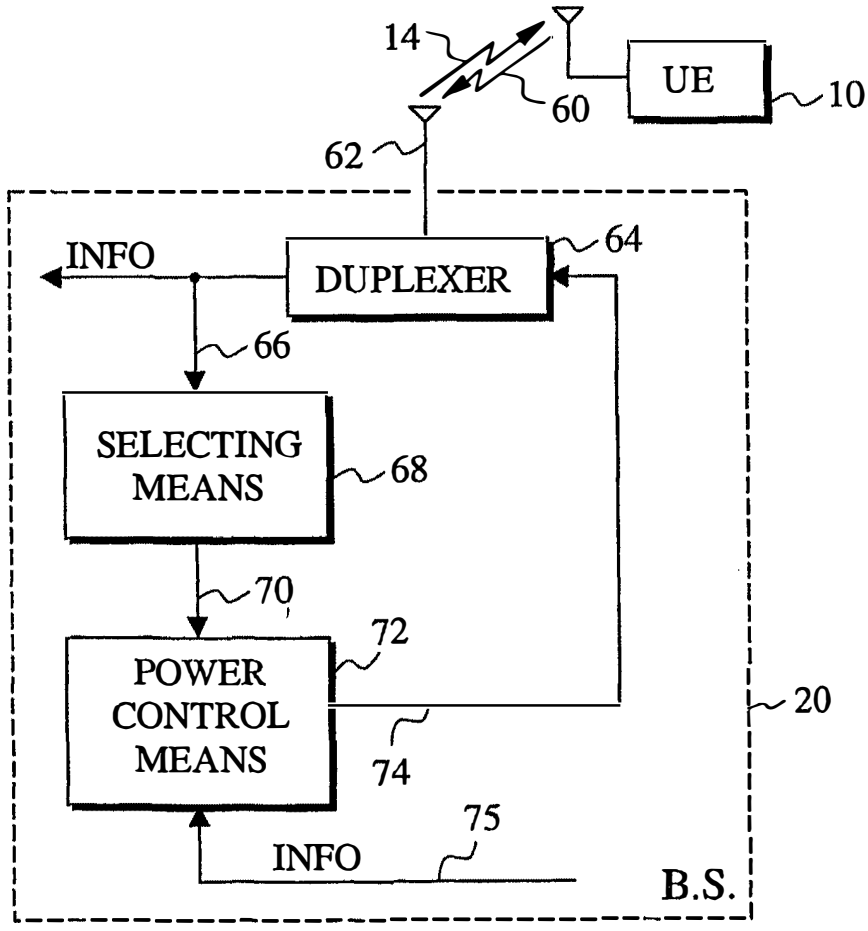

14
60
UE
10
62
INFO
DUPLEXER
64
66
SELECTING MEANS
68
70
72
POWER CONTROL MEANS
74
20
75
INFO
B.S.

FIG. 12

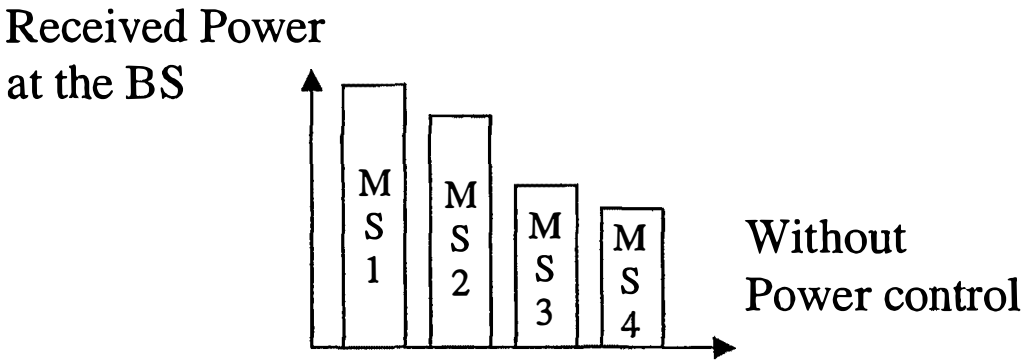


FIG. 7

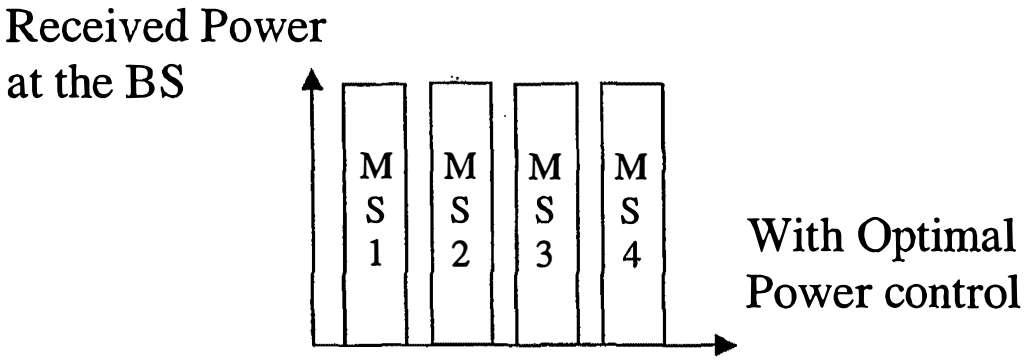


FIG. 8

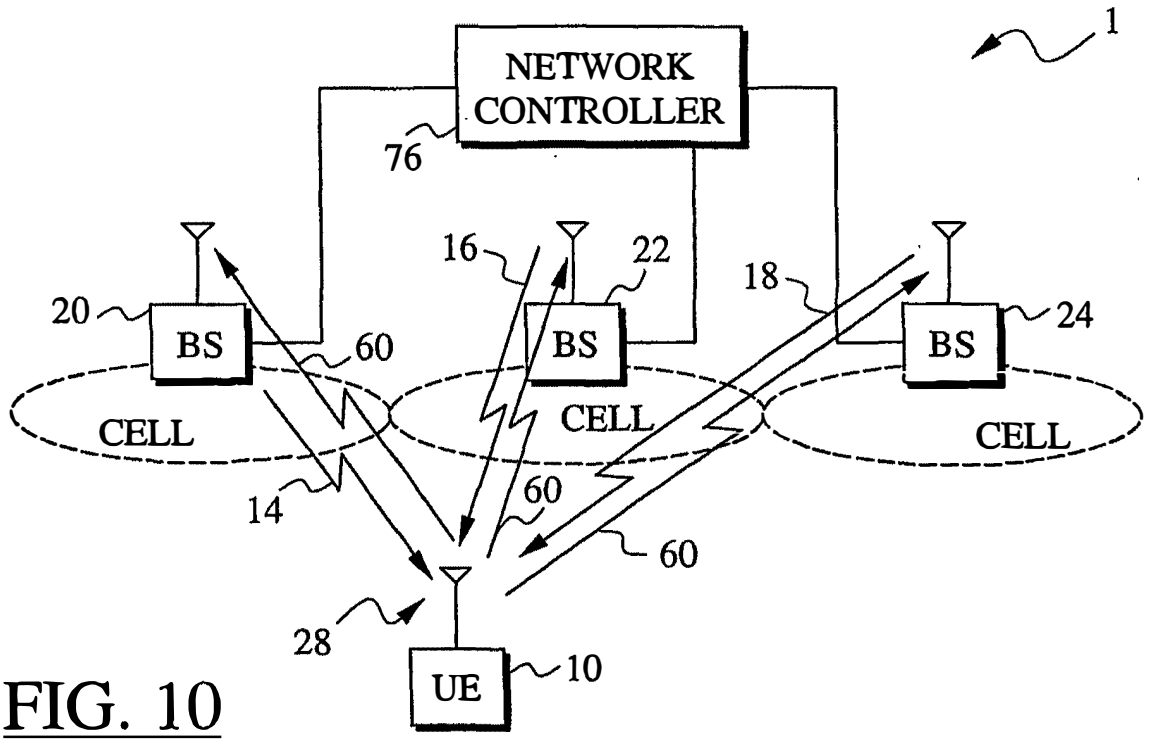


FIG. 10

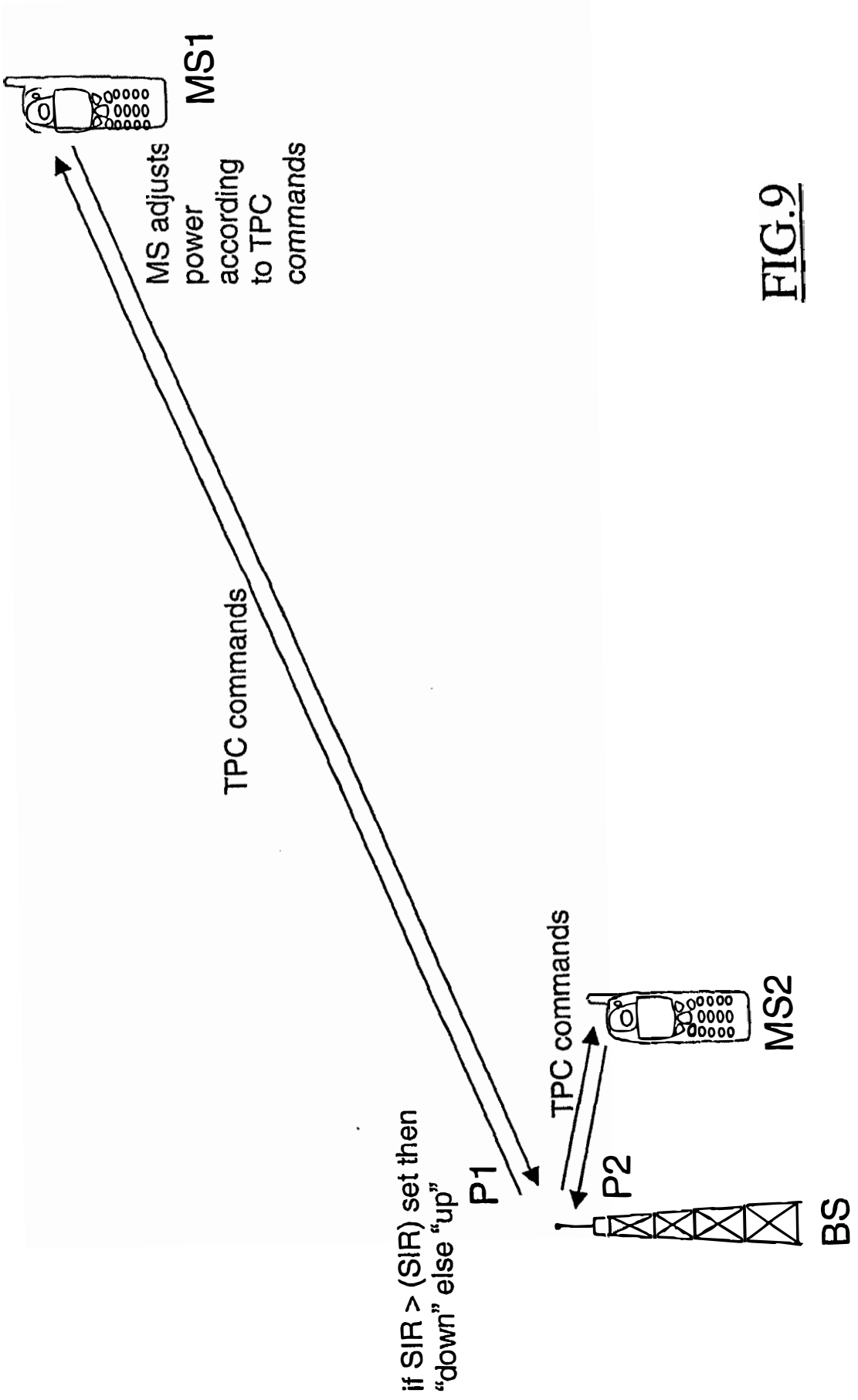

MS1
MS adjusts power according to TPC commands
TPC commands
if SIR > (SIR) set then "down" else "up"
P1
TPC commands
P2
MS2
BS

FIG.9

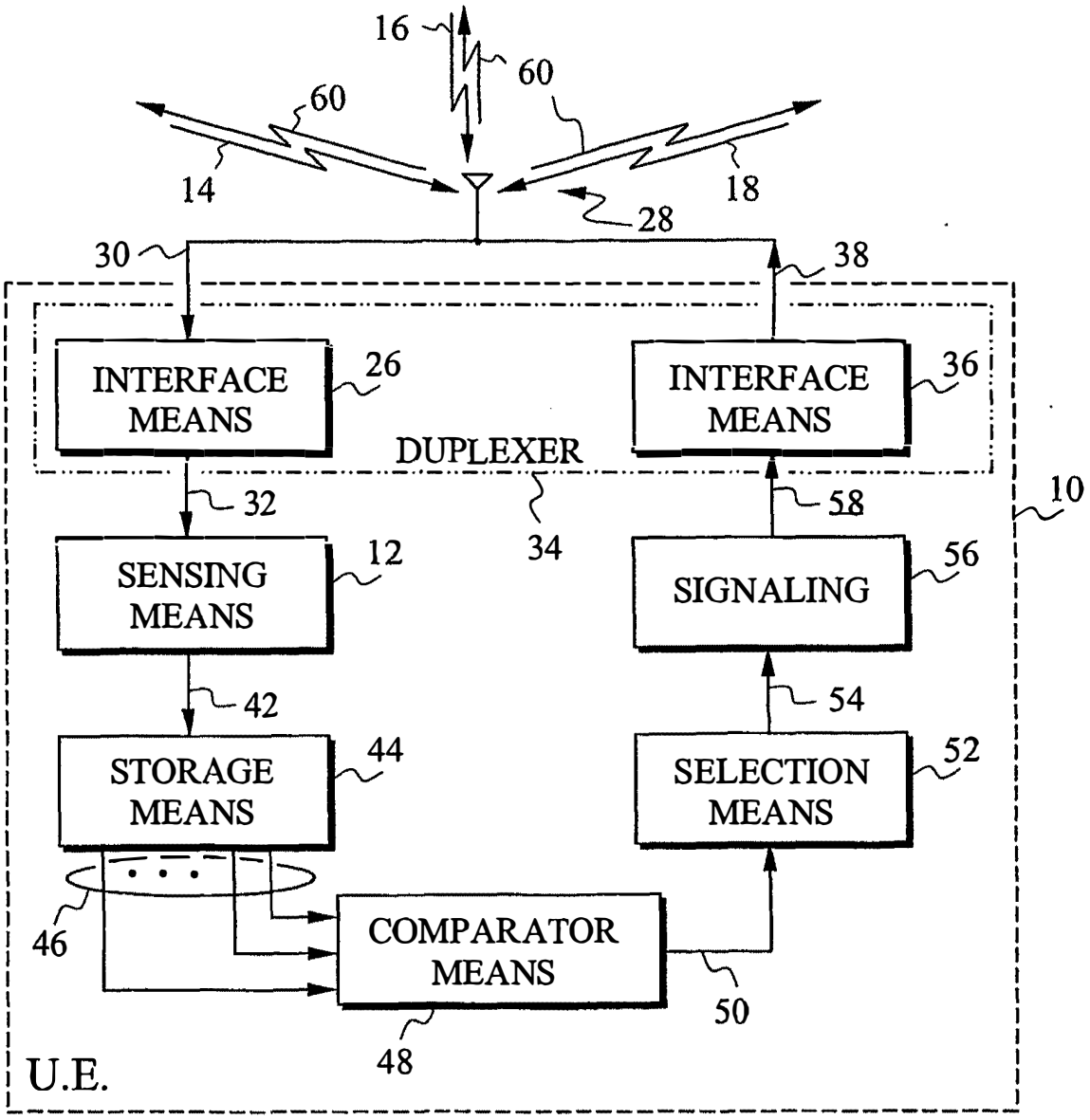

16
60
60
14
18
28
30
38
INTERFACE MEANS
26
INTERFACE MEANS
36
DUPLEXER
32
34
58
10
SENSING MEANS
12
SIGNALING
56
42
54
STORAGE MEANS
44
SELECTION MEANS
52
46
COMPARATOR MEANS
50
48
U.E.

FIG. 11

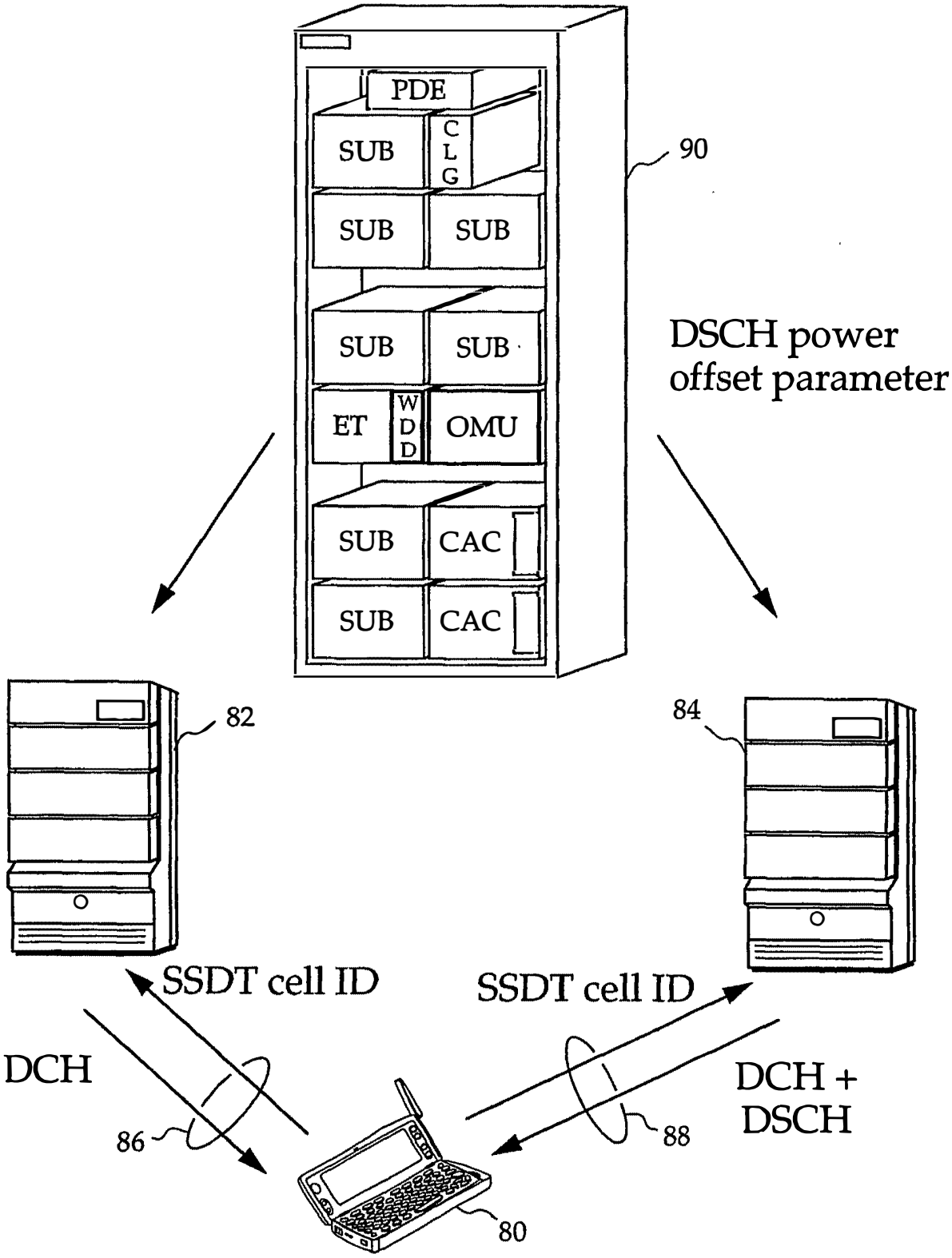

PDE
SUB
C
L
G
SUB
SUB
SUB
SUB
ET
W
D
D
OMU
SUB
CAC
SUB
CAC
90
DSCH power
offset parameter
82
84
SSDT cell ID
SSDT cell ID
DCH
DCH +
DSCH
86
88
80

FIG. 13

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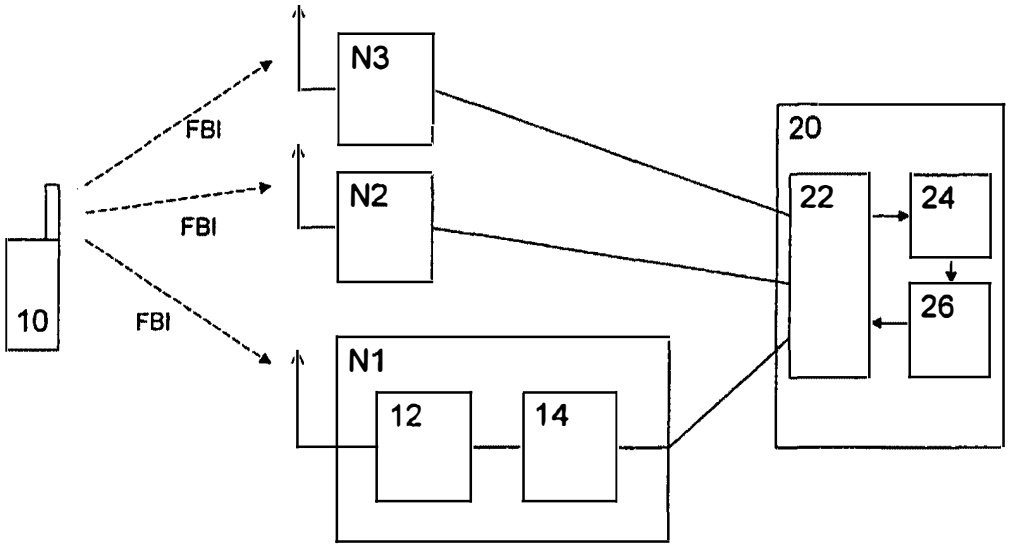
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[Continued on next page]

(54) Title: METHOD AND SYSTEM FOR PROVIDING A DOWNLINK CONNECTION IN A CELLULAR NETWORK



(57) Abstract: The present invention relates to a method and system for providing a downlink connection in a cellular network. A feedback information indicating a selected cell is transmitted to a central network element (20) controlling at least two network elements (N1-N3) serving cells (C1-C3) of the cellular network. The at least two network elements are controlled by the central network element based on the feedback information so as to establish the downlink connection. Thus, the downlink transmissions of the non-central network elements (N1-N3) are controlled by the network so as to decrease performance loss due to reception errors of the feedback information. The feedback information may be a temporary ID obtained in a site selection diversity transmission control scheme.

WO 03/053087 A1

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.

Method and System For Providing a Downlink Connection in a Cellular Network

FIELD OF THE INVENTION

The present invention relates to a method and system for providing a downlink connection in a cellular network, such as a radio access network of a WCDMA (Wideband Code Division Multiple Access) system.

BACKGROUND OF THE INVENTION

In 3rd generation WCDMA systems, the downlink capacity is a limiting factor for system capacity. Therefore, site selection diversity transmit power control (SSDT) has been proposed as a macro-diversity method for the soft handover mode in radio access networks.

During soft handover, a terminal device, such as a mobile station or user equipment, is in the overlapping cell coverage area of e.g. two sectors belonging two different base stations, which are called Node Bs in the corresponding 3rd generation partnership project (3GPP) specifications. The terminal device monitors received signals broadcasted from the different base stations, compares them to a set of thresholds, and reports them accordingly back to the base stations. Based on this information, the network orders the terminal device to add or remove base station links from its active set of soft handover cells. The active set is defined as a set of base stations or active cells from which the same user information is sent to the user equipment (UE). Furthermore, in a micro diversity or softer handover case, soft handover is performed between sectors or cells belonging to the same base station or node B. Thus, in the present example, the communications between the mobile station and the base station may take place concurrently via two air interface channels, one for each sector or active cell separately. This requires the use of two separate codes in the downlink direction, so that the mobile station can distinguish the signals. The SSDT operation can be summarized as follows. The mobile station selects at least one of the cells from its active set to be "pri-

mary", all other cells are classed as "secondary". The main objective is to transmit on the downlink from the primary cell, thus reducing the interference caused by multiple transmissions in the soft handover mode. A second objective is to achieve fast site selection without network intervention on higher protocol layers, thus maintaining the advantage of the soft handover.

In order to select at least one primary cell, each cell is assigned a temporary identification (ID) and the mobile station periodically informs a primary cell ID to the active cells. In response thereto, the non-primary cells selected by the mobile station switch off their transmission power. The primary cell ID is delivered by the mobile station to the active cells via an uplink FBI (Feedback Information) field. Thus, each cell is given a temporary ID during SSDT and this ID is utilized as a site selection signal. The ID is given a binary bit sequence and the ID codes are transmitted aligned to the radio frame structure.

The mobile station selects a primary cell periodically by measuring the Received Signal Code Power (RSCP) of common pilot channels (CPICHs) transmitted by the active cells. The cell with the highest CPICH RSCP is selected as a primary cell. Also the Signal-to-Interference Ratio (SIR) could be used for primary cell selection. The mobile station periodically sends the ID code of the primary cell via predetermined portions of the uplink FBI field assigned for SSDT use (FBI S field). A cell recognizes its state as non-primary if the following conditions are fulfilled simultaneously:

1. the received ID code does not match with the own ID code;

2. the received uplink signal quality satisfies a quality threshold Q_{th} defined by the network; and

3. if uplink compressed mode is used, less than $N_{ID}/3$ bits are lost from the ID code (as a result of uplink compressed mode), where N_{ID} denotes the number of bits in the ID code.

Otherwise, the cell recognizes its state as primary.

The state of the cells (primary or non-primary) in the active set is updated synchronously.

Thus, in SSDT, a mobile station periodically chooses at least one of its active cells or base stations having minimum path loss in its transmission to the mobile station. However, since the ID is sent over the air interface, it may be possible that the ID Is detected erroneously. When the ID is detected erroneously, the problem may occur that all active base stations switch off their output power simultaneously. On the other hand, the mobile station may receive a downlink transmission signal from an assumed primary base station, which however has not transmitted the data, while it was transmitted by a secondary base station. The first problem may cause frame errors but does not lead to additional interference, whereas the latter problem is a more serious problem, because in this situation, the fast transmit power control takes up the control of the transmission power of the undesired secondary base station. The resulting high transmission power of the undesired secondary base station might cause high additional interference to other users.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide a method and system for establishing a downlink connection, by means of which the downlink capacity can be improved without increasing the risk of interference.

This object is achieved by a method of providing a downlink soft handover connec tion in a cellular network, wherein a cell is selected as a primary cell determined ir a site selection power control scheme, said method comprising the steps of:
providing a selection function for selecting said cell of said cellular network based on a comparison of properties of downlink signals received from at least two cells;
transmitting a feedback information indicating the result of said selection to a network element controlling said at least two cells; and
controlling said at least two cells based on said feedback information so as to establish said downlink connection.

Additionally, the above object is achieved by a system for providing a downlink connection in a cellular network, said system comprising:
a terminal device having a selection function for selecting a cell of said cellular network based on a comparison of downlink signals received from at least two first network elements serving respective cells, wherein said terminal device is adapted to transmit a feedback information indicating the result of said selection to said cellular network; and
a second network element for receiving said feedback information and for controlling said at least two first network elements based on said feedback information so as to establish said downlink connection.

Furthermore, the above object is achieved by a network element for providing a downlink connection in a cellular network, said network element comprising:
receiving means for receiving a feedback information from a terminal device; and
extracting means for extracting said feedback information and for transmitting said extracted feedback information to said cellular network.

Finally, the above object is achieved by a network element for providing a downlink connection in a cellular network, said network element comprising:
receiving means for receiving a feedback information from a terminal device via at least two first network elements;
checking means for checking an identification information provided in said feedback information; and
controlling means for controlling said at least two first network elements so as to establish said downlink connection.

Accordingly, the detection accuracy can be improved significantly due to the fact that the network centrally controls the downlink transmissions of the base stations. This improved detection accuracy due to the central control leads to a better overall system capacity. In particular, the feedback information of more than one cell o base station of the active set of a concerned terminal device is combined to ensure correct detection of the temporary ID. Thereby, performance loss due to ID

reception errors can be decreased. The proposed solution can be regarded as an additional diversity gain to ID detection. Moreover, a shorter ID code can be used due to the improved detection probability, to thereby reduce the communication delay between the first and second network elements.

According to an advantageous further development, the identification information may be extracted at the second network element, while the feedback information is routed via the first network elements.

According to another advantageous development, the identification information may be extracted at the first network element and transmitted to the second network element.

The selected cell may be a primary cell determined in the site selection diversity control scheme.

Furthermore, the controlling step may comprise transmitting a transmission command to one of the at least two first network elements, which one serves the selected cell.

The downlink connection may be provided via a Dedicated Physical Data Channel of a WCDMA system.

Preferably, the controlling step may comprise a decision step based on a likeness function, the decision step being used to determine an estimated primary cell for the downlink connection. In this case, the likeness function may be included in the feedback information. In particular, the decision step may be based on a predetermined decision rule in which individual likeness functions of the active cells are summarized to determine the index of the estimated primary cell.

The first network element may be a Node B or a base station transceiver, and the second network element may be a radio network controller. Alternatively, in a micro diversity case (i.e. softer handover), the first network element may be a sector of a Node B, and the second network element may be a radio network controller.

BRIEF DESCRIPTION OF THE DRAWINGS

In the following, the present invention is described in more detail based on preferred embodiments with reference to the accompanying drawings in which:

Fig. 1 shows a schematic block diagram of a network architecture in which the present invention can be applied;

Fig. 2 shows block diagrams of network elements involved in the system according to the preferred embodiments;

Fig. 3 shows a signaling diagram indicating an SSDT signaling according to a first preferred embodiment; and

Fig. 4 shows a signaling diagram indicating an SSDT signaling according to a second preferred embodiment.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The preferred embodiments will now be described on the basis of a radio access network architecture of a 3rd generation WCDMA system, such as a Universal Mobile Telecommunications System Terrestrial Radio Access Network (UTRAN), as indicated in Fig. 1.

According to Fig. 1, a user equipment 10 is connected via radio interfaces to a radio network sub-system (RNS) of the UTRAN. The RNS comprises e.g. three Node Bs N1, N2, N3 which are arranged to route the data flow to a Radio Network Controller (RNC) 20. It is noted that the term "Node B" may be replaced by the more generic term "Base Station" which has the same meaning. The Node Bs N1 to N3 are adapted to serve respective cells C1 to C3, while the ID of at least one of them may be stored in the active set of the UE 10 due to their overlapping cells The RNC 20 owns and controls the radio resources in its domain, i.e. the Node Bs N1 to N3 connected to it. It provides a radio resource control and mobility man-

agement function and is the service access point for all services the UTRAN provides to at least one core networks (indicated on the upper part of Fig. 1).

According to the preferred embodiments, the performance loss due to the ID reception errors is decreased by shifting the SSDT control towards the network site, e.g. to the RNC 20, such that the radio access network controls the Dedicated Physical Data Channel (DPDCH) or Dedicated Physical Channel (DPCH) transmission of the Node Bs N1 to N3.

Fig. 2 shows a schematic block diagram of the network elements involved in the SSDT transmission between the UE 10 and the RNC 20. A UE 10 transmits its feedback information indicating temporary IDs of primary cells in the FBI field of the DPDCH channel. The Node Bs N1 to N3 then transmit the received ID softbits or softvalues (FBI bits) to the RNC 20. In Fig. 2, relevant parts of the preferred embodiments are shown in a first Node B N1 and the RNC 20. In particular, the first Node B N1 comprises a transceiver (TRX) 12 for transmitting and receiving data to/from a UE 10. The received data is supplied to a FBI extraction unit 14 where the information contained in the FBI field is extracted and supplied or transmitted to the RNC 20. It is noted that the same parts or blocks are also provided at the other node Bs N2 and N3. The RNC 20 comprises a switching function or switch 22 for selecting at least one of the Node Bs N1 to N3 and for supplying data received from the selected Node B to an ID checking function or unit 24, where a primary cell to be used for the downlink transmission to the UE 10 is estimated or determined, e.g. based on a decision rule. The identity or index or ID of the estimated primary cell is supplied to an SSDT command generation unit 26 in which corresponding commands for switching on or off at least one of the respective Node Bs N1 to N3 are generated and supplied to the switch 22. Thus, the SSDT control is performed at the RNC 20 to thereby reduce the probability of the ID reception errors.

It is noted that the above described functions or blocks of the node Bs N1 to N3 and the RNC 20 may be implemented by discrete hardware elements or by software routines controlling a processor device.

Fig. 3 shows a signaling diagram of an SSDT signaling according to the first preferred embodiment. In the first preferred embodiment, a centralized detection of the ID codes of determined primary cells is performed. The Node Bs N1 to N3 transmit the received ID softbits or softvalues extracted at the FBI extraction unit 14 to the RNC 20. The RNC 20 detects the ID aid MRC (Maximal Ratio Combining) between ID softbits or softvalues originated from one active set. It is noted that the term "active set" means the set of Node Bs which transmit for one UE or mobile terminal during a normal soft handover operation. This detection is performed at the ID checking unit 24. After ID detection, the RNC 20 informs the Node Bs N1 to N3 to switch off or on the concerned DPDCH or DPCH transmission by using the SSDT command generating unit 26.

Thus, as indicated in Fig. 3, the FBI bits are initially transmitted from each of the Node Bs N1 to N3 to the RNC 20. Then, after ID detection, respective SSDT commands are transmitted to each of the Node Bs N1 to N3.

Fig. 4 shows a signaling diagram indicating an SSDT signaling according to the second preferred embodiment. In the second preferred embodiment, the Node Bs N1 to N3 are arranged to detect the temporary ID of the primary cells e.g. in the FBI extracting unit 14. The detected IDs are then transmitted to the RNC 20. Based on the received IDs, the RNC 20 checks in the ID checking unit 24 whethe there is existing at least one transmitting Node B in the active set. Based on the checking result, the RNC 20 generates corresponding switching commands in the SSDT command generating unit 26 and transmits these commands to one or all Node Bs in the active set. This decentralized ID detection may also be performed based on a decision rule e.g. as explained in the following.

The decision rule may be based on some kind of likeness functions which may be applied in the RNC 20 in the case of the first preferred embodiment, or in the Nod Bs N1 to N3 in the case of the second preferred embodiment. In the second preferred embodiment, the likeness functions may be sent to the RNC 20, instead of the ID softbits. Then, the RNC 20 makes the decision in the ID checking unit 24 based on the received likeness functions.

In the following, the ID detection based on a soft variable connection between a Node B and the RNC 20 is described based on corresponding algorithms. In the conventional SSDT schemes, the temporary ID is detected separately at each Node B. In this case, the decision rule applied can be expressed as follows:

$$z^i = \arg\max_{z\in\{1,\ldots,b\}} \Omega^i(z) \qquad (1)$$

where z^i is the index of the estimated primary cell in the i^{th} Node B and b is the number of active cells. The likeness function of the above example can be expressed e.g. by the following equation:

$$\Omega^i(z) = \sum_{d=1}^{ID\_code\_length} q^i[d]c_z[d] \qquad (2)$$

where q[d] is the soft decision from the received d^{th} ID code symbols and $c_z[d]$ is the d^{th} ID code symbol from the z^{th} ID codes.

In contrast thereto, according to the preferred embodiments of the present invention, the temporary ID is detected centrally at the RNC 20. The applied decision rule can be expressed as follows:

$$z = \arg\max_{z\in\{1,\ldots,b\}} \left(\sum_{i=1}^{b} \Omega^i(z) \right) \qquad (3)$$

where z is the index of the estimated primary cell.

As already mentioned, the likeness function can be calculated in the Node Bs or a the RNC 20 and may be obtained by the above equation (2).

The performance difference between the preferred embodiments of the present invention and the conventional SSDT schemes is described in the following based on practical examples. In the example, a three-way soft handover is assumed,

where three Node Bs are contained in the active set, as indicated in Fig. 1. Assuming an ID code length of 16 bits, a radio channel environment of a pedestrian, a UE location at the boundary of cells, a speech signal of 12.2 kbit/s and equal pathloss in each link, a gain of 1.2 to 2.3 dB compared to the conventional SSDT solution can be obtained. Due to the strong decrease in the ID reception errors, the performance of the SSDT scheme according to the present invention can be regarded as an SSDT performance with perfect ID feedback.

In conventional SSDT solutions, the most serious error situation exists when the primary ID is detected erroneously in the primary Node B or base station. This may occur due to fast fading situations which are fully uncorrelated between the uplink and downlink direction. In the SSDT scheme according to the present invention, the probability of this kind of error is significantly lower due to the additional diversity gain in the centralized ID detection.

In the present invention, communication delays between the Node Bs N1 to N3 and the RNC 20 may become a problem. However, this problem can be tackled for example by using a shorter ID code. Nevertheless, this shorter ID code does not lead to a deterioration of the performance, as the detection probability is improved

It is noted that the present invention can be implemented in any cellular network in which some kind of macro diversity functionality is provided. The names of the various functional entities, such as the RNC 20 or the Node Bs N1 to N3 may be different in different cellular networks. The names used in the context of the preferred embodiment are not intended to limit or restrict the invention. Moreover, any kind of decision rule may be applied to determine or estimate the cell to be used for the downlink transmission at the central network element, i.e. the RNC 20, or at the non-central network elements, i.e. the Node Bs N1 to N3. The preferred embodiments may thus vary in the scope of the attached claims.

Claims

1. A method of providing a downlink soft handover connection in a cellular network, wherein a cell is selected as a primary cell determined in a site selection power control scheme, said method comprising the steps of:
   a) providing a selection function for selecting said cell of said cellular network based on a comparison of properties of downlink signals received from at least two cells (C1-C3);
   b) transmitting a feedback information indicating the result of said selection to a network element (20) controlling said at least two cells (C1-C3); and
   c) controlling said at least two cells (C1-C3) based on said feedback information so as to establish said downlink connection.

2. A method according to claim 1, further comprising the step of adding an identification information of said selected cell to said feedback information, and extracting said identification at said network element (20).

3. A method according to claim 1, further comprising the step of adding an identification information of said selected cell to said feedback information, and extracting said identification information at said at least two cells (C1-C3), and transmitting said extracted identification information to said network element (20).

4. A method according to any one of the preceding claims, wherein said controlling step comprises transmitting a transmission command to one of said at least two cells (C1-C3), which one serves said selected cell.

5. A method according to any one of the preceding claims, wherein said downlink connection is provided via a Dedicated Physical Data Channel (DPDCH) or a Dedicated Physical Channel (DPCH) of a WCDMA system.

6. A method according to any one of the preceding claims, wherein said controlling step comprises a decision step based on a likeness function, said

decision step being used to determine an estimated primary cell for said downlink connection.

7. A method according to claim 7, wherein said likeness function is included ir said feedback information.

8. A method according to claim 7 or 8, wherein said decision step is based on the following decision rule:

$$z = \arg\max_{z\in\{1,\ldots,b\}} \left(\sum_{i=1}^{b} \Omega^i(z) \right),$$

wherein z denotes the index of said estimated primary cell for said downlinl connection, b denotes the number of active cells, and Ω^i denotes the likeness function for the i-th one of said at least two cells.

9. A system for providing a downlink connection in a cellular network, said sys tem comprising:

a) a terminal device (10) having a selection function for selecting a cell of said cellular network based on a comparison of downlink signals received from at least two first network elements (N1-N3) serving respec tive cells (C1-C3), wherein said terminal device (10) is adapted to transmit a feedback information indicating the result of said selection tc said cellular network; and

b) a second network element (20) for receiving said feedback information and for controlling said at least two first network elements (N1-N3) based on said feedback information so as to establish said downlink connection.

10. A system according to claim 10, wherein said first network element is a Node B (N1-N3) or Base Station Transceiver, and said second network element is a Radio Network Controller (20).

11. A system according to claim 10, wherein said first network element is a sec tor of a Node B (N1-N3), and said second network element is a Radio Network Controller (20).

12. A system according to any one of claims 10 to 12, wherein said cellular net work is a WCDMA radio access network.

13. A network element for providing a downlink connection in a cellular network said network element comprising:
    a) receiving means (12) for receiving a feedback information from a terminal device (10); and
    b) extracting means (14) for extracting said feedback information and for transmitting said extracted feedback information to said cellular network.

14. A network element according to claim 14, wherein said network element is Node B (N1-N3) or a Base Transceiver Station.

15. A network element for providing a downlink connection in a cellular network said network element comprising:
    a) receiving means (22) for receiving a feedback information from a terminal device (10) via at least two first network elements (N1-N3);
    b) checking means (24) for checking an identification information provided in said feedback information; and
    c) controlling means (26) for controlling said at least two first network elements (N1-N3) so as to establish said downlink connection.

16. A network element according to claim 16, wherein said network element is radio network controller (20).

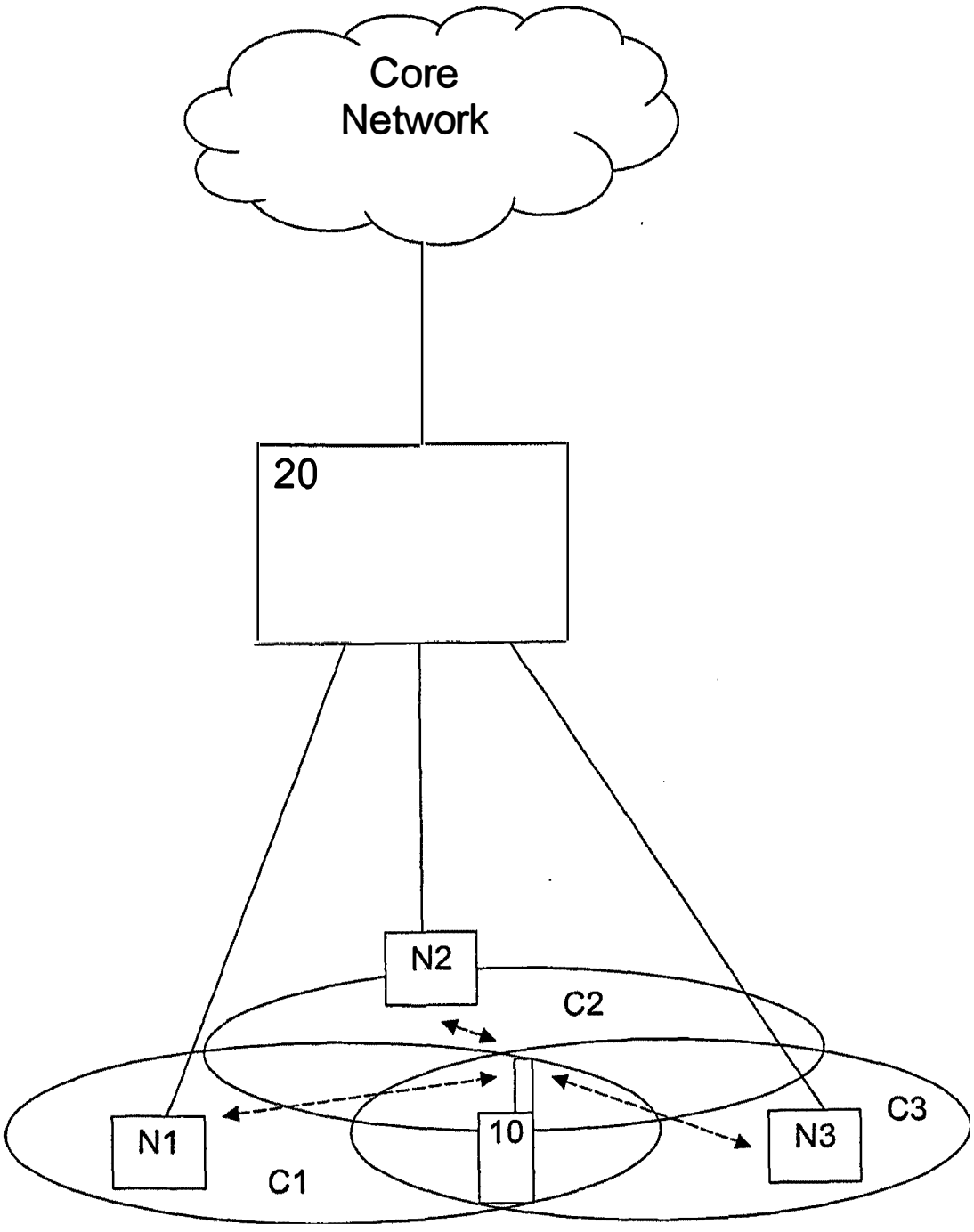


Fig. 1

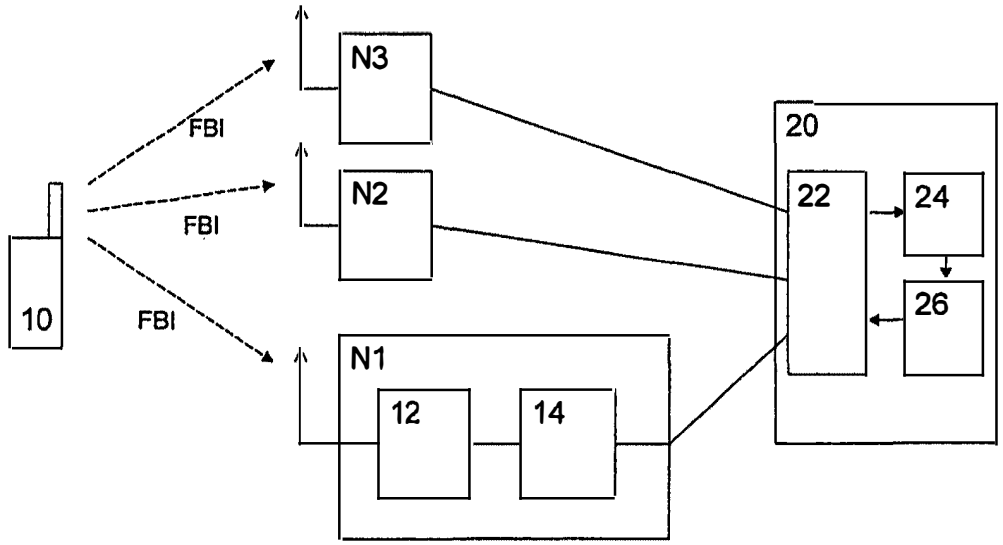

N3
FBI
20
N2
22
24
FBI
26
10
FBI
N1
12
14

Fig. 2

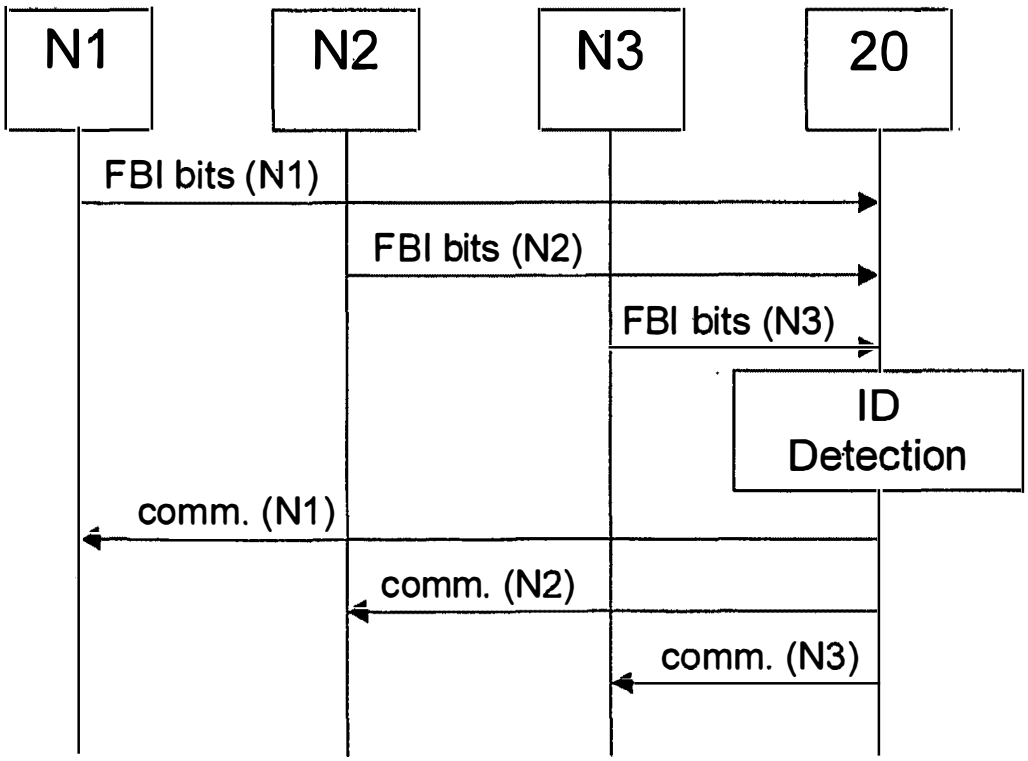

N1
N2
N3
20
FBI bits (N1)
FBI bits (N2)
FBI bits (N3)
ID
Detection
comm. (N1)
comm. (N2)
comm. (N3)

Fig. 3

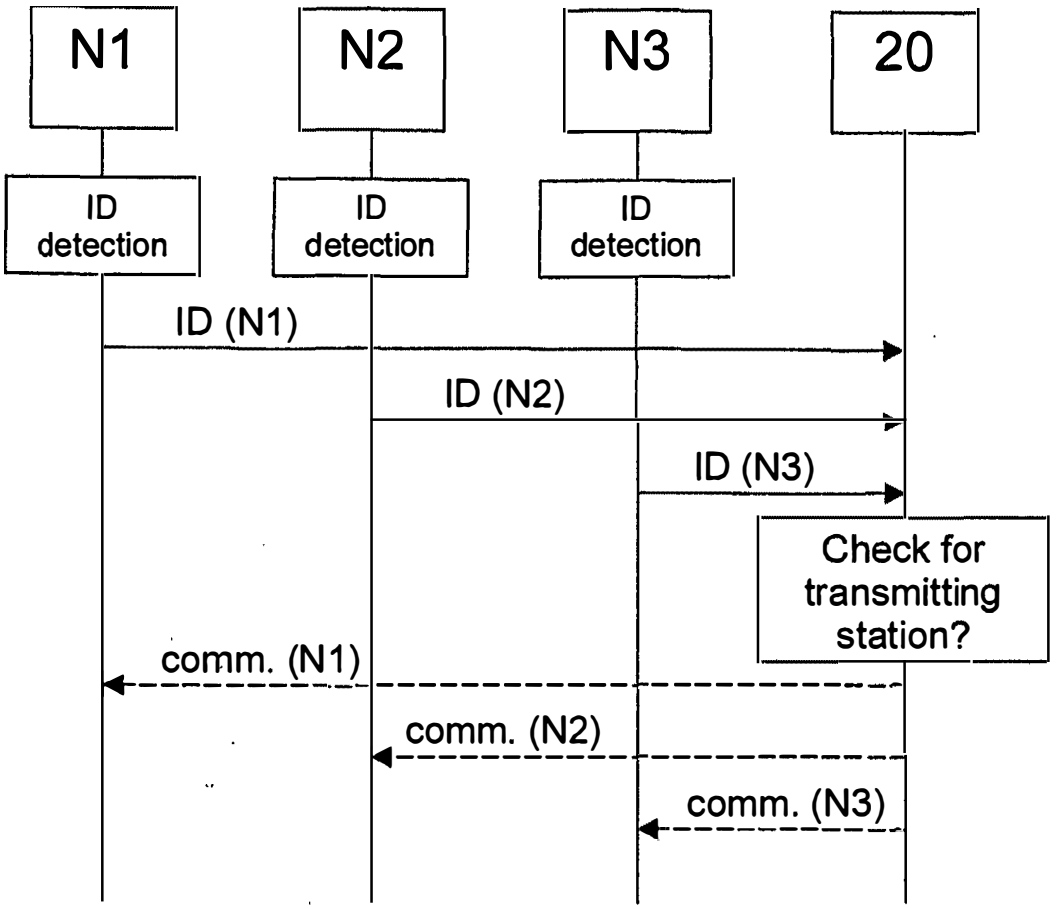

N1
N2
N3
20
ID detection
ID detection
ID detection
ID (N1)
ID (N2)
ID (N3)
Check for transmitting station?
comm. (N1)
comm. (N2)
comm. (N3)

Fig. 4

INTERNATIONAL SEARCH REPORT

Interr al Application No
PCT/EP 01/15007

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04Q7/38

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)
IPC 7 H04Q 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, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 137 302 A (MATSUSHITA ELECTRIC IND CO LTD) 26 September 2001 (2001-09-26) column 3, line 21 -column 4, line 3 column 4, line 41 -column 5, line 13 column 9, line 11 - line 20 column 10, line 28 - line 41 column 10, line 54 -column 11, line 2 abstract; claims 1-9; figures 1,3,5 ---	1-16
E	EP 1 209 820 A (NIPPON ELECTRIC CO) 29 May 2002 (2002-05-29) column 4, line 27 -column 5, line 51 column 6, line 47 -column 7, line 10 abstract; claims 1-15; figures 1,2,4 --- -/--	1,9,13, 15

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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"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	Date of mailing of the international search report
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Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Thomas Tholin

Form PCT/ISA/210 (second sheet) (July 1992)

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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A	PATENT ABSTRACTS OF JAPAN vol. 1998, no. 04, 31 March 1998 (1998-03-31) & JP 09 322222 A (N T T IDO TSUSHINMO KK), 12 December 1997 (1997-12-12) abstract, paragraphs 19-22; claims 8,9	1,9,13, 15
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INTERNATIONAL SEARCH REPORT

Information on patent family members

Intern[illegible] I Application No
PCT/EP 01/15007

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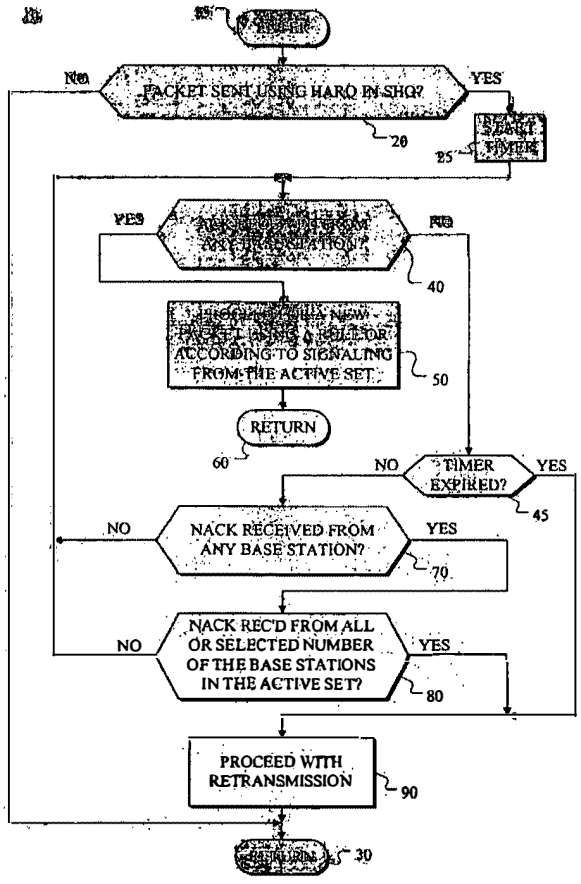
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[Continued on next page]

(54) Title: PHYSICAL LAYER PACKET RETRANSMISSION HANDLING IN WCDMA IN SOFT HANDOVER



(57) Abstract: When employing HARQ in soft handover (SHO) in a mobile communication system, a mobile station in communication with multiple base stations is signaled by each of the base stations when a packet sent by the mobile station is correctly received. However, while one or more base stations may have received the transmission correctly, others may not have, and retransmission may be called for. To address the possibility of having to resend such a packet, the mobile station of the invention retransmits only if a selected nubmer of the base stations received the transmission correctly and does not if at least one base station received the original transmission correctly. The network is then able to retrieve the packet from one or more of the base stations which have received it correctly and to supply it to another or others which have not.

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European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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PHYSICAL LAYER PACKET RETRANSMISSION HANDLING IN WCDMA IN SOFT HANDOVER

BACKGROUND OF THE INVENTION

1. Technical Field

The present invention relates to automatic repeat request (ARQ) methods for high-speed data communications in a mobile communication system and, more particularly, for use on the uplink during a soft handover.

2. Discussion of Related Art

In a standard method of checking transmitted data, the sender encodes an error detection field based on the contents of the message. The receiver recalculates the check field and compares it with that received. If they match, an "ACK" (Acknowledgement) is transmitted to the sender. If they do not match, a "NACK" (Negative Acknowledgement) is returned, and the sender retransmits the message. Naturally, the sender at least temporarily stores the data it has sent until it is assured that the receiver has received it correctly. In the new third generation wireless system which employs code division multiple access, there will be high-speed data transfers using both circuit- and packet-switched data. For the noisy channels encountered in such systems, hybrid automatic repeat request schemes are contemplated for non-real time services. The above-described automatic repeat request (ARQ) idea is combined with forward error correction to arrive at hybrid ARQ (HARQ). Forward error correction (FEC) is a technique used by a receiver for correcting errors incurred in transmission without requiring retransmission. It typically involves a transmitter using a convolution algorithm to embed sufficient redundancy in the data block to allow the receiver to correct transmission errors.

There are different ways of implementing the automatic repeat request (ARQ) concept, but the selective-repeat continuous ARQ is probably going to be used in connection with FEC for third-generation wireless systems. There are several types of ARQ that can be used. For instance, Type I is defined as identifying an erroneous packet data unit and retransmitting an identical copy. The FEC coding rate is fixed, and there is no combining of earlier and later versions of the packet data unit. In Type II, the erroneous packet data unit that needs to be retransmitted is not discarded, but

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combined with some incremental redundancy that is provided by the transmitter for subsequent decoding. The retransmitted packets usually have higher coding rates than Type I and are combined at the receiver with the stored values. Type III is similar to Type II, except that every retransmitted packet is now self-decodable. In situations where the transmitted packet can be severely damaged due, for instance, to interference, it is better to have a scheme where retransmitted blocks are self-decodable.

In any event, in the third generation there is also a concept called soft handover, where a mobile station is connected at the same time to more than one base station, called "Node B" in the third generation. Since third generation is a code-division multiple access system, it differs from earlier generation time division multiple access systems, where a handover was a short procedure, and the normal state of affairs was a non-handover situation. In CDMA systems, the situation is quite different, in that a mobile station can spend a lot of time in handover, called a soft handover (SHO) state. Each separate link from a base station is called a soft-handover branch and, from the point of view of the mobile station, there is not much difference between being connected to one Node B or several Node Bs. The mobile station is prepared to receive numerous multi-path components of the same signal using its specialized receiver. Since all base stations use the same frequency in a soft handover, the mobile station considers the signals as simply multi-path components (except for being coded with different spreading codes).

All of the base stations involved in an SHO are designated as being in an "active set". When the signal strength of a base station transmission exceeds an "addition threshold" in the mobile station, the base station is added to the active set, and the mobile station enters into an SHO state, if not already there. A "drop threshold" prevents premature removal of base stations from the active set, i.e., it has a hysteresis effect because its value is always lower than the add threshold. A timer starts when the signal strength drops below the drop threshold, and the base station is removed from the active set if the timer expires. The network controls the values of these thresholds by communications with the mobile stations.

When in soft handover, with the mobile station communicating on multiple uplinks with multiple corresponding base stations, and when employing HARQ in such a communication, the base stations will be signaling to the mobile station on corresponding downlinks to inform it as to whether or not its transmissions have been

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correctly received or not. In such a case, one or more of the multiple base stations might have received the transmission from the mobile station correctly, while others may not. This can be a problem, since the contemplated high-speed services provided by third generation systems may be slowed down considerably if one of the base stations is able to hold up the successful transmission simply because it or more than one base station did not receive a particular transmission correctly, while one or more other base stations did receive a correct reception.

One way to address this problem, for instance in a case where there are two base stations in the active set, is to have the mobile station deem a transmission successful if either base station ACKs. See "Harmonized 1xEV-DV Reverse Link Solution," C50-RL-20010523-xxx, May 23, 2001 by Lucent Technologies, Inc. Either one or all active set base stations may schedule a mobile station in soft handover. For the scenario with one base station doing the scheduling (timing of sending a packet) as well as assigning rate, duration and packet size, it is assumed the mobile was being served by that base station alone before it moved into handoff. The other base station does not schedule the user even though it is in the mobile's active set. It however monitors the mobile's reverse channels. The mobile responds to the scheduling by transmitting a data packet at the granted time using the appropriate power, rate and duration indicated by the scheduling base station. Both base stations decode the packet and send an ACK or NACK as the case may be. The mobile deems the transmission successful if either base station ACKs. In the next transmission, the mobile sends a message to flush out the buffer of any base station that may have been unsuccessful in decoding the previous transmission. For a case of both stations scheduling independently, the mobile may for instance use the scheduling received from the first base station and ignore the other base station's schedule grant. Again, the mobile deems the transmission successful if for instance the first base station ACKs and the second NACKs. The next packet transmission of the mobile can be scheduled by either base station. The mobile sends a message to flush out the second base station's buffer during this transmission.

A problem with this approach is that as individual base stations make scheduling decisions, then for example two base stations can assign the maximum rate to two mobiles simultaneously even when those mobiles are connected both to these two base stations. Then both mobiles can transmit at the cell border (in soft handover) at full rate and probably both the transmissions will fail. On the other hand, if one

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base station sets the values very low, then data rates could remain too low, especially if the active set is large.

DISCLOSURE OF INVENTION

An object of the present invention is to overcome the above-described problem by setting forth a procedure for packet retransmission handling in mobile communication systems in soft-handover.

According to a first aspect of the present invention, a mobile station has means that uses a method when operating in a packet-switched mode in a mobile communication system in which the mobile station is in communication over multiple radio links with corresponding base stations, that is characterized by determining, for a packet sent on uplinks of the multiple radio links to the corresponding base stations, whether an acknowledgement has been received on any downlink from any one of the base stations, and if so, proceeding to a new packet with a rate selected according to a rule from data rate information or signaling received from one or more of said base stations and, if not, determining if a negative acknowledgement has been received on a selected number of downlinks of the multiple radio links from the base stations and if so, proceeding with a retransmission of the packet.

In further accord with the first aspect of the invention, the mobile station and method are characterized by repeating the above-mentioned steps of determining, if a negative acknowledgement is not received from any base station or alternatively is received but not from the selected number of base stations, until acknowledgement is received, until negative acknowledgements are received from the selected number of base stations or until a timer started after sending the packet expires.

According to a second aspect of the invention, a base station has means that uses a method when operating in a packet-switched mode in a mobile communication system in which a mobile station is in communication over multiple radio links with corresponding base stations, wherein the base station checks for correct reception of incoming packets and sends an acknowledgement to the mobile station in case of correct reception and sends a negative acknowledgement otherwise, that is characterized by, prior to said check for correct reception, checking a block number of a newly-received packet, by determining if the block number is the same as a previously-received packet, by combining the newly-received packet with the

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previously-received packet if the block number is the same, and otherwise by storing the newly-received packet without combination.

These and other objects, features and advantages of the present invention will become more apparent in light of the following detailed description of a best mode embodiment thereof, as illustrated in the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWING

Fig. 1 shows a physical/link layer packet retransmission handling procedure for use in a mobile station in soft handover in a code division multiple access system, according to the present invention.

Fig. 2 shows physical/link layer packet retransmission handling for use in a base station in communication with a mobile station in soft handover in a code division multiple access system, according to the present invention.

Fig. 3 shows a code division multiple access system in which a mobile station is operating in a packet-switched mode in communication over multiple radio links with corresponding base stations, according to the present invention.

BEST MODE FOR CARRYING OUT THE INVENTION

Fig. 1 shows a method 10 for use by a mobile station operating in a packet-switched mode in a mobile communication system, such as a code division multiple access system, in which the mobile station is in communication over multiple radio links with corresponding base stations. After entering in a step 15, a step 20 is executed to determine whether the mobile station is using hybrid automatic repeat request (HARQ) in soft handover (SHO). If not, a return is made is a step 30. If so, a retransmission timer is started in a step 25 and a step 40 is executed to determine if an acknowledgement has been received from any base station in the active set acknowledging receipt of the packet. If so, the mobile station proceeds for a new packet using a rule or according to signaling from the active set, as shown in a step 50, such as transmitting a new packet and a return is made in a step 60. This means the mobile station assumes that the network can determine the correct packet in all base stations in the active set, even though not all of the base stations have sent an acknowledgement back to the mobile station. The mobile station can then take appropriate steps to, for instance, cease storing the packet that has just been

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acknowledged by one of the base stations, since it is now confident that the network has received it properly.

On the other hand, if an acknowledgement has not yet been received from any base station, as determined in the step 40, a step 45 is executed to determine if the retransmission timer has expired. If not, a step 70 is then executed to find out if any negative acknowledgements have been received from any of the base stations in the active set. If not, the step 40 is re-executed. If an acknowledgement has now been received, the step 50 is executed. If not, the timer is checked again in step 45. If the step 70 had instead determines that a NACK has been received, a step 80 is executed to determine if negative acknowledgements have been received from all of the base stations in the active set or from a selected number of them. If not, the step 40 is re-executed and the timer is checked in step 45. If step 80 finds that all or the selected number of the base stations in the active set have sent negative acknowledgements, a step 90 is executed to proceed with retransmission of the packet by the mobile station, and a return is made in the step 30. If, during any of the timer checks performed in step 45, it is determined the retransmission timer has expired, the retransmission step 90 is executed directly and a return made in the step 30.

According to the procedure shown in Fig.1, therefore, it is not necessary for the mobile station to wait for acknowledgements from all of the base stations before proceeding for a new packet. In the event that one or more of the base stations may have received the transmission correctly while others may not have, the transmission of data is not delayed by further (repeat) transmissions. The mobile station deals with the situation by assuming that if an acknowledgement is received from one base station then the network can take care of any problems in reception in all of the base stations in the active set. Only if none or only a selected number of the base stations have received the transmission correctly is there any requirement for retransmission.

As individual base stations make scheduling decisions, then e.g. two base stations can give the maximum rate to two mobiles simultaneously even when those mobiles are connected both to these two base stations, and then without rules both terminals could for instance transmit at the cell border (in SHO) at full rate. Probably both transmissions will fail. Another problem would be if one base station sets the values very low. Then the data rates could remain too low especially if the active set were large.

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Therefore, according to the present invention, and referring back to step 50 of Fig. 1, in addition to the ACK/NACK from multiple base stations, there is a need to consider also the base station specific scheduling information. A rule needs to be established for choosing the best parameters among those assigned by the base stations, particularly when more than one base station in the active set are assigning such parameters independently and particularly with respect to the rate. Alternative ways for doing so are provided, for instance, according to the invention:

1. Continue transmission according to the smallest scheduler value from the values received from multiple base stations; or

2. Continue transmission according to the smallest scheduler value from the values received from multiple base stations, but consider only those that fit into certain window in terms of reliability (based on signal strength); or

3. Continue transmission according to a weighted average scheduler value from the values received from multiple base stations, with weights determined based on the base station signal strength.

The choice of the smallest scheduler value according to the first alternative relates to the fact that each base station in the active set can give scheduling information for the terminal independently (distributed scheduling). This means that e.g. when the active set size is two, then the mobile station can receive scheduling information from two base stations. One might have a good interference situation and thus allow a high data rate while the other might have a worse interference situation (higher interference level) and thus allow only a low data rate in the scheduling.

The above mentioned window according to the second alternative refers to a range of e.g. CPICH Ec/Ior differences between the base stations or any other measurement value that may be used as handover criteria. The window is relevant for the case where a base station is in the active set but the signal strength (such as CPICH Ec/Ior level) is significantly lower than the strongest base station. In the uplink direction such a base station does not receive a very good signal either as the strongest base station will dominate also the power control behavior of the mobile station's uplink transmission. Then it is advantageous to consider the scheduling information less important from the "weak" base station and either ignore it fully or to weight it with some factor. A parameter could be given with higher layer signaling as well. For example, a mobile station might receive scheduling values from two base stations as 2 Mbits/s and 100 kbits/s. It would then derive from the signal strength,

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based on some rule or based on higher layer signaling (or both), weight factors that the mobile station would then use to transmit with e.g. 1.5 Mbits/s. (0.7 * 2 + 0.3 *0.1) Mbits/s.

The signal strength can be derived from the base station signal (CPICH=Common Pilot Channel) strength, and a bigger weight given to the base station with the greater signal strength and thus better reliability.

If the example is extended for three base stations, then for example it could be that two are determined as reliable and these two are given the weight e.g. 0.7 and one less reliable and given the weight 0.3. The calculation should be adjusted according the number of base stations in the active set so that the sum of weights remains as one (as was done in the earlier example). Thus we would have:
(0.7 * 2Mbits/s + 0.7 * 2 Mbits/s+ 0.3 *100 kbits/s)/(0.7+0.7+0.3), which would correspond to the mobile station transmitting at around 1.7 Mbits/s (assuming both strong base station indicate 2 Mbits/s and the weaker indicates 100 Kbits/s). Thus the higher layer signaling could determine the window within which base stations are considered reliable/strong and then how to weight the strong base station with respect to a weak one. An example would be to consider base stations reliable which are within 5 dB of the strongest base station CPICH strength and weight scheduling values from strong base stations with 0.6 and with 0.4 for the weak ones.

At the base station side, as shown in Fig. 2, the physical/link layer packet retransmission handling, according to the present invention, is shown in a series of steps 100. After entering in a step 105, a step 120 is executed to determine if a packet has been received. If not, a return is made in a step 125. If a packet has been received, however, the block number of the received packet is then checked in a step 170 and compared to a block number of a previously-received packet, as shown in a step 180. Such block or sequence numbers may be provided for instance at the MAC layer as disclosed in co-pending, co-owned US provisional application serial number 60/292,023 filed May 18, 2001 entitled "HARQ scheme with in-sequence delivery of packets." If it has the same MAC block number as a previously-received packet, it is a retransmitted packet and is combined with the previous packet in a soft buffer, as shown in a step 190. If not, it is a new packet and the contents of the soft buffer are flushed, and the new packet stored therein, as shown in a step 195, followed by a step 130 to check for correct reception, e.g., by forward error correction (FEC). If not correct, as determined in a step 135, a negative acknowledgement is set in a step 150

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and a return is made in the step 125. If correct, an acknowledgement is sent in the step 160 followed by a return step 125.

According to the methodology 100 shown in Fig. 2, therefore, the base station maintains a counter for ARQ channels or processes and identifies when there is a transmission for a process with a packet waiting for combining already. There will be a separate soft decision buffer for each mobile station and each HARQ process. When the base station receives a block from a given mobile station for a given HARQ process with the same block number, it combines it with the contents of the soft buffer. On the other hand, if the block number is not the same, then the base station will flush the contents of the soft buffer and store the newly-received block in the buffer. In either case, if some base station has received a block correctly, it will acknowledge it, and the mobile station will proceed with the transmission of a new block as per step 50 of Fig. 1. Other base stations will notice the new transmission from the incremented block number.

Depending on the network configuration, the indication sent at the step 150 of the failed decoding is also sent to the radio network controller. The base station common pilot indicator channel (CPICH) Ec/Ior, or the like, can be used as an additional reliability criterion for a received acknowledge message/bits.

Fig. 3 shows a code division multiple access system 300 in which a mobile station 310 is operating in a packet-switched mode in communication over multiple radio links 320, 330, 340 with corresponding base stations 350, 360, 370 which are part of an active set 380, according to the present invention. After transmission of a packet on uplinks of the links 320, 330, 340, the mobile station 310 stores the transmitted packet, starts a timer 403, and waits for an acknowledgement or a negative acknowledgement from one or more of the base stations of the active set 380. In this connection, the mobile station has a means 400 responsive to a signal on a line 402 from a duplexer 404 connected to an antenna 406 for receiving signals on downlinks associated with the links 320, 330, 340 (it will be realized that separate receive and transmit antennas may be used and a duplexer would not be necessary). If one of the base stations, for instance, the base station 350, sends acknowledgement of the just-transmitted packet, the means 400 for determining if acknowledgements have been received from any base station makes such a determination and sends a signal on a line 407 to a means 408 for proceeding, for instance, for transmitting a new packet on a line 410 to the duplexer 404 for transmission on the antenna 406 on uplinks of

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the links 320, 330, 340 to the base stations of the active set 380. In response to the signal on the line 407, the means 408 initiates transmission of a new packet with a rate selected according to a rule from data rate information or signaling received from one or more of the base stations in the active set 380. On the other hand, the mobile station also has means 412 for determining if a negative acknowledgement has been received from any, all or a selected number of the base stations in the active set before the timer expires. Another way of saying this is that the means 412 determines if a NACK has been received from all or a selected number of the base stations in the active set. If one such base station sends a negative acknowledgement, this fact is taken note of by the means 412 and may also be signaled to the means 400, as indicated on a line 414. Unlike the means 400 which will immediately proceed to cause a new packet to be transmitted even if only one base station acknowledges receipt of the previous packet, the means 412 may wait to find out if any more negative acknowledgements are incoming from the active set 380 depending on how it is set up. In particular, if all of the base stations in the active set send negative acknowledgements, the means 412 will definitely send a signal on a line 416 to means 418 for proceeding with retransmission of the packet previously stored after transmission. In such a case, a transmitted packet that has not been properly received by any base station in the active set can be retransmitted, but only after negative acknowledgements are received from all of the base stations in the active set 380. However, it is also conceivable to foresee a situation where one or more of the base stations is totally out of communication for some reason, and the means 412 should be able to send the signal on the line 416 to initiate retransmission if a selected number of negative acknowledgements are received, i.e., not necessarily from all the base stations (maybe even only one). Such could be reserved for a condition where there are known high interference conditions, for instance. The selected number need not be fixed, but could vary according to some rule.

The various base stations 350, 360, 370 of the active set 380 of Fig. 3 are illustrated in more detail with respect to the base station 350, according to the present invention. The base station is, of course, operating in the packet-switched mode, also in the code division multiple access system of Fig. 3, in which the mobile station 310 is in communication with not only the base station 350 but also the base stations 360, 370, all being part of the active set 380. Upon reception of a packet on an uplink of the link 320 via an antenna 420 and a duplexer 422, the new packet is provided on a

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line 424 to a means 425 for receiving and temporarily storing a new packet. Of course, separate receive and transmit antennas may be used and no duplexer. A block number of the newly received packet is provided on a line 425a to a means 434 for obtaining, checking, and providing block numbers or sequence numbers of received packets. This block number is provided on a line 436 to a means 438 for comparing the block number of the received packet to the block number of a packet previously received from the mobile station 310 and provided on a line 442 to the means 438. The block number of the previously-received packet could for instance be provided on the line 442 to the means 438 in order to enable the comparison with the block number provided on the line 436. The results of the comparison are provided on a line 450 to the means 425 or to some other equivalent means for providing the newly received packet to the soft buffer either directly or with combination. If they are the same, as indicated on a line 454, the received packet is provided on a line 451 to a means 452 for combining the received packet with the previously-received packet (in the event the block numbers are the same), and then storing the combined packets in the soft buffer. In case they are different, as indicated on a line 458, the new packet can be provided on a line 460 from the means 425 to the soft buffer 440 for storage therein. In that case, the contents of the soft buffer are entirely replaced by the new packet, i.e., the buffer is "flushed" and the new packet is then stored.

In both cases, the contents of the soft buffer are then provided on a line 425b to a means 426 for checking for correct reception thereof. This could be done by FEC, for instance. An indication is provided on a line 428 of correct or incorrect reception to a means 430 for sending an appropriate acknowledgement or negative acknowledgement on a line 432 to the duplexer 422 and the antenna 420, where the ACK or NACK is provided on a downlink of the line 320 to the mobile station 310. In this way, a criterion is defined for use in a system including a mobile station in which it is decided whether to retransmit the data or whether to send a new packet. If any of the base stations in the active set gives a positive HARQ acknowledgement in the downlink direction, then the transmission is considered successful, and a new packet is transmitted in the uplinks. This allows a short round-trip delay, as radio network controller (RNC) involvement is not needed for MAC operation. Further, the base station buffer can be cleared for a new packet when a packet with a higher (different) sequence number is sent to the same "ARQ channel" than the earlier

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packet with a decoding failure. As mentioned, base station CPICH Ec/Ior, etc., can be used as an additional reliability criterion for a received acknowledge message/bits.

Although the invention has been shown and described with respect to a best mode embodiment thereof, it should be understood by those skilled in the art that the foregoing and various other changes, omissions and additions in the form and detail thereof may be made therein without departing from the spirit and scope of the invention.

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CLAIMS

1. Method (10) for use by a mobile station operating in a packet-switched mode in a mobile communication system in which the mobile station is in communication over multiple radio links with corresponding base stations, characterized by

determining (40), for a packet sent on uplinks of said multiple radio links to the corresponding base stations, whether an acknowledgement has been received on any downlink from any one of the base stations, and if so, proceeding (50) to a new packet with a rate selected according to a rule from data rate information or signaling received from one or more of said base stations and, if not,

determining (70, 80) if a negative acknowledgement has been received on a selected number of downlinks of said multiple radio links from the base stations and if so, proceeding (90) with a retransmission of the packet.

2. The method of claim 1, characterized by repeating said steps of determining (40, 70, 80), if a negative acknowledgement is not received from any base station or alternatively is received but not from the selected number of the base stations, until an acknowledgement is received, until negative acknowledgements are received on the selected number of downlinks, or until a timer started (25) after sending said packet expires.

3. The method of claim 1, characterized by said selected number of downlinks coming from more than one of said base stations.

4. The method of claim 1, characterized by said mobile station in soft handover and by said base stations in an active set.

5. Method (100) for use in a base station operating in a packet-switched mode in a mobile communication system in which a mobile station operating according to claim 1 is in communication over multiple radio links with corresponding base stations, wherein said base station checks (130) for correct reception of incoming packets and sends an acknowledgement (160) to the mobile station in case of correct reception and sends (150) a negative acknowledgement

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otherwise, further characterized by, prior to said check (130) for correct reception, checking (170) a block number of a received packet, by determining (180) if the block number is the same as a previously-received packet, by combining (190) the received packet with the previously-received packet if the block number is the same, and otherwise by storing the newly-received packet without combination.

6. Method (10, 100) for use in a mobile communication system in which a mobile station operating in a packet-switched mode is in communication over multiple radio links with corresponding base stations, characterized by

determining (40) in the mobile station, for a packet sent on multiple uplinks of said multiple radio links to the corresponding base stations, whether an acknowledgement has been received on any one of multiple downlinks of said multiple radio links from any one of the base stations, and if so, proceeding (50) to a new packet with a rate selected according to a rule from data rate information or signaling received from one or more of said base stations and, if not, determining (70) in the mobile station if a negative acknowledgement has been received on downlinks of all said multiple radio links from all the base stations and if so, retransmitting (90) said packet, and if a negative acknowledgement has not been received from all the base stations, repeating said steps of determining (40, 70) until an acknowledgement is received or until negative acknowledgements are received from all the base stations, by

checking (170) in each base station a block number of a received packet, by determining (180) if the block number is the same as a previously-received packet, by combining (190) the received packet with the previously-received packet if the block number is the same, and otherwise by storing the new, received packet, and by checking (130) in each base station for correct reception of received packets, by sending (160) an acknowledgement to the mobile station in case of correct reception, or by sending (150) a negative acknowledgement in case of incorrect reception.

7. A mobile station (310) operating in a packet-switched mode in a mobile communication system (300), in which the mobile station is in communication over multiple radio links (320, 330, 340) with corresponding base stations (350, 360, 370), characterized by

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means (400) for determining, for a packet sent on uplinks of said multiple radio links to the corresponding base stations, whether an acknowledgement has been received on any downlink from any one of the base stations and if so, providing a signal (407) for initiating the transmission of a new packet with a rate selected according to a rule from data rate information or signaling received from one or more of said base stations; and

means (412) for determining if a negative acknowledgement has been received from a selected number of downlinks of said multiple radio links from the base stations and if so, providing a signal (416) for initiating retransmission of the packet.

8. The mobile station of claim 7, further comprising a timer (403) for timing a period after said packet is sent on said uplinks and for initiating said retransmission after a selected period without any acknowledgement received from said any one of the base stations.

9. Base station (350) operating in a packet-switched mode in a mobile communication system (300) in which a mobile station (310) according to claim 7 is in communication over multiple radio links (320, 330, 340) with corresponding base stations (350, 360, 370), wherein said base station comprises

means (426) for checking for correct reception of incoming packets;

means (430) for sending an acknowledgement to the mobile station in case of correct reception and for sending a negative acknowledgement otherwise;

means (438) for determining if a sequence number is the same as a previously-received packet;

means (452) for combining the received packet with the previously-received packet if the block number is the same; and

means (440) for storing the received packet with or without combination with said previously-received packet.

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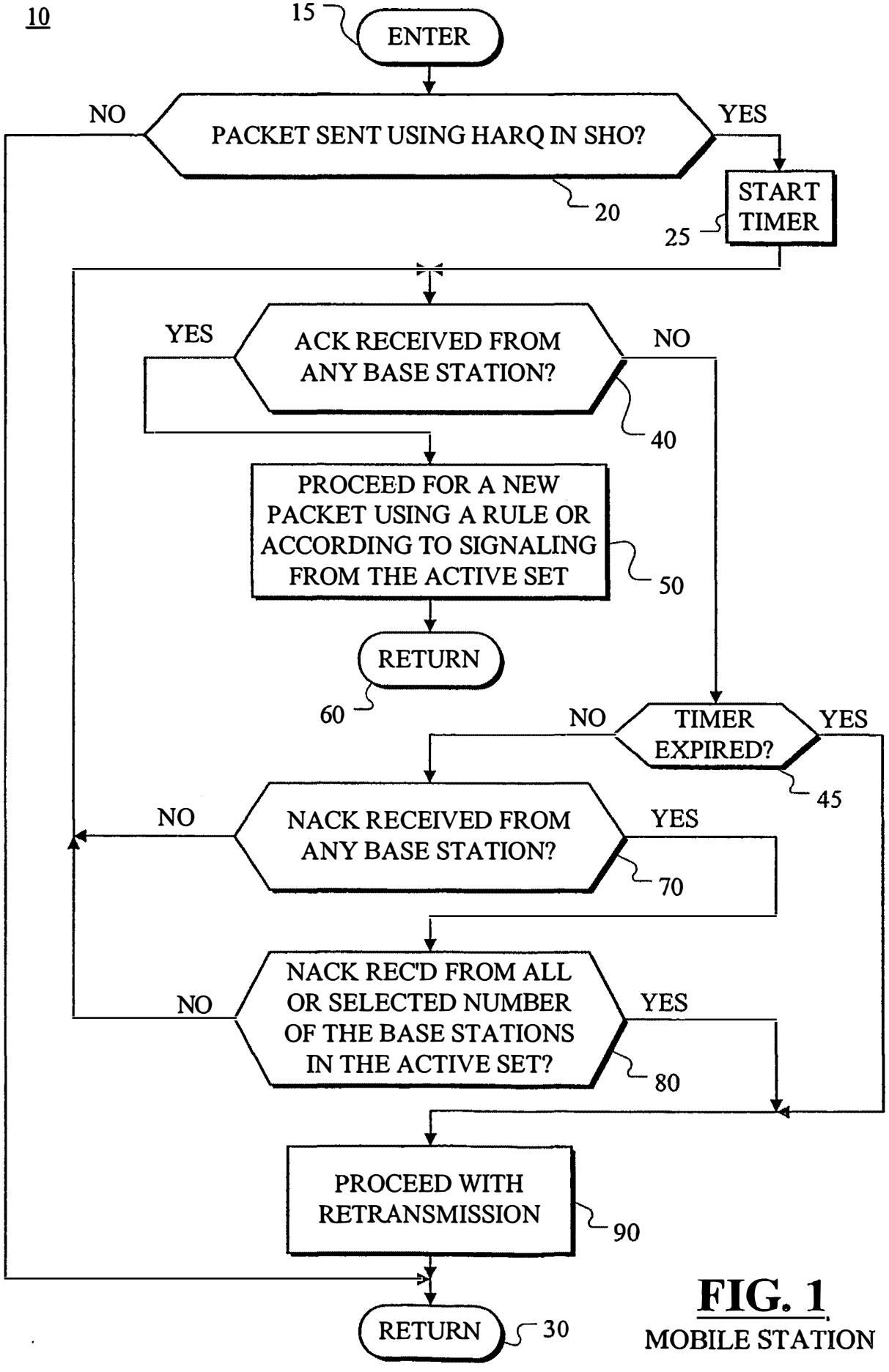
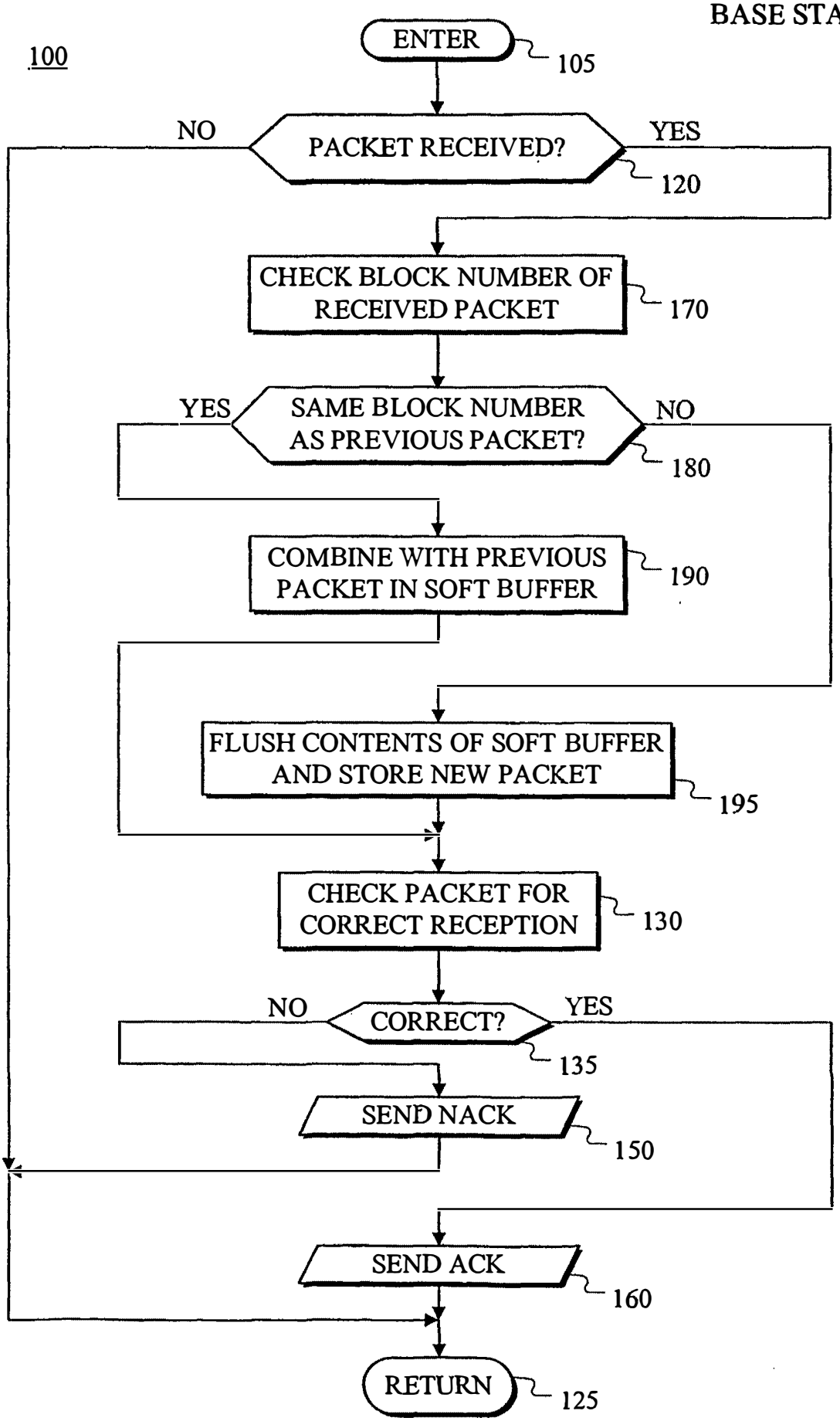


FIG. 1
MOBILE STATION

FIG. 2

BASE STATION



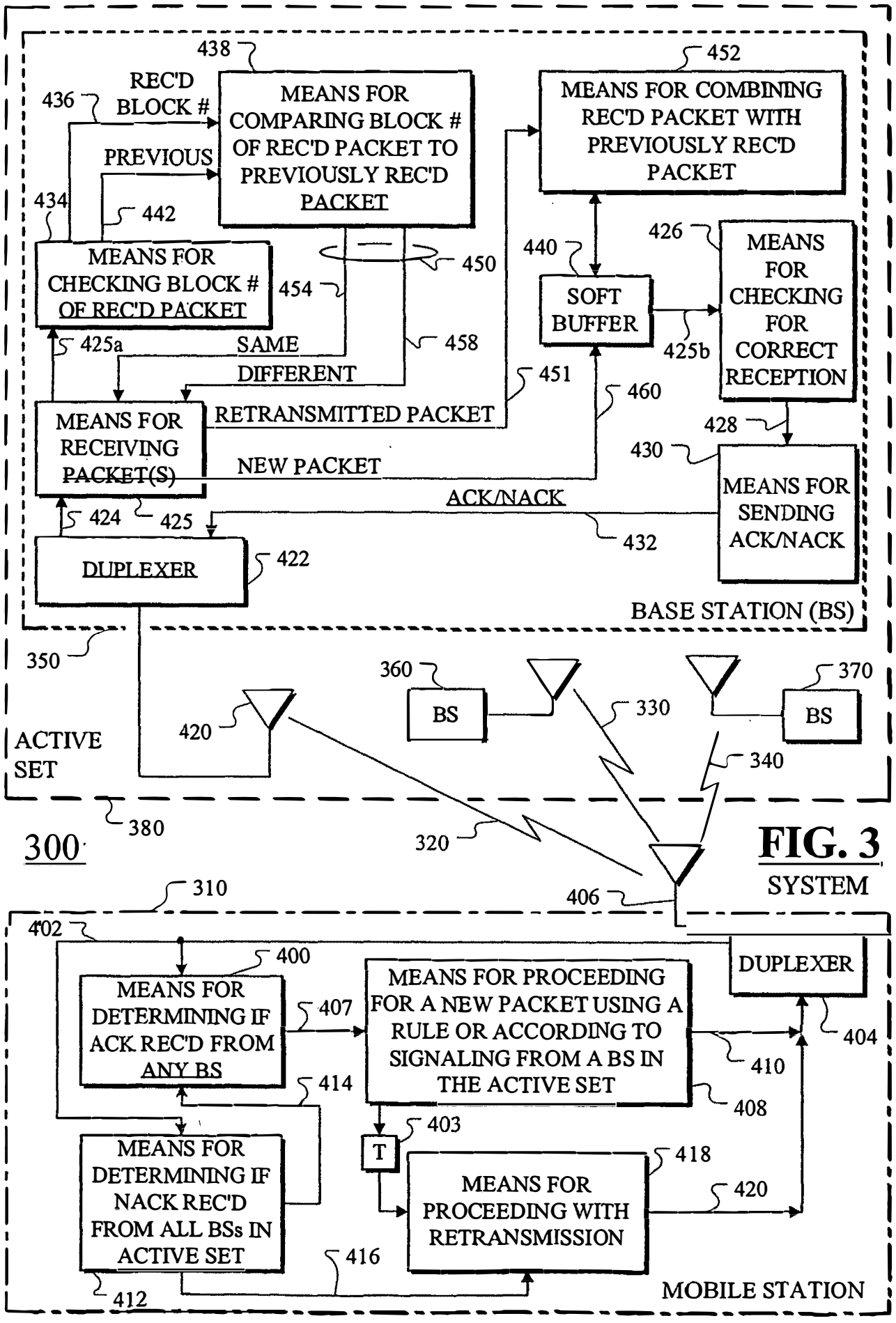

438
REC'D BLOCK #
436
MEANS FOR COMPARING BLOCK # OF REC'D PACKET TO PREVIOUSLY REC'D PACKET
PREVIOUS
434
442
MEANS FOR CHECKING BLOCK # OF REC'D PACKET
454
450
425a
SAME
458
DIFFERENT
MEANS FOR RECEIVING PACKET(S)
RETRANSMITTED PACKET
451
NEW PACKET
424
425
DUPLEXER
422
350
452
MEANS FOR COMBINING REC'D PACKET WITH PREVIOUSLY REC'D PACKET
440
SOFT BUFFER
426
MEANS FOR CHECKING FOR CORRECT RECEPTION
425b
460
428
430
MEANS FOR SENDING ACK/NACK
ACK/NACK
432
BASE STATION (BS)
360
BS
330
370
BS
420
340
ACTIVE SET
380
320
300
310
406
402
400
MEANS FOR DETERMINING IF ACK REC'D FROM ANY BS
407
MEANS FOR PROCEEDING FOR A NEW PACKET USING A RULE OR ACCORDING TO SIGNALING FROM A BS IN THE ACTIVE SET
DUPLEXER
404
410
414
408
403
T
MEANS FOR DETERMINING IF NACK REC'D FROM ALL BSs IN ACTIVE SET
418
MEANS FOR PROCEEDING WITH RETRANSMISSION
420
416
412
MOBILE STATION

FIG. 3
SYSTEM

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First Named Inventor	Zhang et al.
Art Unit	2616
Examiner Name	Not yet known
Attorney Docket Number	I-2-0674.2US

ENCLOSURES *(Check all that apply)*

- ☐ Fee Transmittal Form
- ☐ Fee Attached
- ☐ Amendment/Reply
- ☐ After Final
- ☐ Affidavits/declaration(s)
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- ☒ Other Enclosure(s) (please Identify below):

PTO - 1449 with 3 references

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	VOLPE AND KOENIG, P.C.		
Signature	Thomas A. Mattioli		
Printed name	Thomas A. Mattioli		
Date	December 10, 2007	Reg. No.	56,773

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the PATENT APPLICATION of:	Zhang et al.
Application No.:	11/434,330
Confirmation No.:	5166
Filed:	May 15, 2006
For:	SUPPORTING ENHANCED UPLINK TRANSMISSION DURING SOFT HANDOVER
Group:	2616
Examiner:	Not yet known

Our File: I-2-0674.2US

Date: December 10, 2007

INFORMATION DISCLOSURE STATEMENT

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Further to Applicants' Duty of Disclosure pursuant to 37 C.F.R. §1.56, Applicants wish to bring to the Examiner's attention the material cited on the enclosed Form PTO-1449.

The listed references include references previously cited in this application. Newly cited documents are indicated by an asterisk (*) on the enclosed Form PTO-1449. Copies of the newly cited documents are enclosed. Pursuant to 37 C.F.R. §1.98(a)(2)(ii), copies of the newly cited U.S. publications and/or patent documents have not been included.

It is respectfully requested that the Examiner consider these documents and return an initialed copy of the Form PTO-1449 indicating his consideration of the cited materials.

Respectfully submitted,

Zhang et al.

By _____
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United Plaza, Suite 1600
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Philadelphia, PA 19103

TAM/pck
Enclosures (3)

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	APPLICANT Zhang et al.	
	FILING DATE May 15, 2006	GROUP 2616

U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	*	6,778,830	08/2004	Oizumi et al.			
		6,892,071	05/2005	Park et al.			
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		2005/0083888	04/2005	Smee et al.			

FOREIGN PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES	TRANSLATION NO
		2 353 439	02/2001	GB				
	*	2001-128209	05/2001	JP			X**	
		02/01893	01/2002	WO				

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	FILING DATE May 15, 2006	GROUP 2616

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES	TRANSLATION NO
		03/053087	06/2003	WO				
		03/067953	08/2003	WO				
	*	03/088545	10/2003	WO				

OTHER DOCUMENTS

EXAMINER INITIAL		DESCRIPTION (Including Author, Title, Date, Pertinent Pages, Etc.)
	*	3GPP, "Third Generation Partnership Project; Technical Specification Group Radio Access Network; FDD Enhanced Uplink; Overall Description; Stage 2 (Release 6)," 3GPP TS 25.309 V6.0.0 (September 2004).
		3GPP2 C.20003-C, "Medium Access Control (MAC) Standard for cdma2000 Spread Spectrum Systems", 3rd Generation Partnership Project 2 "3GPP2", Version 2.0, Release C, August 2004.
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		3GPP2 C.S0005-C, "Upper Layer (Layer 3) Signaling Standard for cdma2000 Spread Spectrum Systems", 3rd Generation Partnership Project 2 "3GPP2", Version 2.0, Revision c, July 23, 2004.
		GPP2 C.S0002-C, "Physical Layer Standard for cdma2000 Spread Spectrum Systems", 3rd Generation Partnership Project 2 "3GPP2", Version 2.0, Revision C, July 23, 2004.

EXAMINER	DATE CONSIDERED

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EUROPEAN PATENT OFFICE

Patent Abstracts of Japan

PUBLICATION NUMBER : 2001128209
PUBLICATION DATE : 11-05-01

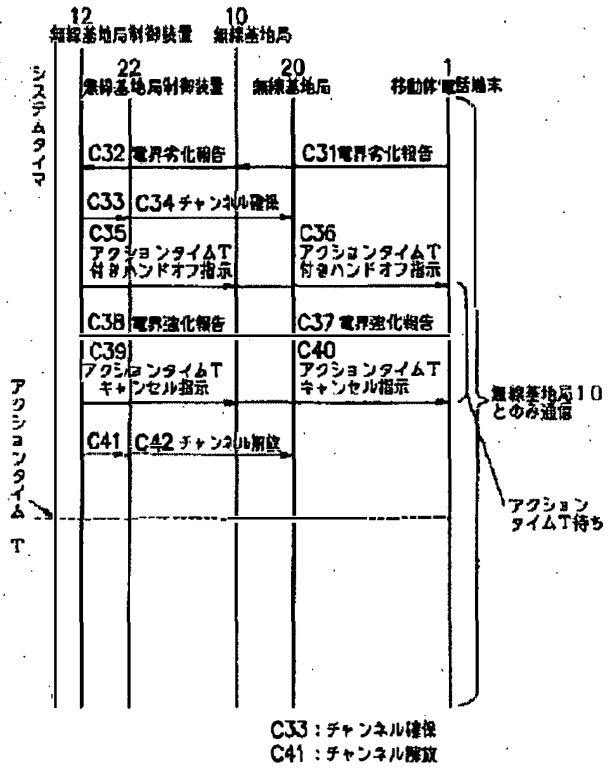
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APPLICATION NUMBER : 11304659

APPLICANT : NEC COMMUN SYST LTD;

INVENTOR : SHIOTSUKI HIROBUMI;

INT.CL. : H04Q 7/22 H04Q 7/34

TITLE : MOBILE PHONE COMMUNICATION SYSTEM AND CHANNEL CHANGEOVER SYSTEM BETWEEN THE MOBILE PHONE COMMUNICATION SYSTEMS



ABSTRACT : PROBLEM TO BE SOLVED: To prevent deterioration in the service quality by hard hand-off control conducted repetitively in an area where service areas by adjacent different vendors or different operators overlap.

SOLUTION: A wireless base station controller receiving an electric field deterioration report adds an action time T to a hard hand-off instruction signal to be sent so as to delay timing for the hard hand-off control until a surrounding radio electric field is made clear. Furthermore, when no hard hand-off control is required, a hard hand-off instruction signal is aborted to avoid useless hard hand-off control.

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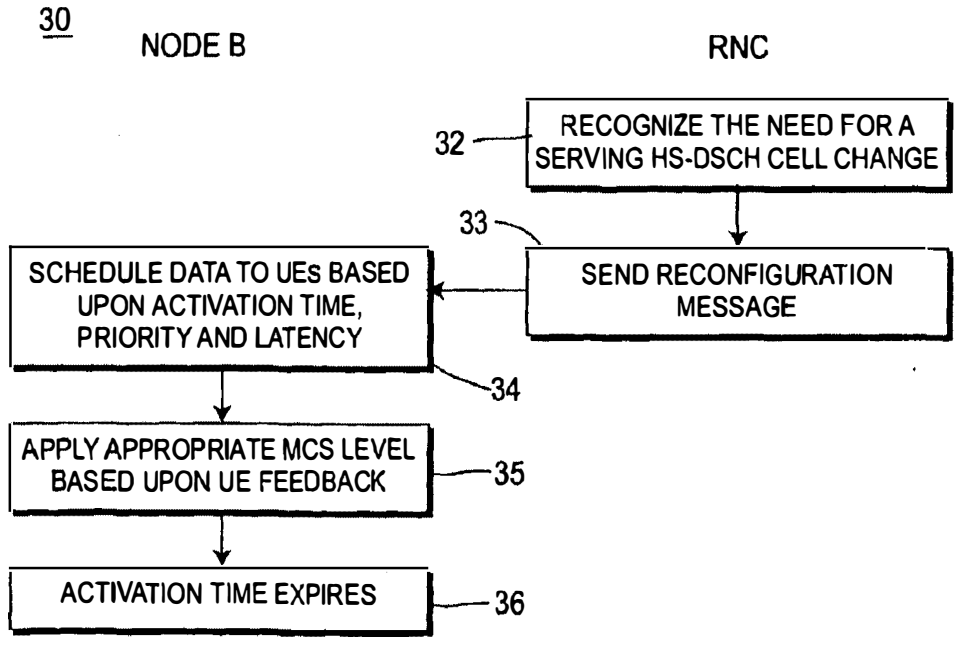
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(54) Title: NODE B AND RNC ACTIONS DURING A SERVING HSDPA CELL CHANGE



(57) Abstract: A system and method in accordance with the present invention reduce the amount of data that is stalled in a source Node B after a serving HS-DSCH cell change in a communication system that includes a serving RNC and at least one Node B. In a first embodiment, the RNC temporarily suspends data transmissions from the RNC to the Node B. In a second embodiment, the activation time is used in data scheduling. In a third embodiment, a more robust MCS level is selected. In a fourth embodiment flow control is employed for the data transmitted between the RNC and the Node B.

WO 03/088545 A2

[0001] # NODE B AND RNC ACTIONS DURING A SERVING HSDPA CELL CHANGE

[0002] ## FIELD OF THE INVENTION

[0003] The present invention relates to the field of wireless communications. More specifically, the present invention relates to intelligent scheduling of data transmissions to reduce, and potentially avoid, data recovery by high layers following handover.

[0004] ## BACKGROUND OF THE INVENTION

[0005] In the High Speed Downlink Packet Access (HSDPA) of a third generation (3G) cellular system for Frequency Division Duplex (FDD) and Time Division Duplex (TDD) modes, data in the form of Protocol Data Units (PDUs) for the High Speed Downlink Shared Channel (HS-DSCH) is distributed (i.e., buffered and scheduled) in the Node B. Therefore, the Radio Network Controller (RNC) does not have an up-to-date status of the transmissions of Protocol Data Units (PDU).

[0006] There are scenarios in which a User Equipment (UE) has to perform a serving HS-DSCH cell change to achieve improved radio conditions and avoid loss of the radio link. The serving HS-DSCH cell change is when the UE has to change the cell associated with the UTRAN access point performing transmission and reception of the serving HS-DSCH radio link.

[0007] The Node B associated with the cell before the serving HS-DSCH cell change is called the source Node B and the Node B associated with the cell after the serving HS-DSCH cell change is called the target Node B. With HSDPA, since data is typically distributed in a Node B prior to transmission to the UE, when the UE performs a serving HS-DSCH cell change it is possible that the UE stops transmission and reception in the source cell before all of the PDUs currently stored in the source Node B are transmitted. Accordingly, there is a possibility that considerable amounts of data buffered in the source Node B will be lost. The reason is at the moment of handover there is no mechanism within the UTRAN architecture that allows for

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transfer of the buffered data to the target Node B. When data is lost in the source Node B it can be recovered by the RNC, but at the cost of significant additional transmission latency that may result in inability to achieve the user's quality of service requirement.

[0008] A prior art method for processing data during a serving HS-DSCH cell change is shown in Figure 1. After the RNC recognizes the need for a serving HS-DSCH cell change, it sends a reconfiguration message to the Node B. This reconfiguration message may or may not specify an activation time, which is an explicit moment in time that is known in the Node B when the UE will stop listening to the HS-DSCH in that cell and start receiving the HS-DSCH in a new cell. If there is no activation time specified in the reconfiguration message, the UE will stop listening to the HS-DSCH in the source cell and wait for receiving the HS-DSCH in a new cell until the Layer 1 connection to the new cell is established. Any data that is buffered in the Node B after the activation time will be stalled in the Node B and is useless and therefore will be discarded.

[0009] Upon receipt of the reconfiguration message, the Node B continues to schedule data to UEs based upon the priority of the data and latency requirements. The Node B then applies the appropriate modulation and coding set (MCS), which is chosen by the scheduler, to the data for transmission to the UEs. In current 3G systems, the MCS level is based upon UE feedback that identifies the downlink channel quality to the Node B. Upon reception of the channel quality estimate, the Node B determines the MCS primarily based on a mapping table predefined and known by both the UE and the Node B. The mechanism to choose the MCS may, for example, be based on reaching certain channel quality thresholds. MCS choices range from less robust combinations that provide a high data rate with less error protection, to more robust MCS choices that provide greater probability of successful transmission at lower data rates. The less robust MCS choices use less radio resources for a given data transmission then are required for the more robust MCS choices.

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[0010] Using the prior art method shown in the flow diagram of Figure 1, once the activation time expires, the UE is no longer receiving in the source cell and data buffered in the source Node B for transmission in that cell is lost.

[0011] The prior art method of recovery of data lost in the source Node B is by radio link control (RLC) layer. The difficulty with the prior art RLC recovery process is that transmission latency is significantly increased and the quality of service requirements may not be achieved. If the number of PDUs stalled in the source Node B is large, the RLC will need to retransmit a large amount of PDUs, resulting in a longer latency of PDU transmission. The transmission delay may be increased further by any new data that is transmitted in the target cell prior to the lost PDUs in the source Node B are known to the sending RLC, since the Node B for each priority queue schedules transmissions as a FIFO regardless of whether the PDUs are initial transmissions or retransmissions. As a result, upon a serving HS-DSCH cell change when data remains buffered in the source Node B, PDUs stalled in the source Node B can result in significant transmission latency for those PDUs.

[0012] It is therefore desirable to reduce and potentially eliminate the amount of data that is stalled in a source Node B upon a serving HS-DSCH cell change.

[0013] SUMMARY OF THE INVENTION

[0014] A system and method in accordance with the present invention reduce the amount of data that is stalled in a source Node B after a serving HS-DSCH cell change in a communication system that includes an RNC and at least one Node B. In a first embodiment the RNC temporarily suspends data transmissions from the RNC to the Node B. In a second embodiment, the activation time is used in data scheduling. In a third embodiment, a more robust MCS level is selected to apply to the data. In a fourth embodiment flow control is employed for the data transmitted between the RNC and the Node B.

[0015] BRIEF DESCRIPTION OF THE DRAWINGS

[0016] Figure 1 is a flow diagram of the actions taken by a prior art communication system including a Node B and an RNC as part of a serving HS DSCH cell change.

[0017] Figure 2 is a flow diagram of the actions taken by a communication system in accordance with a first embodiment of the present invention including a Node B and an RNC employing the suspension of data as part of a serving HS-DSCH cell change.

[0018] Figure 3 is a flow diagram of the actions taken by a communication system in accordance with a second embodiment of the present invention including a Node B and an RNC employing the activation time in data scheduling as part of a serving HS-DSCH cell change.

[0019] Figure 4 is a flow diagram of the actions taken by a communication system in accordance with a third embodiment of the present invention including a Node B and an RNC employing the activation time in MCS selection as part of a serving HS-DSCH cell change.

[0020] Figure 5 is a flow diagram of the actions taken by a communication system in accordance with a fourth embodiment of the present invention including a Node B and an RNC employing flow control as part of a serving HS-DSCH cell change.

[0021] Figure 6 is a flow diagram of the actions taken by a communication system in accordance with a fifth embodiment of the present invention including a Node B and an RNC employing all of the techniques shown in Figures 2-5 as part of a serving HS-DSCH cell change.

[0022] DETAILED DESCRIPTION OF THE DRAWINGS

[0023] The present invention will be described with reference to the drawing figures wherein like numerals represent like elements throughout.

[0024] Referring to the flow diagram of Figure 2, the first embodiment for the method 10 of the present invention is shown. This embodiment

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temporarily suspends data transmissions from the serving RNC (hereinafter RNC) to the Node B. Once the RNC recognizes the need for a serving HS-DSCH cell change (step 12), the RNC suspends all data transmissions to the source Node B (step 14). As those of skill in the art will appreciate, there are many different mechanisms the RNC may use to suspend data transmissions. For example, the RNC may suspend transmissions by forcing the RLC entity enter into the "Null State", or by applying suspend and resume techniques during which the RLC does not transfer any PDUs. It should be noted that the specific method used to suspend data transmissions from the RNC is not important; only the fact that they are suspended. In any event, regardless of the method used to suspend data transmissions, suspending data transmissions to the source Node B will ensure that new data will not continue to be forwarded to the source Node B for buffering and thus, possible stalling.

[0025] The RNC then sends a reconfiguration message to the Node B (step 16). The reconfiguration message notifies the Node B of the serving HS-DSCH cell change. This initiates a series of events such that the UE will stop listening to the HS-DSCH in the source cell and start listening the HS-DSCH in the target cell.

[0026] The scheduler (not shown) in the Node B schedules data to the UEs (step 18) in accordance with prior art methods, which are typically based upon the priority class of the data and/or the latency requirements of the data. Once the data is scheduled at step 18, the Node B applies the appropriate MCS level based upon UE feedback (step 20) and transmits the data to the UEs. The Node B attempts to successfully transmit all the PDUs in the priority buffers (in the MAC-hs) belonging to the UE. The activation time then expires (step 22) if the activation time is included in the reconfiguration message. However, if the activation time is not included in the reconfiguration message or utilized in this embodiment, then in step 22, the UE stops listening to the source Node B.

[0027] In accordance with this first embodiment of the present invention, since the data transmissions have been suspended at step 14, it is

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more likely that the source Node B will be able to transmit all buffered data to the UE before the UE stops listening to the source Node B. Data left in the source Node B after the serving HS-DSCH cell change is useless and will not be transmitted to the UE. It is the responsibility of the higher layer, the RLC, to recover the lost data. The recovery procedure of the higher layer creates larger data transmission latency.

[0028] Referring to the flow diagram of Figure 3, a second embodiment for a method 30 in accordance with the present invention is shown. This embodiment utilizes an activation time as a new criteria to schedule data to a UE that is undergoing an HS-DSCH cell change. Once the RNC recognizes the need for a serving HS-DSCH cell change (step 32), the RNC then sends a reconfiguration message to the Node B (step 33). In accordance with this embodiment, the reconfiguration message includes an activation time, which is an explicit moment in time known in the Node B when the UE will stop listening to the HS-DSCH in the source cell and start listening the HS-DSCH in the target cell. In current 3G systems, the activation time, if present, is included in the message "Radio Link Reconfiguration Commit" of the NBAP message.

[0029] The Node B schedules data (step 34) to the UEs based, at least in part, upon the activation time by providing more resource allocations then would normally be given to the user in the time interval ending at the activation time of the HS-DSCH cell change. The Node B scheduler may achieve this by, for example, giving a higher priority to data transmissions of the UE and/or by adjusting the latency requirements of the data for that UE to provide a greater resource allocation than would normally be given to the UE in the time interval ending at the activation time of the HS-DSCH cell change. The appropriate MCS level is selected based upon UE feedback (step 35). If there are not enough radio resources for the source Node B to transmit all the PDUs by the activation time, the source Node B attempts to transmit the PDUs as many as possible taking into account requirements of other UEs within the cell. The activation time then expires (step 36).

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[0030] Although the activation time provides a "time certain" by which the Node B should complete the transmission of data to the UE undergoing the serving HS-DSCH cell change, the activation time is not necessary to employ the teachings of this embodiment. Accordingly, as an alternative to the second embodiment, the activation time is not sent as part of the reconfiguration message and is not utilized to schedule the data. In this alternative, once the Node B receives the reconfiguration message, it begins to schedule the data (step 34) to the UEs such that more resources are allocated to the UE undergoing the serving HS-DSCH cell change. The MCS level is then selected (step 35). Since the activation time is not included in the reconfiguration message or utilized in this alternative to the second embodiment, in step 22 the UE stops listening to the source Node B.

[0031] In accordance with this second embodiment of the present invention, since the data has been scheduled at step 34 giving more resources to the UE undergoing the serving HS-DSCH cell change, (whether or not the activation time is utilized), the UE undergoing the serving HS-DSCH cell change will successfully receive more of the source Node-B buffered data than if the cell transmission scheduling algorithm did not give more resources to that UE undergoing the serving HS-DSCH cell change.

[0032] Referring to the flow diagram of Figure 4, a third embodiment for a method 40 in accordance with the present invention is shown. This embodiment applies a more robust MCS level to the data destined for the UE undergoing the serving HS-DSCH cell change than the appropriate MCS level based solely on UE feedback. Once the RNC recognizes the need for a serving HS-DSCH cell change (step 42) the RNC sends a reconfiguration message to the Node B (step 46) which includes the activation time. The Node B schedules data to the UEs based upon the priority and latency of the data (step 48), as is similar to current scheduling methods. The Node B then applies a more robust MCS level than the appropriate MCS level based on UE feedback (step 50) in consideration of the activation time. The activation time then expires (step 52). Applying a more robust MCS level implies the use of

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more radio resources. By choosing a more robust MCS the probability of successful delivery of data to the UE is increased.

[0033] As aforementioned, although the activation time provides a "time certain" by which the Node B should complete the transmission of data to the UE undergoing the serving HS-DSCH cell change, the activation time is not necessary to employ the teachings of this third embodiment. Accordingly, as an alternative to the third embodiment, the activation time is not sent as part of the reconfiguration message and is not utilized to select the MCS level to transmit the data. In this alternative, once the Node B receives the reconfiguration message and it begins to schedule the data to the UEs (step 48), it selects a more robust MCS level at step 50 such that more resources are allocated to the UE undergoing the serving HS-DSCH cell change. The activation time is not necessary. Since the activation time is not utilized, at step 52 the UE stops listening to the source Node B.

[0034] In accordance with this embodiment of the present invention, since the MCS levels are selected to allocate more resources to the UE undergoing the serving HS-DSCH cell change, (whether or not the activation time is utilized), the UE undergoing the serving HS-DSCH cell change will most likely receive more of its data in the source cell then if the selection of the MCS levels did not allocate more resources to the UE undergoing the serving HS-DSCH cell change.

[0035] Referring to the flow diagram of Figure 5, a fourth embodiment for a method 80 in accordance with the present invention is shown. This embodiment eases flow control on the data flow between the RNC and the Node B such that all of the data destined for the UE undergoing the HS-DSCH cell change is sent as quickly as possible to the Node B. Once the RNC recognizes the need for a serving HS-DSCH cell change (step 82) the RNC sends a reconfiguration message to the Node B (step 86). The reconfiguration may or may not include the activation time.

[0036] The Node B then eases flow control (step 88) on the data flow between the RNC and the source Node B that is destined to the UE

undergoing the HS-DSCH cell change. Essentially, flow control speeds up transmission of the data that is in the pipeline between the RNC and the source Node B. The intention is to maximize successfully transmitted data before the UE stops listening to the source Node B. Therefore it is necessary to forward data maintained between the RNC and Node B as soon as possible so that the scheduler in the source cell has greater ability process all data for the UE undergoing the HS-DSCH cell change before the UE stops listening to the source Node B.

[0037] The Node B then schedules data to the UEs based upon the priority and latency of the data (step 90). Once the data is scheduled at step 90, the Node B applies the appropriate MCS level (step 92) based upon UE feedback, which is consistent with prior art MCS selection methods.

[0038] The data is then transmitted to the UEs. The Node B attempts to transmit all the PDUs belonging to the UE as soon as possible, or before the activation time is expired if an activation time is present in the reconfiguration message from the RNC to the Node B. If there are not enough radio resources for the source Node B to transmit all the PDUs in time, the source Node B attempts to transmit as many PDUs as possible. The activation time then expires (step 94). If the activation time is not utilized in this embodiment, then in step 94 the UE stops listening to the source Node B.

[0039] In accordance with this embodiment of the present invention, implementing flow control at step 88 increases the chances that all of the data will be more timely received by the Node B.

[0040] It should be understood by those of skill in the art that any of the techniques employed in the four embodiments shown in Figures 2-5 may be used separately or together in various combinations. Referring to the flow diagram of Figure 6, an example embodiment for a method 100 in accordance with the present invention is shown. This embodiment: 1) utilizes the activation time as one of the criteria in scheduling of the data to the UE; 2) applies a more robust MCS level to the data; and either 3) suspends data transmissions from the RNC to the Node B after recognizing the need for a

serving HS-DSCH cell change; or 4) employs flow control to the data that is in the pipeline between the RNC and the Node B. It should be noted that suspending data transmissions and performing flow control are mutually exclusive. If data transmissions are suspended, flow control cannot be pursued. Likewise, if flow control is desired, suspension of data transmissions cannot be performed. Accordingly, these steps will be referred to as optional in reference to Figure 6, although it should be understood that both steps cannot be performed together.

[0041] Once the RNC recognizes the need for a serving HS-DSCH cell change (step 102) the RNC may optionally suspend all new data transmissions to the Node B (step 104). The RNC then sends a reconfiguration message to the Node B (step 106). The reconfiguration message may include the activation time. Steps 104 and 106 may be performed in any order, but suspending data transmissions (step 104) is preferably first, since data buffered in the source B Node is minimized.

[0042] Optionally, flow control is then exhibited on the data buffered at the RNC such that all of the data buffered at the RNC is sent to the Node B as quickly as possible (step 108).

[0043] The Node B schedules data to the UEs based upon the activation time, priority and latency of the data (step 110). As aforementioned with respect to the embodiment shown in Figure 3, using the activation time as one of the scheduling criteria increases the amount of radio resources directed to the particular UE in order to increase the amount of successfully transmitted data in advance of the activation time. However, if the activation time is not sent as part of the reconfiguration message and is not utilized to schedule the data, once the Node B receives the reconfiguration message, it begins to schedule the data to the UEs such that more resources are allocated to the UE undergoing the serving HS-DSCH cell change in order to get data to that UE as quickly as possible.

[0044] Once the data is scheduled at step 110, the Node B applies a more robust MCS level (step 112), based upon not only UE feedback, but also

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the activation time. As aforementioned with respect to the embodiment shown in Figure 4, using the activation time as one of the criteria to adjust the MCS level increases the possibility of successful delivery and avoids the need for retransmissions. However, if the activation time is not sent as part of the reconfiguration message and is not utilized to apply the MCS level, once the Node B receives the reconfiguration message, it applies a more robust MCS level to the data destined to the UE undergoing the HS-DSCH cell change such that more resources are allocated to that UE data is sent to that UE as quickly as possible.

[0045] The data is then transmitted to the UEs. The Node B attempts to transmit all the PDUs destined to the UE undergoing the HS-DSCH cell change before the activation time is expired, or as quickly as possible. If there are not enough radio resources for the source Node B to transmit all the PDUs in time, the Node B attempts to transmit the PDUs as many as possible. The activation time then expires (step 114). If the activation time is not utilized in this embodiment, then in step 114 the UE stops listening to the source Node B.

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CLAIMS

What is claimed is:

1. A method for efficient delivery of Node B buffered data in a wireless communication system that includes a radio network controller (RNC) associated with at least one Node B, said at least Node B communicating with a plurality of User Equipment (UEs), at least one of said UEs communicating within a cell and undergoing a high-speed downlink shared channel (HS-DSCH) cell change, the system comprising:

determining at the RNC the need for an HS-DSCH cell change and for generating a notification to said at least one Node B regarding the cell change;

suspending at the RNC all further data transmissions to said at least one Node B serving said at least one UE;

sending from the RNC to said at least one Node B said notification;

receiving at said at least one Node B said notification;

scheduling data at said at least one Node B for transmission to said at least one UE;

applying a modulation and coding set (MCS) level to said scheduled data; and transmitting said modulated data to said at least one UE.

2. The method of claim 1 wherein said scheduling step schedules a greater amount of resources to data for transmission to said at least one UE than to data for transmission to other UEs.

3. The method of claim 1 wherein said applying step applies MCS levels such that a greater amount of resources are applied to data for transmission to said at least one UE than to data for transmission to other UEs.

4. The method of claim 1 wherein said notification includes an activation time, which indicates when said at least one UE will cease communicating within said cell.

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5. The method of claim 4 wherein said scheduling step schedules a greater amount of resources to data for transmission to said at least one UE than to data for transmission to other UEs, such that said data for transmission to said at least one UE is sent to said at least one UE prior to said activation time.

6. The method of claim 4 wherein said applying step applies an MCS level such that a greater amount of resources are applied to data for transmission to said at least one UE than to data for transmission to other UEs, such that said data for transmission to said at least one UE is sent to said at least one UE prior to said activation time.

7. A method for efficient delivery of Node B buffered data in a wireless communication system that includes a radio network controller (RNC) associated with at least one Node B, said at least Node B communicating with a plurality of User Equipment (UEs), at least one of said UEs undergoing a high-speed downlink shared channel (HS-DSCH) cell change, the system comprising:

determining at the RNC the need for an HS-DSCH cell change and for generating a notification to said at least one Node B regarding the cell change;

sending from the RNC to said at least one Node B said notification;

receiving at said at least one Node B said notification;

scheduling data at said at least one Node B for transmission to said at least one UE;

applying a modulation and coding set (MCS) level to said scheduled data; and transmitting said modulated data to said at least one UE.

8. The method of claim 7 wherein said scheduling step schedules a greater amount of resources to data for transmission to said at least one UE than to data for transmission to other UEs.

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9. The method of claim 7 wherein said applying step applies MCS levels such that a greater amount of resources are applied to data for transmission to said at least one UE than to data for transmission to other UEs.

10. The method of claim 7 wherein said notification includes an activation time, which indicates when said at least one UE will cease communicating within said cell.

11. The method of claim 10 wherein said scheduling step schedules a greater amount of resources to data for transmission to said at least one UE than to data for transmission to other UEs, such that said data for transmission to said at least one UE is sent to said at least one UE prior to said activation time.

12. The method of claim 10 wherein said applying step applies an MCS level such that a greater amount of resources are applied to data for transmission to said at least one UE than to data for transmission to other UEs, such that said data for transmission to said at least one UE is sent to said at least one UE prior to said activation time.

13. The method of claim 7 further including performing flow control, such that data for transmission to said at least one UE is sent at a higher rate from said RNC to said at least one Node B.

14. A wireless communication system for efficiently delivering Node B buffered data, including a radio network controller (RNC) associated with at least one Node B, said at least Node B communicating with a plurality of User Equipment (UEs), at least one of said UEs communicating within a cell and undergoing a high-speed downlink shared channel (HS-DSCH) cell change, the system comprising:

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the RNC which determines the need for an HS-DSCH cell change, generates a notification to said at least one Node B regarding the cell change, and sends said notification to said at least one Node B; and

said at least one Node B which receives said notification, schedules data for transmission to said at least one UE, applies a modulation and coding set (MCS) level to said scheduled data and transmits said modulated data to said at least one UE.

15. The system of claim 14 wherein said RNC further suspends all further data transmissions to said at least one Node B serving said at least one UE.

16. The system of claim 14 wherein said Node B schedules a greater amount of resources to data for transmission to said at least one UE than to data for transmission to other UEs.

17. The system of claim 14 wherein said Node B applies an MCS level such that a greater amount of resources are applied to data for transmission to said at least one UE than to data for transmission to other UEs.

18. The system of claim 14 wherein said notification includes an activation time, which indicates when said at least one UE will cease communicating within said cell.

19. The system of claim 14 wherein said Node B further performs flow control, such that data for transmission to said at least one UE is sent at a higher rate from said RNC to said at least one Node B.

20. A Node B which efficiently receives and buffers data, the Node B communicating with a radio network controller (RNC) and with a plurality of

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User Equipment (UEs), at least one of said UEs undergoing a high-speed downlink shared channel (HS-DSCH) cell change, the Node B comprising:

a receiver for receiving a notification from the RNC which indicates said cell change;

a scheduler for scheduling data for transmission to said at least one UE;

an MCS unit for applying a modulation and coding set (MCS) level to said scheduled data; and

a transmitter for transmitting said modulated data to said at least one UE.

21. The Node B of claim 20 wherein said scheduler schedules a greater amount of resources to data for transmission to said at least one UE than to data for transmission to other UEs.

22. The Node B of claim 20 wherein said MCS unit applies an MCS level such that a greater amount of resources are applied to data for transmission to said at least one UE than to data for transmission to other UEs.

23. The Node B of claim 20 wherein said notification includes an activation time, which indicates when said at least one UE will cease communicating within said cell.

24. The Node B of claim 20 wherein said Node B further performs flow control, such that data for transmission to said at least one UE is sent at a higher rate from said RNC to said at least one Node B.

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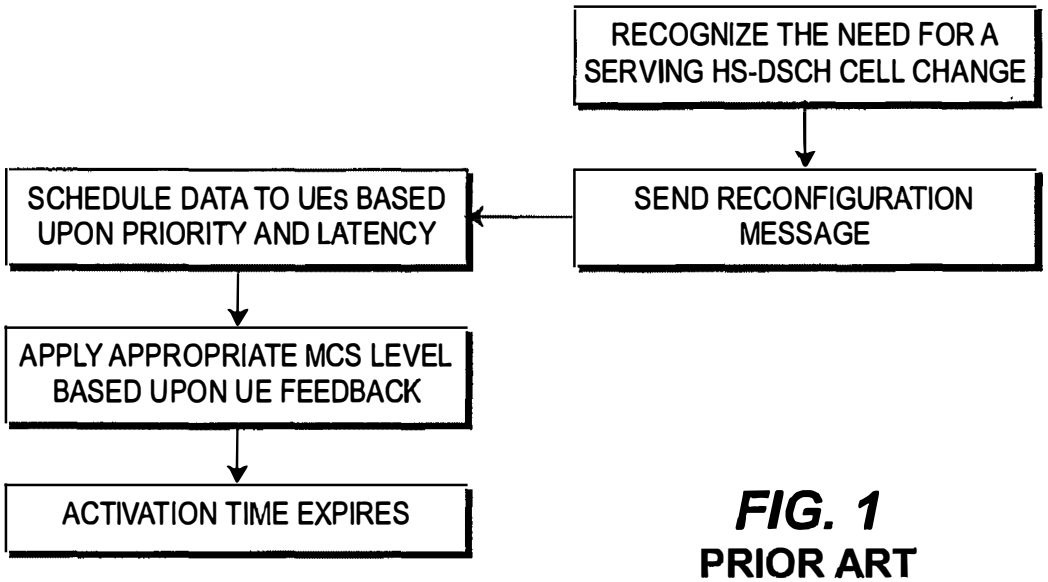


FIG. 1
PRIOR ART

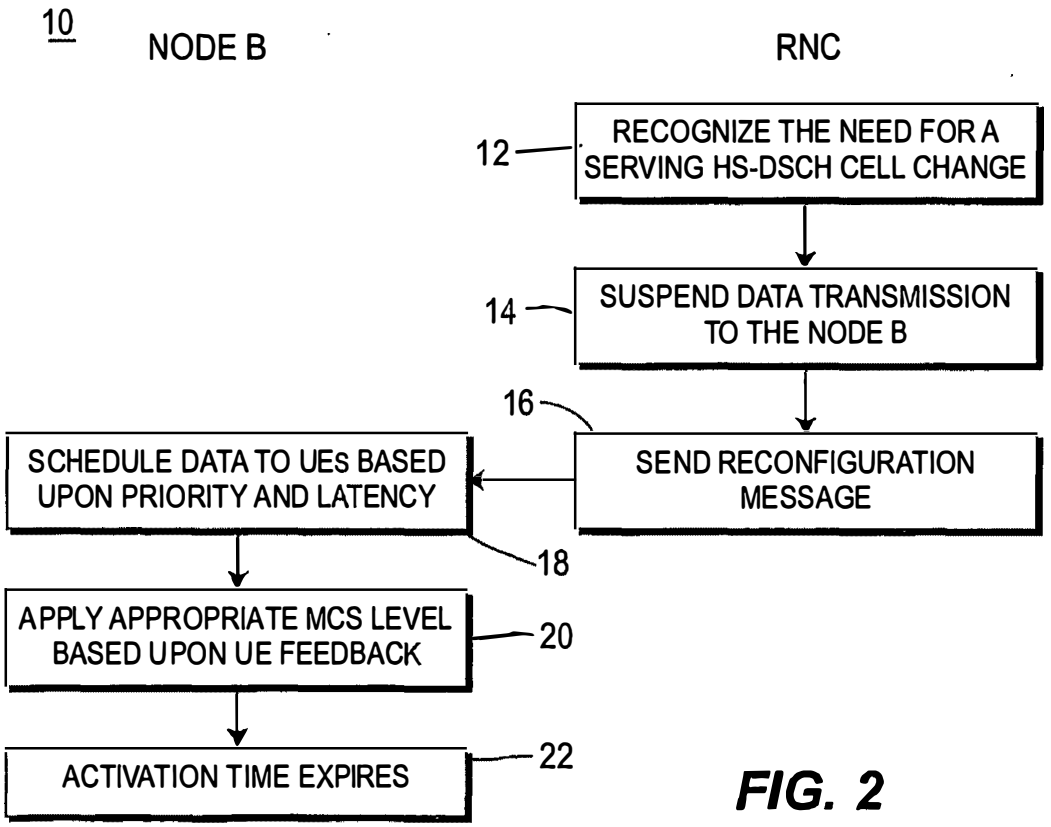


FIG. 2

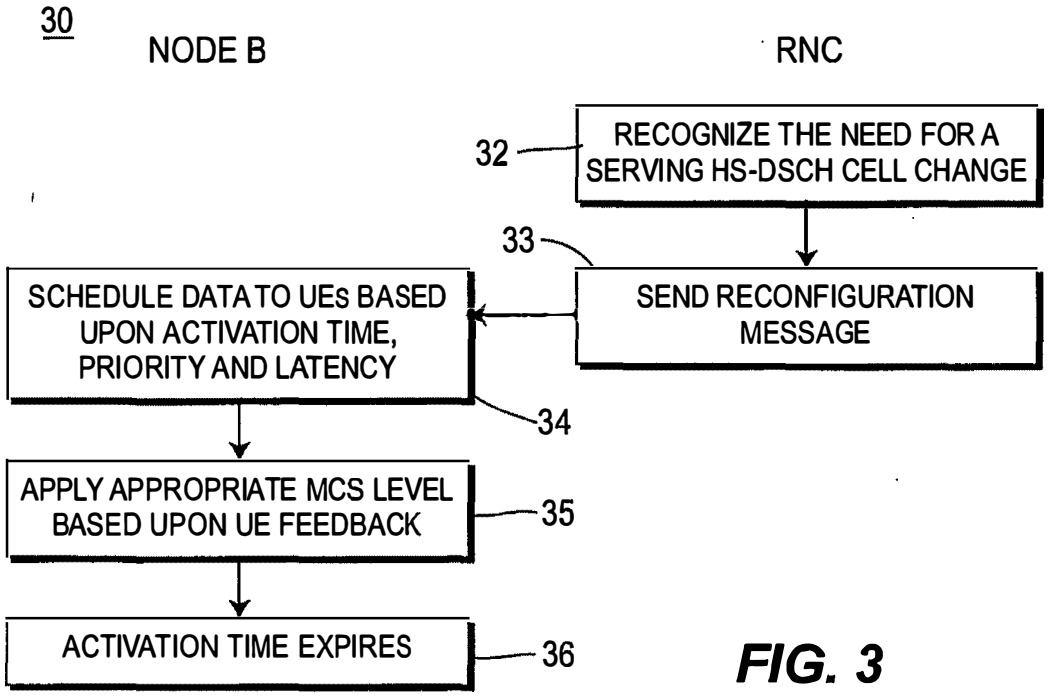

30
NODE B
RNC
RECOGNIZE THE NEED FOR A SERVING HS-DSCH CELL CHANGE
32
33
SEND RECONFIGURATION MESSAGE
SCHEDULE DATA TO UEs BASED UPON ACTIVATION TIME, PRIORITY AND LATENCY
34
APPLY APPROPRIATE MCS LEVEL BASED UPON UE FEEDBACK
35
ACTIVATION TIME EXPIRES
36

FIG. 3

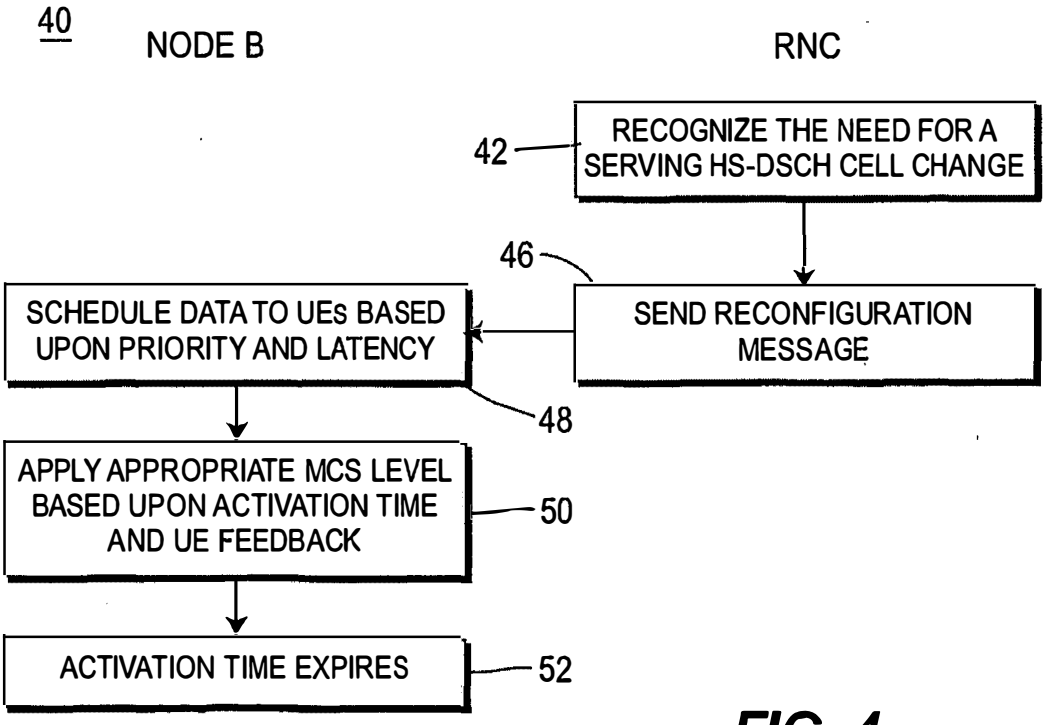

40
NODE B
RNC
RECOGNIZE THE NEED FOR A SERVING HS-DSCH CELL CHANGE
42
46
SEND RECONFIGURATION MESSAGE
SCHEDULE DATA TO UEs BASED UPON PRIORITY AND LATENCY
48
APPLY APPROPRIATE MCS LEVEL BASED UPON ACTIVATION TIME AND UE FEEDBACK
50
ACTIVATION TIME EXPIRES
52

FIG. 4

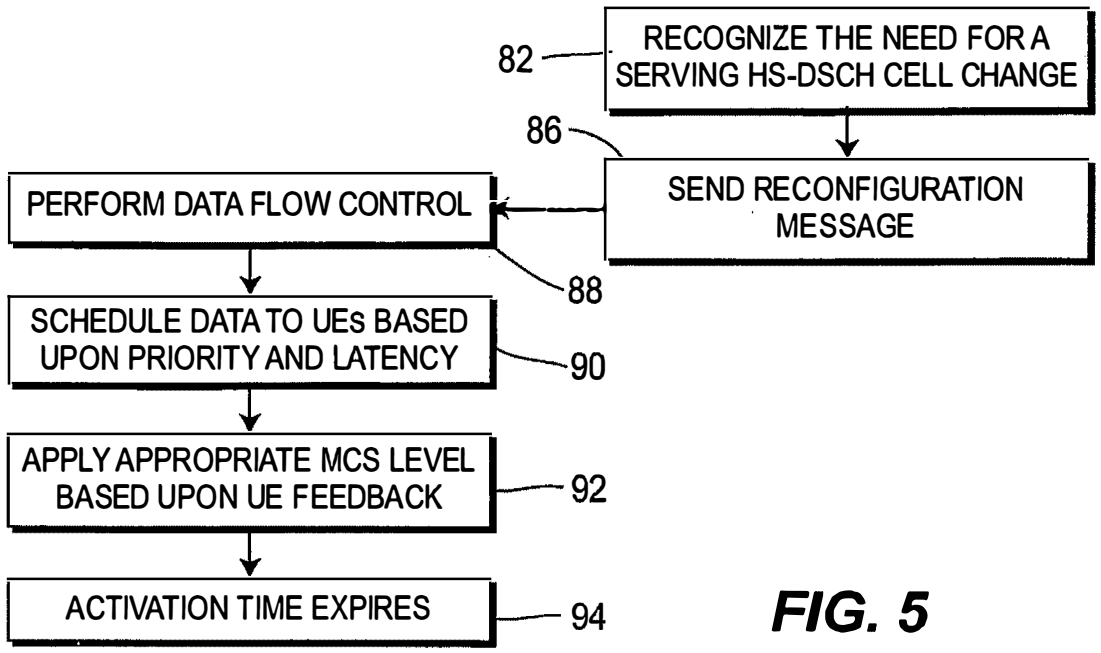

80
NODE B
RNC
RECOGNIZE THE NEED FOR A SERVING HS-DSCH CELL CHANGE
82
86
SEND RECONFIGURATION MESSAGE
PERFORM DATA FLOW CONTROL
88
SCHEDULE DATA TO UEs BASED UPON PRIORITY AND LATENCY
90
APPLY APPROPRIATE MCS LEVEL BASED UPON UE FEEDBACK
92
ACTIVATION TIME EXPIRES
94

FIG. 5

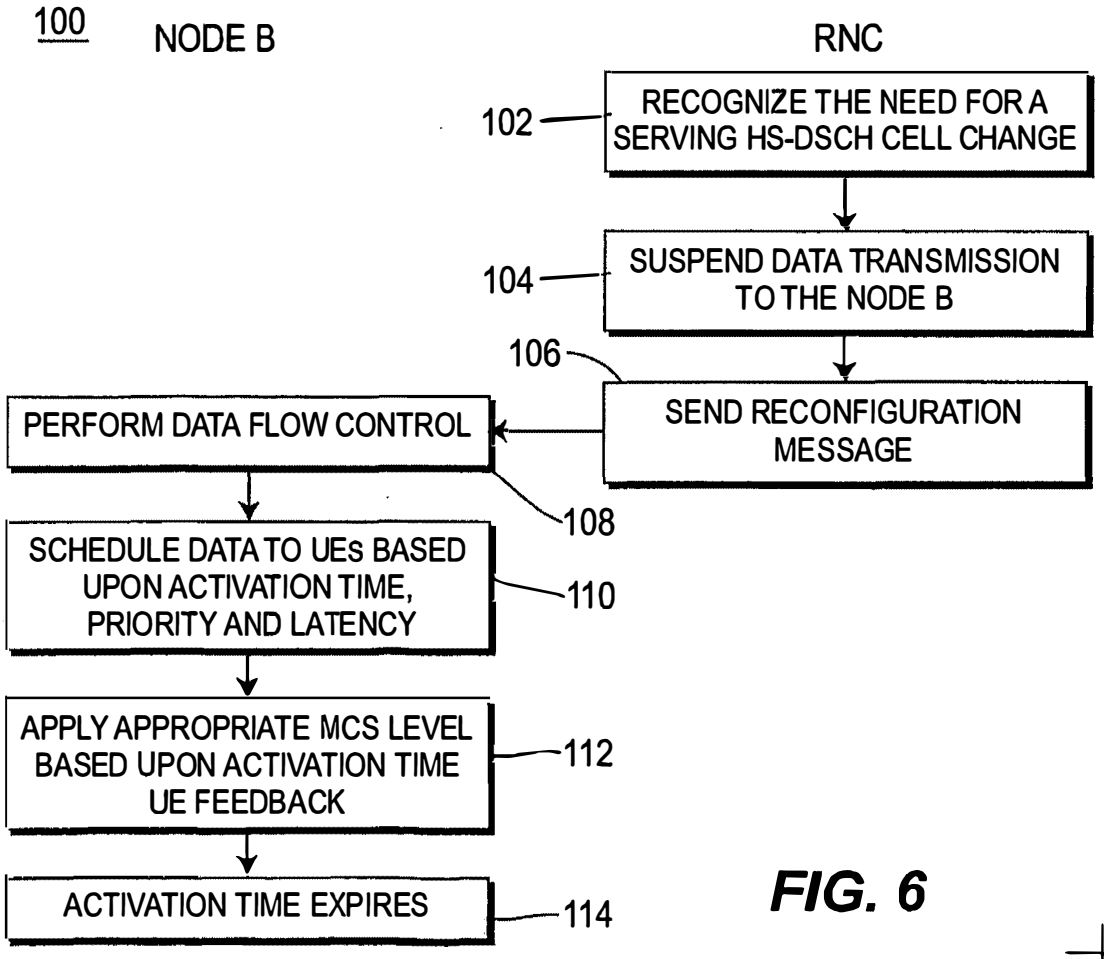

100
NODE B
RNC
RECOGNIZE THE NEED FOR A SERVING HS-DSCH CELL CHANGE
102
SUSPEND DATA TRANSMISSION TO THE NODE B
104
106
SEND RECONFIGURATION MESSAGE
PERFORM DATA FLOW CONTROL
108
SCHEDULE DATA TO UEs BASED UPON ACTIVATION TIME, PRIORITY AND LATENCY
110
APPLY APPROPRIATE MCS LEVEL BASED UPON ACTIVATION TIME UE FEEDBACK
112
ACTIVATION TIME EXPIRES
114

FIG. 6

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S93	9	((universal near mobile near telecommunication near system) or UMTS) and primary near node near b and non near primary near node near b	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/01/11 17:56
S94	20	((universal near mobile near telecommunication near system) or UMTS) and serv$3 near base near station and non near serv$3 near base near station	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/01/11 18:05
S96	3	enhanced near uplink and UTMS	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/01/11 18:10
S97	375	enhanced near uplink and ((radio near network near controller) or RNC)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/01/11 18:11
S99	9	soft near combin$3 and utms	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/01/14 17:51
S100	8	(primary adj Node-B) and RNC	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/01/14 18:25
S103	6	370/230.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/01/14 19:50
S104	5	370/235.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/01/14 19:51

EAST Search History

S10 5	22	370/328.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/01/14 19:52
S10 8	0	370/344.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/01/14 19:53
S10 7	0	370/343.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/01/14 19:53
S10 6	18	370/331.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/01/14 19:53
S10 9	18	455/436.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/01/14 19:57
S11 1	17	455/442.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/01/14 19:58
S11 0	4	455/439.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/01/14 19:58
S10 2	6	370/229.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/01/14 20:01

EAST Search History

S11 6	503	370/331.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/01/14 20:06
S11 5	544	370/328.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/01/14 20:06
S11 4	116	370/235.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/01/14 20:06
S11 3	133	370/230.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/01/14 20:06
S11 2	100	370/229.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/01/14 20:06
S11 8	6	370/344.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/01/14 20:08
S11 7	28	370/343.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/01/14 20:08
S12 2	23	455/442.ccls. and ((Node adj B) or Node-B) and (H-ARQ or HARQ)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/01/14 20:18

EAST Search History

S121	197	455/442.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/01/14 20:18
S120	147	455/439.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/01/14 20:18
S119	664	455/436.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/01/14 20:18

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/434,330	05/15/2006	Guodong Zhang	1-2-0674.2US	5166

24374 7590 01/17/2008

VOLPE AND KOENIG, P.C.
DEPT. ICC
UNITED PLAZA, SUITE 1600
30 SOUTH 17TH STREET
PHILADELPHIA, PA 19103

EXAMINER	
ROBERTS, BRIAN S	

ART UNIT	PAPER NUMBER
2619	

MAIL DATE	DELIVERY MODE
01/17/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	11/434,330	ZHANG ET AL.	
	Examiner	Art Unit	
	Brian Roberts	2619	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 May 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) ____ is/are withdrawn from consideration.

5)☐ Claim(s) ____ is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) ____ is/are objected to.

8)☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 May 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. ____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date ____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. ____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: ____.

DETAILED ACTION

- Claims 1-8 have been examined.

Claim Objections

Claims 3-4 and 7-8 are objected to because of the following informalities:

- In claims 3-4 and 7-8, "MCS" should read --modulation and coding scheme--

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-8 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. In independent claim 1 line 23, the limitation "the UE configured to receive acknowledgments and negative acknowledgements from at least the non-primary Node-B" and similarly in independent claim 5 line 28, the limitation "receiving acknowledgements and negative acknowledgements by the UE from at least the non-primary Node-B" contradict the specification, and therefore, are not enabled by the disclosure. As shown in Figure 3, the primary Node-B is configured to transmit an

acknowledgement or non-acknowledgement to the UE and the non-primary Node-Bs are not configured to transmit an acknowledgement or non-acknowledgement to the UE (see paragraph [0035]). Accordingly, the UE is configured to receive acknowledgments and negative acknowledgements from only the primary Node-B and not the non-primary Node-Bs.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure are:

- Love et al. (US 7013143) teaches HARQ ACK/NAK coding during soft handoff.
- Wigard et al. (US 20040120306) teaches scheduling retransmission in access networks.
- Toskala et al. (US 6678249) teaches physical layer packet retransmission handling in soft handover.
- Terry et al. (US 2004/0004954) teaches a system and method for monitoring transmission sequence numbers assigned to PDUs to detect and correct transmission errors.
- Kim et al. (US 2003/0007480) teaches a data retransmission system and method.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian Roberts whose telephone number is (571) 272-3095. The examiner can normally be reached on M-F 10:00-7:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wing Chan can be reached on (571) 272-7493. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

1/15/08

WING CHAN
SUPERVISORY PATENT EXAMINER

BSR
01/14/2008

FORM PTO-1449 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use several sheets if necessary)	ATTY. DOCKET NO. I-2-0674.2US	SERIAL NO. 11/434,330
	APPLICANT Zhang et al.	
	FILING DATE May 15, 2006	GROUP 2616

PTO JAN 25 2007 PATENT & TRADEMARK OFFICE

U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
/BR/		6,892,071	05/2005	Park et al.			
	*	2002/095635	07/2002	Wagner et al.			
		2003/0081692	05/2003	Kwan et al.			
		2003/0161284	08/2003	Chen			
		2003/0210668	11/2003	Malladi et al.			
		2004/0072567	04/2004	Cao et al.			
		2004/0085934	05/2004	Balachandran et la.			
		2004/0202129	10/2004	Kolding et al.			
		2004/0203991	10/2004	Chen et al.			
		2004/0219917	11/2004	Love et al.			
		2004/0219919	11/2004	Whinnett et al.			
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		2004/0228313	11/2004	Cheng et al.			
		2005/0041694	02/2005	Liu			
		2005/0047354	03/2005	Zeira et al.			
		2005/0048920	03/2005	Liu			
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/BR/	*	2353439	02/2001	GB				
	*	02/001893	03/2002	WO				
	*	03/053087	06/2003	WO				
	*	03/067953	08/2003	WO				

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/Brian Roberts/	01/14/2008

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OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)		
/BR/		GPP2 C.S0002-C, "Physical Layer Standard for cdma2000 Spread Spectrum Systems", 3rd Generation Partnership Project 2 "3GPP2", Version 2.0, Revision C, July 23, 2004.
		3GPP2 C.20003-C, "Medium Access Control (MAC) Standard for cdma2000 Spread Spectrum Systems", 3rd Generation Partnership Project 2 "3GPP2", Version 2.0, Release C, August 2004.
		3GPP2 C.S0004-C, "Signaling Link Access Control (LAC) Standard for cdma2000 Spread Spectrum Systems", 3rd Generation Partnership Project 2 "3GPP2", Version 2.0, Revision C, July 23, 2004.
		3GPP2 C.S0005-C, "Upper Layer (Layer 3) Signaling Standard for cdma2000 Spread Spectrum Systems", 3rd Generation Partnership Project 2 "3GPP2", Version 2.0, Revision c, July 23, 2004.

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/Brian Roberts/	01/14/2008

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	APPLICANT Zhang et al.	
	FILING DATE Not Yet Known	GROUP Not Yet Known

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	*	2003/0210668	11/2003	Malladi et al.			
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	*	2004/0202129	10/2004	Kolding et al.			
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	*	2004/0228313	11/2004	Cheng et al.			
	*	2005/0041694	02/2005	Liu			
	*	2005/0047354	03/2005	Zeira et al.			
	*	2005/0048920	03/2005	Liu			
	*	2005/0083888	04/2005	Smee et al.			

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FORM PTO-1449 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use several sheets if necessary)	ATTY. DOCKET NO. I-2-0647.2US	SERIAL NO. Not Yet Known
	APPLICANT Zhang et al.	
	FILING DATE Not Yet Known	GROUP Not Yet Known

		OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)
/BR/	*	GPP2 C.S0002-C, "Physical Layer Standard for cdma2000 Spread Spectrum Systems", 3rd Generation Partnership Project 2 "3GPP2", Version 2.0, Revision C, July 23, 2004.
/BR/	*	3GPP2 C.20003-C, "Medium Access Control (MAC) Standard for cdma2000 Spread Spectrum Systems", 3rd Generation Partnership Project 2 "3GPP2", Version 2.0, Release C, August 2004.
/BR/	*	3GPP2 C.S0004-C, "Signaling Link Access Control (LAC) Standard for cdma2000 Spread Spectrum Systems", 3rd Generation Partnership Project 2 "3GPP2", Version 2.0, Revision C, July 23, 2004.
/BR/	*	3GPP2 C.S0005-C, "Upper Layer (Layer 3) Signaling Standard for cdma2000 Spread Spectrum Systems", 3rd Generation Partnership Project 2 "3GPP2", Version 2.0, Revision c, July 23, 2004.

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OIPE IAP20 DEC 12 2007 PATENT & TRADEMARK OFFICE

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	APPLICANT Zhang et al.	
	FILING DATE May 15, 2006	GROUP 2616

U.S. PATENT DOCUMENTS

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/BR/	*	6,778,830	08/2004	Oizumi et al.			
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		2005/0083888	04/2005	Smee et al.			

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/BR/		2 353 439	02/2001	GB				
/BR/	*	2001-128209	05/2001	JP			X**	
/BR/		02/01893	01/2002	WO				

EXAMINER	DATE CONSIDERED
/Brian Roberts/	01/14/2008

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FORM PTO-1449 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use several sheets if necessary)	ATTY. DOCKET NO. I-2-0674.2US	SERIAL NO. 11/434,330
	APPLICANT Zhang et al.	
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EXAMINER INITIAL		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES	TRANSLATION NO
/BR/		03/053087	06/2003	WO				
/BR/		03/067953	08/2003	WO				
/BR/	*	03/088545	10/2003	WO				

OTHER DOCUMENTS

EXAMINER INITIAL		DESCRIPTION (Including Author, Title, Date, Pertinent Pages, Etc.)
/BR/	*	3GPP, "Third Generation Partnership Project; Technical Specification Group Radio Access Network; FDD Enhanced Uplink; Overall Description; Stage 2 (Release 6)," 3GPP TS 25.309 V6.0.0 (September 2004).
		3GPP2 C.20003-C, "Medium Access Control (MAC) Standard for cdma2000 Spread Spectrum Systems", 3rd Generation Partnership Project 2 "3GPP2", Version 2.0, Release C, August 2004.
		3GPP2 C.S0004-C, "Signaling Link Access Control (LAC) Standard for cdma2000 Spread Spectrum Systems", 3rd Generation Partnership Project 2 "3GPP2", Version 2.0, Revision C, July 23, 2004.
		3GPP2 C.S0005-C, "Upper Layer (Layer 3) Signaling Standard for cdma2000 Spread Spectrum Systems", 3rd Generation Partnership Project 2 "3GPP2", Version 2.0, Revision c, July 23, 2004.
		GPP2 C.S0002-C, "Physical Layer Standard for cdma2000 Spread Spectrum Systems", 3rd Generation Partnership Project 2 "3GPP2", Version 2.0, Revision C, July 23, 2004.

EXAMINER	DATE CONSIDERED
/Brian Roberts/	01/14/2008

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Notice of References Cited	Application/Control No. 11/434,330	Applicant(s)/Patent Under Reexamination ZHANG ET AL.	
	Examiner Brian Roberts	Art Unit 2619	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-7,013,143	03-2006	Love et al.	455/450
*	B	US-2004/0120306	06-2004	Wigard et al.	370/349
*	C	US-6,678,249	01-2004	Toskala et al.	370/236
*	D	US-2004/0004954	01-2004	Terry et al.	370/349
*	E	US-2003/0007480	01-2003	Kim et al.	370/349
	F	US-			
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NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
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	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Index of Claims

Application/Control No.	Applicant(s)/Patent under Reexamination
11/434,330	ZHANG ET AL.
Examiner	**Art Unit**
Brian Roberts	2619

√	Rejected	–	(Through numeral) Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

Claim		Date
Final	Original	1/14/08
	1	✓
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	8	✓
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Claim		Date
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Claim		Date
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BIB DATA SHEET

CONFIRMATION NO. 5166

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
11/434,330	05/15/2006 RULE	370	2619	I-2-0674.2US

APPLICANTS

Guodong Zhang, Farmingdale, NY;
Sung-Hyuk Shin, Northvale, NJ;
Stephen E. Terry, Northport, NY;
James M. Miller, Verona, NJ;
Stephen G. Dick, Nesconset, NY;

**** CONTINUING DATA ***************************

This application is a CON of 10/962,720 10/12/2004 PAT 7,046,648
which claims benefit of 60/578,674 06/10/2004
and claims benefit of 60/520,692 11/17/2003
and claims benefit of 60/519,990 11/14/2003
and claims benefit of 60/517,656 11/05/2003

**** FOREIGN APPLICATIONS ***************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****

06/06/2006

Foreign Priority claimed ☐ Yes ☑ No 35 USC 119(a-d) conditions met ☐ Yes ☑ No Verified and Acknowledged /BRIAN S ROBERTS/ Examiner's Signature	☐ Met after Allowance BSR Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		NY	4	8	2

ADDRESS

VOLPE AND KOENIG, P.C.
DEPT. ICC
UNITED PLAZA, SUITE 1600
30 SOUTH 17TH STREET
PHILADELPHIA, PA 19103
UNITED STATES

TITLE

Supporting enhanced uplink transmission during soft handover

FILING FEE RECEIVED	FEES: Authority has been given in Paper	☐ All Fees
1000	No._____ to charge/credit DEPOSIT ACCOUNT	☐ 1.16 Fees (Filing)
	No._____ for following:	☐ 1.17 Fees (Processing Ext. of time)
		☐ 1.18 Fees (Issue)
		☐ Other _____
		☐ Credit

Search Notes	Application/Control No.	Applicant(s)/Patent under Reexamination
	11/434,330	ZHANG ET AL.
	Examiner	Art Unit
	Brian Roberts	2619

SEARCHED			
Class	Subclass	Date	Examiner

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
PALM inventor search	1/14/2008	BSR
Search focused on: 370/229,230,235,328,331,343,344 455/436,439,442	1/14/2008	
EAST text search: see search history printout	1/14/2008	

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the **PATENT APPLICATION** of:	
Zhang et al.	
Application No.: 11/434,330	
Confirmation No.: 5166	Our File: I-2-0674.2US
Filed: May 15, 2006	Date: April 16, 2008
For: SUPPORTING ENHANCED UPLINK TRANSMISSION DURING SOFT HANDOVER	
Group: 2619	
Examiner: Brian S. Roberts	

REPLY PURSUANT TO 37 C.F.R. §1.111

Mail Stop Amendment (via EFS)
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Reply is being timely filed in response to the Office Action dated January 17, 2008.

Please amend the application without prejudice or disclaimer as follows:

Amendments to the Claims:

1-4. (Canceled)

5. (Currently Amended) A method for universal mobile telecommunication system (UMTS) frequency division duplex (FDD) enhanced uplink communication during soft handover implemented in a radio network controller (RNC), ~~the method~~ comprising:

initiating soft handover of enhanced uplink communications ~~by a radio network controller (RNC)~~ for a user equipment (UE);

selecting ~~by the RNC~~ a single primary Node-B out of a plurality of Node-Bs receiving enhanced uplink data packets from the UE during soft handover;

receiving successfully received enhanced uplink data packets ~~by a medium access control (MAC) entity of the RNC~~ from the plurality of soft handover Node-Bs, each successfully received enhanced uplink data packet having a transmission sequence number; and

reordering the received successfully received enhanced uplink data packets ~~by the MAC entity~~ based on the transmission sequence number for in-sequence deliver to a radio link control (RLC) entity[[;]].

~~transmitting to the UE specified scheduling information by the primary Node-B, the specified scheduling information is not transmitted to the UE by any non-primary Node-Bs of the plurality of Node-B's;~~

~~receiving the enhanced uplink packets by the primary Node-B from the UE;~~

~~transmitting by the primary Node-B an acknowledgement or a negative acknowledgment to the UE in response to the received enhanced uplink data~~

~~packet, the primary Node-B configured to deliver successfully received enhanced uplink data packets to the RNC;~~

~~receiving by the non-primary Node-Bs the enhanced uplink packets;~~

~~delivering by the non-primary Node-Bs successfully received enhanced uplink packets to the RNC;~~

~~transmitting enhanced uplink data packets by the UE to the plurality of Node-Bs;~~

~~receiving acknowledgments and negative acknowledgements by the UE from the non-primary Node-B;~~

~~in response to receiving a negative acknowledgement, the UE retransmitting an enhanced uplink data packet associated with the negative acknowledgment, the retransmission of the negative acknowledgment is given a higher priority for transmission than other non-negative acknowledgment enhanced uplink data packets for transmission.~~

6-8. (Canceled)

9. (New) A method for universal mobile telecommunication system (UMTS) frequency division duplex (FDD) enhanced uplink communication during soft handover implemented in a primary Node-B of a plurality of Node-Bs, comprising:

transmitting to a UE specified scheduling information, wherein the specified scheduling information is not transmitted to the UE by any non-primary Node-B of the plurality of Node-Bs;

receiving enhanced uplink packets from the UE;

transmitting an acknowledgement or a negative acknowledgment to the UE in response to the received enhanced uplink data packet;

delivering successfully received enhanced uplink data packets to a radio network controller (RNC); and

receiving enhanced uplink data packets from the UE.

10. (New) The method of claim 9 further comprising:

soft combining an initial transmission of an enhanced uplink data packet with a retransmission of the enhanced uplink data packet.

11. (New) A method for universal mobile telecommunication system (UMTS) frequency division duplex (FDD) enhanced uplink communication during soft handover implemented in a user equipment (UE), comprising:

sending enhanced uplink packets to a plurality of Node-Bs during soft handover;

receiving specified scheduling information from a primary Node-B of the plurality of Node-Bs;

sending enhanced uplink packets to the primary Node-B;

receiving from the primary Node-B an acknowledgement or a negative acknowledgment in response to the received enhanced uplink data packet;

transmitting enhanced uplink data packets to the plurality of Node-Bs;

receiving acknowledgments and negative acknowledgements from the non-primary Node-Bs; and

in response to receiving a negative acknowledgement, retransmitting an enhanced uplink data packet associated with the negative acknowledgment, wherein the retransmission of the negative acknowledgment is given a higher

priority for transmission than other non-negative acknowledgment enhanced uplink data packets for transmission.

12. (New) The method of claim 11, further comprising:

changing a modulation and coding scheme (MCS) of an enhanced uplink data packet retransmission.

REMARKS

After the foregoing Amendment, Claims 5 and 9-12 are currently pending in this application. Claims 1-4 and 6-8 have been canceled without prejudice. Claim 5 has been amended. New claims 9-12 have been added. Applicants submit that no new matter has been introduced into the application by these amendments.

Claim Objections

The Examiner objected to claims 3-4 and 7-8 due to informalities. Claims 3-4 and 7-8 have been canceled without prejudice, and withdrawal of the claim objections to claims 3-4 and 7-8 is respectfully requested.

Claim Rejections - 35 USC §112

The Examiner rejected claims 1-8 under 35 USC §112, second paragraph, as being indefinite for failing to point out and distinctly claim the subject matter which applicant regards as the invention.

The Applicants have canceled claims 1-4 and 6-8 without prejudice. In view of the foregoing amendment, rejection of claim 1-4 and 6-8 is now moot.

The Applicants have amended independent claim 5. The claim amendment is fully supported in the specification.

Accordingly, the Applicants respectfully request withdrawal of the Examiner's 35 USC §112 rejection.

Conclusion

If the Examiner believes that any additional minor formal matters need to be addressed in order to place this application in condition for allowance, or that a telephonic interview will help to materially advance the prosecution of this application, the Examiner is invited to contact the undersigned by telephone at the Examiner's convenience.

In view of the foregoing amendment and remarks, Applicants respectfully submit that the present application is in condition for allowance and a notice to that effect is respectfully requested.

Respectfully submitted,

Zhang et al.

By _____
Thomas A. Mattioli
Registration No. 56,773
(215) 568-6400

Volpe and Koenig, P.C.
United Plaza, Suite 1600
30 South 17th Street
Philadelphia, PA 19103
Telephone: (215) 568-6400
Facsimile: (215) 568-6499

TAM/MPK/pf

Electronic Acknowledgement Receipt

EFS ID:	3162154
Application Number:	11434330
International Application Number:	
Confirmation Number:	5166
Title of Invention:	Supporting enhanced uplink transmission during soft handover
First Named Inventor/Applicant Name:	Guodong Zhang
Customer Number:	24374
Filer:	Jeffrey M. Glabicki/Peggy Ferello
Filer Authorized By:	Jeffrey M. Glabicki
Attorney Docket Number:	I-2-0674.2US
Receipt Date:	16-APR-2008
Filing Date:	15-MAY-2006
Time Stamp:	15:33:53
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
1		I_2_0674_2US_Response.PDF	74272 616480c80f7887704f6b3464e322c93695f3069e	yes	8

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment - After Non-Final Rejection	1	1
	Amendment Copy Claims/Response to Suggested Claims	2	5
	Applicant Arguments/Remarks Made in an Amendment	6	8

Warnings:	
Information:	
Total Files Size (in bytes):	74272

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
11/434,330	05/15/2006	

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY ☐ RATE ($)	SMALL ENTITY FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	04/16/2008	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 5	Minus	** 20	= 0	X $ =		OR	X $50=	0
	Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X $ =		OR	X $210=	0
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/ROLITA WIMBUSH/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/434,330	05/15/2006	Guodong Zhang	I-2-0674.2US	5166

24374 7590 07/21/2008
VOLPE AND KOENIG, P.C.
DEPT. ICC
UNITED PLAZA, SUITE 1600
30 SOUTH 17TH STREET
PHILADELPHIA, PA 19103

EXAMINER	
ROBERTS, BRIAN S	
ART UNIT	PAPER NUMBER
2619	
MAIL DATE	DELIVERY MODE
07/21/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	11/434,330	ZHANG ET AL.	
	Examiner	Art Unit	
	BRIAN ROBERTS	2619	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *4/16/2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *5 and 9-12* is/are pending in the application.

4a) Of the above claim(s) ___ is/are withdrawn from consideration.

5)☐ Claim(s) ___ is/are allowed.

6)☒ Claim(s) *5 and 9-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) ___ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date ____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: ____.

DETAILED ACTION

- Claims 5 and 9-12 remain pending.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 11-12 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. In independent claim 11 lines 12-13, the limitation "receiving acknowledgments and negative acknowledgements from the non-primary Node- Bs" contradicts the specification, and therefore, are not enabled by the disclosure. As shown in Figure 3, the primary Node-B is configured to transmit an acknowledgement or non-acknowledgement to the UE and the non-primary Node-Bs are not configured to transmit an acknowledgement or non-acknowledgement to the UE (see paragraph [0035]). Accordingly, the UE receives acknowledgments and negative acknowledgements from only the primary Node-B and not the non-primary Node-Bs.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 5 and 9-12 are rejected under 35 U.S.C. 102(e) as being anticipated by Lee et al. (US 7346035)

- In reference to claim 5

In Figure 7, Lee et al. teaches a method that includes: initiating soft handover of enhanced uplink communications for a user equipment (UE); selecting a single primary Node-B out of a plurality of Node-Bs receiving enhanced uplink data packets from the UE during soft handover; receiving successfully received enhanced uplink data packets from the plurality of soft handover Node-Bs, each successfully received enhanced uplink data packet having a transmission sequence number; and reordering the received successfully received enhanced uplink data packets based on the transmission sequence number for in-sequence deliver to a radio link control (RLC) entity. (column 8 lines 18-62)

- In reference to claim 9

In Figure 8, Lee et al. teaches a method that includes: that includes transmitting to a UE specified scheduling information, wherein the specified scheduling information is not transmitted to the UE by any non-primary Node-B of the plurality of Node-Bs; receiving enhanced uplink packets from the UE; transmitting an acknowledgement or a negative acknowledgment to the UE in response to the received enhanced uplink data packet; delivering successfully received enhanced uplink data packets to a radio network controller (RNC); and receiving enhanced uplink data packets from the UE. (column 8 line 66 - column 9 line 51)

- In reference to claim 10

In Figure 8, Lee et al. teaches soft combining an initial transmission of an enhanced uplink data packet with a retransmission of the enhanced uplink data packet. (column 8 line 66 - column 9 line 51)

- In reference to claim 11, as best understood

In Figure 8, Lee et al. teaches a method that includes: sending enhanced uplink packets to a plurality of Node-Bs during soft handover; receiving specified scheduling information from a primary Node-B of the plurality of Node-Bs; sending enhanced uplink packets to the primary Node-B; receiving from the primary Node-B an acknowledgement or a negative acknowledgment in response to the received enhanced uplink data packet; transmitting enhanced uplink data packets to the plurality of Node-Bs; receiving acknowledgments and negative acknowledgements from the non- primary

Node-Bs; and in response to receiving a negative acknowledgement, retransmitting an enhanced uplink data packet associated with the negative acknowledgment, wherein the retransmission of the negative acknowledgment is given a higher priority for transmission than other non-negative acknowledgment enhanced uplink data packets for transmission. (column 8 line 66 - column 9 line 51)

- In reference to claim 12, as best understood

In Figure 8, Lee et al. further teaches changing a modulation and coding scheme (MCS) of an enhanced uplink data packet retransmission. (column 8 line 66 - column 9 line 51)

Response to Arguments

Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRIAN ROBERTS whose telephone number is (571)272-3095. The examiner can normally be reached on M-F 10:00-7:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wing Chan can be reached on (571) 272-7493. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

BSR
07/09/2008

/Wing F. Chan/
Supervisory Patent Examiner, Art Unit 2619
7/17/08

Notice of References Cited	Application/Control No. 11/434,330	Applicant(s)/Patent Under Reexamination ZHANG ET AL.	
	Examiner BRIAN ROBERTS	Art Unit 2619	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-7,346,035	03-2008	Lee et al.	370/331
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11434330	ZHANG ET AL.
	Examiner	Art Unit
	BRIAN ROBERTS	2619

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	07/08/2008								
	1	-								
	2	-								
	3	-								
	4	-								
	5	✓								
	6	-								
	7	-								
	8	-								
	9	✓								
	10	✓								
	11	✓								
	12	✓								

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11434330	ZHANG ET AL.
	Examiner	Art Unit
	BRIAN ROBERTS	2619

SEARCHED

Class	Subclass	Date	Examiner

SEARCH NOTES

Search Notes	Date	Examiner
Updated search focused on: 370/229,230,235,328,331,343,344 455/436,439,442	7/8/2008	BSR
Updated EAST text search: see search history printout	7/8/2008	BSR

INTERFERENCE SEARCH

Class	Subclass	Date	Examiner

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S123	2	UTMS and enhance$3 near uplink near2 packet	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/08 13:48
S125	27	primary near2 node near b and umts	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/08 13:50
S124	97	primary near2 node near b	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/08 13:50
S126	191	enhanced near uplink with schedul$3	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/08 14:07
S129	26	RNC with primary near2 ((base near station) or (basestation) or bs or (node near b) or "node-b" or (access near point))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/09 15:16
S138	585	370/331.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/09 16:08
S137	614	370/328.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/09 16:08
S136	130	370/235.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/09 16:08
S135	149	370/230.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/09 16:08

S134	106	370/229.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/09 16:08
S133	9	soft near combin$3 and utms	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/09 16:08
S132	437	enhanced near uplink and ((radio near network near controller) or RNC)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/09 16:08
S131	21	((universal near mobile near telecommunication near system) or UMTS) and serv$3 near base near station and non near serv $3 near base near station	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/09 16:08
S130	9	((universal near mobile near telecommunication near system) or UMTS) and primary near node near b and non near primary near node near b	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/09 16:08
S144	33	455/442.ccls. and ((Node adj B) or Node-B) and (H-ARQ or HARQ)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/09 16:09
S143	157	455/439.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/09 16:09
S142	157	455/439.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/09 16:09
S141	750	455/436.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/09 16:09
S140	9	370/344.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	~~US-PGPUB;~~ USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/09 16:09

S139	34	370/343.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/09 16:09

7/10/2008 5:23:21 PM
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Doc code: RCEX
Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (03/08)
Approved for use through 04/30/2008. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	11/434,330	Filing Date	2006-05-15	Docket Number (if applicable)	I-2-0674.2US	Art Unit	2619
First Named Inventor	Zhang et al.			Examiner Name	Brian S. Roberts		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____

☐ Other _____

☒ Enclosed

☒ Amendment/Reply

☐ Information Disclosure Statement (IDS)

☐ Affidavit(s)/ Declaration(s)

☐ Other _____

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____
(Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

☒ **The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 090435

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

PTO/SB/30EFS (03/08)
Approved for use through 04/30/2008. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Signature of Registered U.S. Patent Practitioner			
Signature	/Thomas A. Mattioli/	Date (YYYY-MM-DD)	2009-01-21
Name	Thomas A. Mattioli	Registration Number	56773

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Electronic Patent Application Fee Transmittal

Application Number:	11434330
Filing Date:	15-May-2006
Title of Invention:	Supporting enhanced uplink transmission during soft handover
First Named Inventor/Applicant Name:	Guodong Zhang
Filer:	Robert D. Leonard/Katie Carlson
Attorney Docket Number:	I-2-0674.2US

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 3 months with $0 paid	1253	1	1110	1110

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Request for continued examination	1801	1	810	810
		Total in USD ($)		**1920**

Electronic Acknowledgement Receipt

EFS ID:	4649899
Application Number:	11434330
International Application Number:	
Confirmation Number:	5166
Title of Invention:	Supporting enhanced uplink transmission during soft handover
First Named Inventor/Applicant Name:	Guodong Zhang
Customer Number:	24374
Filer:	Robert D. Leonard/Katie Carlson
Filer Authorized By:	Robert D. Leonard
Attorney Docket Number:	I-2-0674.2US
Receipt Date:	21-JAN-2009
Filing Date:	15-MAY-2006
Time Stamp:	16:26:44
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$1920
RAM confirmation Number	2300
Deposit Account	090435
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1	Amendment Submitted/Entered with Filing of CPA/RCE	20090121_I_2_0674_2US_Reply.PDF	322140 e99f89b9c7fbfdc77bee6a5a63a47e0d9e7b3b90	no	9
Warnings:					
Information:					
2	Extension of Time	20090121_I_2_0674_2US_EOT.PDF	67738 65bcad405f390400e213eec83b1a59f9729c8e86	no	1
Warnings:					
Information:					
3	Request for Continued Examination (RCE)	20090121_I_2_0674_2US_RCE.PDF	86490 481c645b05bd9abf2fe88b6ca555ec83c2935ab7	no	2
Warnings:					
This is not a USPTO supplied RCE SB30 form.					
Information:					
4	Fee Worksheet (PTO-06)	fee-info.pdf	32117 86a22f1798aac9161acfe233569f38f79a5a5fa4	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	508485		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the **PATENT APPLICATION** of: Guodong Zhang **Application No.:** 11/434,330 **Confirmation No.:** 5166 **Filed:** May 15, 2006 For: SUPPORTING ENHANCED UPLINK TRANSMISSION DURING SOFT HANDOVER Group: 2619 Examiner: Brian S. Roberts	Our File: I-2-0674.2US Date: **January 21, 2009**

REPLY PURSUANT TO 37 C.F.R. §1.114

Mail Stop RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Reply is being filed in response to the Final Office Action dated July 21, 2008. A request for continued examination (RCE) and an appropriate petition for extension of time are submitted concurrently herewith.

Please amend the application without prejudice or disclaimer as follows:

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-4. (Canceled)

5. (Currently amended) A method for universal mobile telecommunication system (UMTS) frequency division duplex (FDD) enhanced uplink communication during soft handover implemented in a radio network controller (RNC), comprising:

initiating soft handover of enhanced uplink communications for a user equipment (UE);

receiving an indication of a percentage of correctly received data blocks during a predefined time window;

receiving an indication of downlink pilot power from the UE;

selecting a single primary Node-B out of a plurality of Node-Bs receiving enhanced uplink data packets from the UE during soft handover, wherein the select primary Node-B is based on the percentage of correctly received data blocks and the indication of downlink pilot power;

transmitting an indication of the primary Node-B to the UE via radio resource control (RRC) signaling;

transmitting an indication of the primary Node-B to the plurality of Node-Bs via Iub signaling;

receiving successfully decoded ~~received~~ enhanced uplink data packets from the plurality of soft handover Node-Bs, each successfully decoded ~~received~~ enhanced uplink data packet having a transmission sequence number; ~~and~~

reordering the received successfully decoded ~~received~~ enhanced uplink data packets based on the transmission sequence number for in-sequence delivery to a radio link control (RLC) entity~~.~~; and

identifying missed uplink data packets and sending information regarding the missed packets to the UE through radio link control (RLC) messaging.

6-8. (Canceled)

9. (Currently amended) A method for universal mobile telecommunication system (UMTS) frequency division duplex (FDD) enhanced uplink communication during soft handover implemented in a primary Node-B of a plurality of Node-Bs, comprising:

transmitting to a UE specified scheduling information, wherein the specified scheduling information is not transmitted to the UE by any non-primary Node-B of the plurality of Node-Bs;

receiving enhanced uplink packets from the UE;

performing a cyclic redundancy check (CRC);

transmitting an acknowledgement (ACK) or a negative acknowledgment (NACK) to the UE in response to the received enhanced uplink data packet wherein the transmission of either the ACK or NACK is based on the results of the CRC;

delivering successfully received enhanced uplink data packets to a radio network controller (RNC); and

receiving enhanced uplink data packets from the UE.

10. (Currently amended) The method of claim 9, further comprising:

soft combining an initial transmission of an enhanced uplink data packet, stored in a buffer, with a retransmission of the enhanced uplink data packet.

11. (Canceled).

12. (Canceled).

13. (New) A primary Node-B comprising:

a medium access controller (MAC) configured to handle enhanced uplink (EU) transmissions;

an uplink (UL) scheduler configured to receive transmission power level and interference level information to schedule EU transmissions;

a receiver configured to receive data blocks during a predefined time window;

an error rate indicator configured to indicate a percentage of correctly received data blocks during the predefined time window; and

a transmitter configured to transmit a pilot signal and acknowledgments or negative acknowledgements.

REMARKS/ARGUMENTS

After the foregoing Amendment, claims 5 and 9, 10 and 13 are currently pending in this application. Claims 1-4, 6-8, 11 and 12 are canceled without prejudice. Claims 5, 9 and 10 are amended. New claim 13 is added. Applicants submit that no new matter has been introduced into the application by these amendments, and that all claim amendments and new claim 13 are fully supported in the specification and/or drawings.

Request for Withdrawal of the Finality of the Office Action

The Applicants respectfully request that the Examiner withdraw the finality of the Office Action mailed on July 21, 2008 in view of the amendments made above and the remarks to follow.

Claim Rejections - 35 USC § 112

Claims 11-12 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. Claims 11 and 12 are cancelled in this response. In view of the foregoing amendment, Applicants respectfully request withdrawal of the Examiner's 35 U.S.C. § 112 rejection of claims 11 and 12.

***Claim Rejections - 35 USC* § 102**

Claims 5 and 9-12 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 7,346,035 Lee et al. (hereinafter Lee).

With respect to claim 5, Lee discloses uplink packet data retransmission wherein a user equipment (UE) receives negative acknowledgement (NACK) information for the previously transmitted packet data from each Node-B. Each Node-B checks errors in the received uplink data and transmits ACK/NACK information to the UE according to the error check result.

There is no disclosure, teaching, or suggestion in the Lee reference of selecting a primary Node-B having the highest percentage of correctly received data blocks during a predefined time window or selecting a primary Node-B having the highest pilot power. Furthermore, there is no disclosure, teaching, or suggestion in the Lee reference of transmitting an indication of the primary Node-B to the UE via radio resource control (RRC) signaling, transmitting an indication of the primary Node-B to the plurality of Node-Bs via Iub signaling and identifying missed uplink data packets and sending information regarding the missed packets through radio link control (RLC) messaging. Therefore, amended independent claim 5 is patentable over the Lee reference.

Furthermore, with respect to claim 9, Lee discloses that each of the Node-Bs, regardless of whether or not the Node-B is a primary Node-B, detects errors in the

uplink packet data and transmits NACK information to the UE while transmitting the uplink data to an RNC. The RNC disclosed in Lee does not correct the errors but transmits NACK information to each Node-B, which in turn transmits NACK information to the UE. The UE disclosed in the Lee reference retransmits the packet data to the Node Bs.

There is no disclosure, teaching or suggestion in the Lee reference of a method for enhanced uplink communication during soft handover implemented in a primary Node-B comprising performing a cyclic redundancy check (CRC) on the uplink packets and transmitting an ACK or a NACK to the UE in response to the received enhanced uplink data packet based on the results of the CRC. As opposed to the system disclosed in Lee, only the primary Node-B performs the CRC in the present application and if the data packet is correctly decoded, the primary Node-B also transmits the correctly decoded data packet to the RNC.

Therefore, amended independent claim 9 is patentable over the Lee reference.

With respect to claim 10, Lee teaches soft combining the previous packet data stored in the memories of the Node-Bs. However, Lee does not disclose, teach or suggest, soft combining an initial transmission of an enhanced uplink data packet, stored in a buffer, with a retransmission of the enhanced uplink data packet. In addition, claim 10 is dependent upon amended patentable independent claim 9 and

is therefore patentable for at least the same reasons as amended patentable independent claim 9.

Based on the arguments presented above, withdrawal of the 35 U.S.C. 102(e) rejection of claims 5, 9 and 10 is respectfully requested.

Conclusion

If the Examiner believes that any additional minor formal matters need to be addressed in order to place this application in condition for allowance, or that a telephonic interview will help to materially advance the prosecution of this application, the Examiner is invited to contact the undersigned by telephone at the Examiner's convenience.

In view of the foregoing [amendment and] remarks, Applicants respectfully submit that the present application is in condition for allowance and a notice to that effect is respectfully requested.

Respectfully submitted,

Guodong Zhang

By _____
Thomas A. Mattioli
Registration No. 56,773

Volpe and Koenig, P.C.
United Plaza, Suite 1600
30 South 17th Street
Philadelphia, PA 19103
Telephone: (215) 568-6400
Facsimile: (215) 568-6499

TAM/MDD/kmc
Enclosure(s)

PTO/SB/22 (12-08)
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PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a) **FY 2009** ***(Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).)***	Docket Number (Optional) I-2-0674.2US
Application Number 11/434,330	Filed May 15, 2006
For SUPPORTING ENHANCED UPLINK TRANSMISSION DURING SOFT HANDOVER	
Art Unit 5166	Examiner Brian S. Roberts

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

	Fee	Small Entity Fee	
☐ One month (37 CFR 1.17(a)(1))	$130	$65	$
☐ Two months (37 CFR 1.17(a)(2))	$490	$245	$
☒ Three months (37 CFR 1.17(a)(3))	$1110	$555	$ 1110
☐ Four months (37 CFR 1.17(a)(4))	$1730	$865	$
☐ Five months (37 CFR 1.17(a)(5))	$2350	$1175	$

☐ Applicant claims small entity status. See 37 CFR 1.27.

☐ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☒ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number 09-0435.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

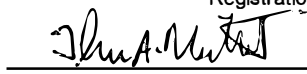
I am the

☐ applicant/inventor.

☐ assignee of record of the entire interest. See 37 CFR 3.71.
Statement under 37 CFR 3.73(b) is enclosed (Form PTO/SB/96).

☒ attorney or agent of record. Registration Number 56,773

☐ attorney or agent under 37 CFR 1.34.
Registration number if acting under 37 CFR 1.34 _____



Signature — January 21, 2009 (Date)

Thomas A. Mattioli (Typed or printed name) — 215-568-6400 (Telephone Number)

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.

☐ Total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.136(a). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 6 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PTO/SB/06 (07-06)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 11/434,330	Filing Date 05/15/2006	☐ To be Mailed

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	01/21/2009	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 4	Minus	** 20	= 0	X $ =		OR	X $52=	0
	Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X $ =		OR	X $220=	0
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/DIANIECE JACOBS/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/434,330	05/15/2006	Guodong Zhang	I-2-0674.2US	5166

24374 7590 02/04/2009
VOLPE AND KOENIG, P.C.
DEPT. ICC
UNITED PLAZA, SUITE 1600
30 SOUTH 17TH STREET
PHILADELPHIA, PA 19103

EXAMINER	
ROBERTS, BRIAN S	
ART UNIT	PAPER NUMBER
2419	
MAIL DATE	DELIVERY MODE
02/04/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	11/434,330	ZHANG ET AL.	
	Examiner	Art Unit	
	BRIAN ROBERTS	2419	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 January 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *5,9,10 and 13* is/are pending in the application.

4a) Of the above claim(s) *5 and 13* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *9 and 10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) ___ ___ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05/15/2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date ____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

- Claims 5, 9-10, and 13 remain pending.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 01/21/2009 has been entered.

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claim 5, drawn to handoff initiated by a RNC, classified in class 455, subclass 439.

II. Claims 9-10, drawn to digital data error correction, classified in class 714, subclass 746.

III. Claim 13, drawn to details of a Node-B, classified in class 455, subclass 550.1.

Inventions of group 1, 2 and 3 are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct if they do not

overlap in scope and are not obvious variants, and if it is shown that at least one subcombination is separately usable. In the instant case, subcombination of group 1 has separate utility such as selecting a primary base station for handoff of a mobile station by a radio network controller in a mobile telecommunications system. See MPEP § 806.05(d).

The examiner has required restriction between subcombinations usable together. Where applicant elects a subcombination and claims thereto are subsequently found allowable, any claim(s) depending from or otherwise requiring all the limitations of the allowable subcombination will be examined for patentability in accordance with 37 CFR 1.104. See MPEP § 821.04(a). Applicant is advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application.

Restriction for examination purposes as indicated is proper because all these inventions listed in this action are independent or distinct for the reasons given above and there would be a serious search and examination burden if restriction were not required because one or more of the following reasons apply:

(a) the inventions have acquired a separate status in the art in view of their different classification;

(b) the inventions have acquired a separate status in the art due to their recognized divergent subject matter;

(c) the inventions require a different field of search (for example, searching different classes/subclasses or electronic resources, or employing different search queries);

(d) the prior art applicable to one invention would not likely be applicable to another invention;

(e) the inventions are likely to raise different non-prior art issues under 35 U.S.C. 101 and/or 35 U.S.C. 112, first paragraph.

Applicant is advised that the reply to this requirement to be complete must include (i) an election of a invention to be examined even though the requirement may be traversed (37 CFR 1.143) **and (ii) identification of the claims encompassing the elected invention**.

The election of an invention may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election, applicant must indicate which of these claims are readable on the elected invention.

If claims are added after the election, applicant must indicate which of these claims are readable upon the elected invention.

Should applicant traverse on the ground that the inventions are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

During a telephone conversation with Thomas Mattioli on 01/29/2009 a provisional election was made without traverse to prosecute the invention of Group 2, claims 9-10. Affirmation of this election must be made by applicant in replying to this Office action. Claims 5 and 13 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (US 7346035) in view of Cheng et al. (US 2002/0191544).

- In reference to claim 9

In Figure 8, Lee et al. teaches a method for a UMTS FDD enhanced uplink communication during soft handover in a primary Node-B (*The Examiner interprets a primary Node-B to be any Node-B in the UMTS network that the UE is communicating with such as Figure 8, 820*) of a plurality of Node-Bs (*The Examiner interprets non-primary Node-Bs to be any Node-Bs in the UMTS network that the Node-B is not communicating with*) that includes: transmitting to a UE specified scheduling information, wherein the specified scheduling information is not transmitted to the UE by any non-primary Node-B of the plurality of Node-Bs (*as shown in Figure 2, steps 203,204 col. 2 line 47-55 scheduling occurs prior to the transmission of data packets between a Node-B and UE*); receiving enhanced uplink packets from the UE (*Figure 8, step 21*); transmitting an acknowledgement or a negative acknowledgment to the UE in response to the received enhanced uplink data packet; delivering successfully received enhanced uplink data packets to a radio network controller (*Figure 8 step 817*); and

receiving enhanced uplink data packets from the UE (*Figure 8 step 821*). (column 8 line 66 - column 9 line 51)

Lee et al. does not explicitly teach performing a cyclic redundancy check wherein the transmission of either the ACK or NACK is based on the results of the CRC.

In Figure 2, Cheng et al. teaches performing a cyclic redundancy check (s6) to determine if a received packet is valid and the transmission of either the ACK or NACK (s9) is based on the results of the CRC. (paragraph 0044)

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the system and method of Lee et al. to include performing a cyclic redundancy check wherein the transmission of either the ACK or NACK is based on the results of the CRC as suggested by Cheng et al. because it allows for determining whether a received packet is valid and retransmission of the packet if it is not valid in order to decrease the error rate of a communication between a UE and base station.

- In reference to claim 10

The combination of Lee et al. and Cheng et al. teaches a system and method that covers substantially all limitations of the parent claim. In Figure 8, Lee et al. teaches soft combining an initial transmission of an enhanced uplink data packet stored in a buffer (826) with a retransmission of the enhanced uplink data packet (Figure 8, step 824). (column 8 line 66 - column 9 line 51)

Response to Arguments

Applicant's arguments with respect to claim 9 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure are:

- US 7414989

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRIAN ROBERTS whose telephone number is (571)272-3095. The examiner can normally be reached on M-F 10:00-7:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wing Chan can be reached on (571) 272-7493. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

BSR
01/29/2009

/Hong Cho/

Hong Cho
Primary Examiner, Art Unit 2419
1/30/2009

Notice of References Cited	Application/Control No. 11/434,330	Applicant(s)/Patent Under Reexamination ZHANG ET AL.	
	Examiner BRIAN ROBERTS	Art Unit 2419	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-7,414,989	08-2008	Kuchibhotla et al.	370/329
*	B	US-2002/0191544	12-2002	Cheng et al.	370/236
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11434330	ZHANG ET AL.
	Examiner	Art Unit
	BRIAN ROBERTS	2419

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/29/2009								
	1	-								
	2	-								
	3	-								
	4	-								
	5	N								
	6	-								
	7	-								
	8	-								
	9	✓								
	10	✓								
	11	-								
	12	-								
	13	N								

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11434330	ZHANG ET AL.
	Examiner	Art Unit
	BRIAN ROBERTS	2419

SEARCHED

Class	Subclass	Date	Examiner

SEARCH NOTES

Search Notes	Date	Examiner
Updated search focused on: 370/229,230,235,328,331,343,344 455/436,439,442	1/29/2009	BSR
Updated EAST text search: see search history printout	1/29/2009	BSR

INTERFERENCE SEARCH

Class	Subclass	Date	Examiner

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S147	363	enhanced near uplink and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/29 16:57
S146	820	enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/29 16:57
S148	183	enhanced near uplink and ((universal near mobile near telecommunication near system) or UMTS) and (ACK or NACK)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/29 16:58
S149	84	enhanced near uplink and ((universal near mobile near telecommunication near system) or UMTS) and (ACK or NACK) and ((cyclic near redundan$3 near check) or CRC)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/29 17:23
S150	132	((universal near mobile near telecommunication near system) or UMTS) and (ACK or NACK) with ((cyclic near redundan$3 near check) or CRC)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/29 17:41
S151	100	chase near combin$3 and (ACK or NACK) with((cyclic near redundan$3 near check) or CRC)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/29 17:48
S157	116	370/229.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/29 20:38
S156	26	RNC with primary near2 ((base near station) or (basestation) or bs or (node near b) or "node-b" or (access near point))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/29 20:38

S155	216	enhanced near uplink with schedul$3	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/29 20:38
S154	28	primary near2 node near b and umts	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/29 20:38
S153	2	UTMS and enhance$3 near uplink near2 packet	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/29 20:38
S166	36	455/442.ccls. and ((Node adj B) or Node-B) and (H-ARQ or HARQ)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/29 20:39
S165	169	455/439.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/29 20:39
S164	843	455/436.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/29 20:39
S163	13	370/344.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/29 20:39
S162	44	370/343.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	~~US-PGPUB;~~ USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/29 20:39
S161	667	370/331.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/29 20:39
S160	704	370/328.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	~~US-PGPUB;~~ USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/29 20:39

S159	145	370/235.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/29 20:39
S158	163	370/230.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/29 20:39
S167	7	714/746.ccls. and ((Node adj B) or Node-B) and (H-ARQ or HARQ)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/29 20:40

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OIPE
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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the PATENT APPLICATION of:	
	Zhang et al.
Application No.:	11/434,330
Confirmation No.:	5166
Filed:	May 15, 2006
For:	SUPPORTING ENHANCED UPLINK TRANSMISSION DURING SOFT HANDOVER
Group:	2419
Examiner:	Brian S. Roberts

Our File: I-2-0674.2US

Date: February 6, 2009

INFORMATION DISCLOSURE STATEMENT

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Further to Applicants' Duty of Disclosure pursuant to 37 C.F.R. §1.56, Applicants wish to bring to the Examiner's attention the material cited on the enclosed Form PTO-1449.

The listed references include references previously cited in this application. Newly cited documents are indicated by an asterisk (*) on the enclosed Form PTO-1449. Copies of the newly cited documents are enclosed. Pursuant to 37 C.F.R. §1.98(a)(2)(ii), copies of the newly cited U.S. publications and/or patent documents have not been included.

This Information Disclosure Statement is being filed with the fee required by 37

02/11/2009 SSITHIB1 00000019 090435 11434330
01 FC:1806 180.00 DA

C.F.R. § 1.17(p).

It is respectfully requested that the Examiner consider these documents and return an initialed copy of the Form PTO-1449 indicating his consideration of the cited materials.

Respectfully submitted,

Zhang et al.

By _____
Thomas A. Mattioli
Registration No. 56,773
(215) 568-6400

Volpe and Koenig, P.C.
United Plaza, Suite 1600
30 South 17th Street
Philadelphia, PA 19103

TAM/pck
Enclosures (4)

OIPE
FEB 10 2009
PATENT & TRADEMARK OFFICE

PTO/SB/21 (09-04)
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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission

Application Number	11/434,330
Filing Date	May 15, 2006
First Named Inventor	Zhang et al.
Art Unit	2419
Examiner Name	Brian S. Roberts
Attorney Docket Number	I-2-0674.2US

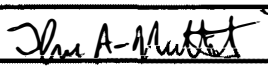
ENCLOSURES *(Check all that apply)*

- [X] Fee Transmittal Form
  - [ ] Fee Attached
- [ ] Amendment/Reply
  - [ ] After Final
  - [ ] Affidavits/declaration(s)
- [ ] Extension of Time Request
- [ ] Express Abandonment Request
- [X] Information Disclosure Statement
- [ ] Certified Copy of Priority Document(s)
- [ ] Reply to Missing Parts/ Incomplete Application
  - [ ] Reply to Missing Parts under 37 CFR 1.52 or 1.53
- [ ] Drawing(s)
- [ ] Licensing-related Papers
- [ ] Petition
- [ ] Petition to Convert to a Provisional Application
- [ ] Power of Attorney, Revocation Change of Correspondence Address
- [ ] Terminal Disclaimer
- [ ] Request for Refund
- [ ] CD, Number of CD(s) _____
  - [ ] Landscape Table on CD
- [ ] After Allowance Communication to TC
- [ ] Appeal Communication to Board of Appeals and Interferences
- [ ] Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- [ ] Proprietary Information
- [ ] Status Letter
- [X] Other Enclosure(s) (please Identify below):

PTO - 1449 with 3 references and the search report in which they were cited.

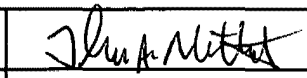
Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	VOLPE AND KOENIG, P.C.		
Signature			
Printed name	Thomas A. Mattioli		
Date	February 6, 2009	Reg. No.	56,773

CERTIFICATE OF TRANSMISSION/MAILING

I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below:

Signature			
Typed or printed name	Thomas A. Mattioli	Date	February 6, 2009

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Fee pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).

FEE TRANSMITTAL
For FY 2006

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($) 180.00

Complete if Known	
Application Number	11/434,330
Filing Date	May 15, 2006
First Named Inventor	Zhang et al.
Examiner Name	Brian S. Roberts
Art Unit	2419
Attorney Docket No.	I-2-0674.2US

METHOD OF PAYMENT (check all that apply)

☐ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): _____

☒ Deposit Account Deposit Account Number: 09-0435 Deposit Account Name: InterDigital Communications Corporation

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☒ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, **except for the filing fee**

☒ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17 ☒ Credit any overpayments

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FEE CALCULATION (All the fees below are due upon filing or may be subject to a surcharge.)

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

	FILING FEES		SEARCH FEES		EXAMINATION FEES		
		Small Entity		Small Entity		Small Entity	
Application Type	Fee ($)	Fee ($)	Fee ($)	Fee ($)	Fee ($)	Fee ($)	Fees Paid ($)
Utility	300	150	500	250	200	100	
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description	Fee ($)	Small Entity Fee ($)
Each claim over 20 (including Reissues)	50	25
Each independent claim over 3 (including Reissues)	200	100
Multiple dependent claims	360	180

Total Claims		Extra Claims	Fee ($)		Fee Paid ($)
_____	-	= _____	x _____	=	0

HP = highest number of total claims paid for, if greater than 20.

Indep. Claims		Extra Claims	Fee ($)		Fee Paid ($)
_____	-	= _____	x _____	=	0

HP = highest number of independent claims paid for, if greater than 3.

Multiple Dependent Claims	
Fee ($)	Fee Paid ($)
_____	_____

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets		Extra Sheets		Number of each additional 50 or fraction thereof		Fee ($)		Fee Paid ($)
_____	- 100 =	_____	/ 50 =	_____ (round **up** to a whole number)	x	_____	=	_____

4. OTHER FEE(S)

	Fees Paid ($)
Non-English Specification, $130 fee (no small entity discount)	
Other (e.g., late filing surcharge): IDS fee required by 37 C.F.R. § 1.17(p).	180.00

SUBMITTED BY

Signature	/Thomas A. Mattioli/	Registration No. (Attorney/Agent) 56,773	Telephone 215-568-6400
Name (Print/Type)	Thomas A. Mattioli		Date February 6, 2009

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FORM PTO-1449 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use several sheets if necessary)	ATTY. DOCKET NO. I-2-0674.2US	SERIAL NO. 11/434,330
	APPLICANT Zhang et al.	
	FILING DATE May 15, 2006	GROUP 2616

U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
		6,678,249	01/2004	Toskala et al.			
		6,778,830	08/2004	Oizumi et al.			
		6,892,071	05/2005	Park et al.			
		7,013,143	03/2006	Love et al.			
		7,346,035	03/2008	Lee et al.			
		2002/0095635	07/2002	Wager et al.			
		2003/0007480	01/2003	Kim et al.			
		2003/0054824	03/2003	Choi et al.			
		2003/0081692	05/2003	Kwan et al.			
		2003/0161284	08/2003	Chen			
		2003/0210668	11/2003	Malladi et al.			
		2004/0004954	01/2004	Terry et al.			
		2004/0072567	04/2004	Cao et al.			
		2004/0085934	05/2004	Balachandran et la.			
		2004/0120306	06/2004	Wigard et al.			
	*	2004/0160925	08/2004	Heo et al.[1]			
		2004/0202129	10/2004	Kolding et al.			
		2004/0203991	10/2004	Chen et al.			
		2004/0219917	11/2004	Love et al.			
		2004/0219919	11/2004	Whinnett et al.			
		2004/0219920	11/2004	Love et al.			
		2004/0228313	11/2004	Cheng et al.			
		2005/0041694	02/2005	Liu			
		2005/0047354	03/2005	Zeira et al.			
		2005/0048920	03/2005	Liu			

EXAMINER	DATE CONSIDERED

EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

FORM PTO-1449 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use several sheets if necessary)	ATTY. DOCKET NO. I-2-0674.2US	SERIAL NO. 11/434,330
	APPLICANT Zhang et al.	
	FILING DATE May 15, 2006	GROUP 2616

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
		2005/0083888	04/2005	Smee et al.			
	*	2007/0047501	03/2007	Usuda et al. [2]			

FOREIGN PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES	TRANSLATION NO
		2 353 439	02/2001	GB				
		2001-128209	05/2001	JP			X**	
	*	2003112283	12/2005	RU			X**	
	*	2005110767	10/2006	RU			X**	
		02/01893	01/2002	WO				
		03/053087	06/2003	WO				
		03/067953	08/2003	WO				
		03/088545	10/2003	WO				
	*	00/074263	12/2000	WO[3]				

OTHER DOCUMENTS

EXAMINER INITIAL		DESCRIPTION (Including Author, Title, Date, Pertinent Pages, Etc.)
		3GPP, "Third Generation Partnership Project; Technical Specification Group Radio Access Network; FDD Enhanced Uplink; Overall Description; Stage 2 (Release 6)," 3GPP TS 25.309 V6.0.0 (September 2004).
		3GPP2 C.20003-C, "Medium Access Control (MAC) Standard for cdma2000 Spread Spectrum Systems", 3rd Generation Partnership Project 2 "3GPP2", Version 2.0, Release C, August 2004.
		3GPP2 C.S0004-C, "Signaling Link Access Control (LAC) Standard for cdma2000 Spread Spectrum Systems", 3rd Generation Partnership Project 2 "3GPP2", Version 2.0, Revision C, July 23, 2004.
		3GPP2 C.S0005-C, "Upper Layer (Layer 3) Signaling Standard for cdma2000 Spread Spectrum Systems", 3rd Generation Partnership Project 2 "3GPP2", Version 2.0, Revision c, July 23, 2004.

EXAMINER	DATE CONSIDERED

EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

FORM PTO-1449 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use several sheets if necessary)	ATTY. DOCKET NO. I-2-0674.2US	SERIAL NO. 11/434,330
	APPLICANT Zhang et al.	
	FILING DATE May 15, 2006	GROUP 2616

EXAMINER INITIAL		DESCRIPTION (Including Author, Title, Date, Pertinent Pages, Etc.)
		GPP2 C.S0002-C, "Physical Layer Standard for cdma2000 Spread Spectrum Systems", 3rd Generation Partnership Project 2 "3GPP2", Version 2.0, Revision C, July 23, 2004.

X** Abstract only

[1] Corresponds to RU 2004104196; [2] Corresponds to RU 2006130462; [3] Corresponds to RU 2001135846.

EXAMINER	DATE CONSIDERED

EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

METHOD FOR SOFT TRANSFER OF SERVICE FOR MULTIMEDIA BROADCASTING/MULTI-ADDRESS SERVICE IN CDMA MOBILE COMMUNICATION SYSTEM

Publication number: RU2265959 (C2)
Publication date: 2005-12-10
Inventor(s): PARK DZOON-GOO [KR]; CHOJ SUNG-KHO [KR]; CHANG DZIN-VEON [KR]; LI KOOK-KHEUJ [KR]; KIM SOENG-KHUN [KR]; LI DZU-KHO [KR]
Applicant(s):
Classification:
- international: ***H04J13/00; H04B7/26; H04J3/06; H04Q7/22; H04Q7/36;*** **H04J13/00; H04B7/26; H04J3/06; H04Q7/22; H04Q7/36;** (IPC1-7): H04J3/06
- European: H04B7/26T; H04B7/26V6D4
Application number: RU20030112283 20030425
Priority number(s): KR20020023283 20020427

Also published as:
FR2839592 (A1)
US2004008646 (A1)
US2004008646 (A1)
US7307971 (B2)
US7307971 (B2)
more >>

Abstract of **RU 2265959 (C2)**

FIELD: mobile communications. ^ SUBSTANCE: when client terminal moves to area, where it can receive data from multiple nodes B, soft service transfer is realized at client terminal. ^ EFFECT: client, receiving multimedia broadcast service and moving from existing cell to new cell, receives reliable multimedia broadcast service signal, and it is also possible for client terminal to perform soft realization of data, received from multiple nodes B. ^ 4 cl, 13 dwg

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(19) RU (11) 2003112283 (13) A

(51) 7 H04Q7/20, H04B7/216, H04J13/00



РОССИЙСКОЕ АГЕНТСТВО
ПО ПАТЕНТАМ И ТОВАРНЫМ ЗНАКАМ

(12) ЗАЯВКА НА ИЗОБРЕТЕНИЕ

(22) Дата подачи заявки: **2003.04.25**

(30) Приоритетные данные: **2002-23283 2002.04.27 KR**

(43) Дата публикации заявки: **2004.11.10**

(71) Заявитель(и): **САМСУНГ ЭЛЕКТРОНИКС КО., ЛТД. (KR)**

(72) Автор(ы): **ПАРК Дзоон-Гоо (KR); ЧОЙ Сунг-Хо (KR); ЧАНГ Дзин-Веон (KR); ЛИ Коок-Хеуй (KR); КИМ Соенг-Хун (KR); ЛИ Дзу-Хо (KR)**

(74) Патентный поверенный: **Кузнецов Юрий Дмитриевич**

Адрес для переписки: **129010, Москва, ул. Б. Спасская, 25, стр.3, ООО "Юридическая фирма Городисский и Партнеры", пат.пов. Ю.Д.Кузнецову, рег.№ 595**

(54) СПОСОБ МЯГКОЙ ПЕРЕДАЧИ ОБСЛУЖИВАНИЯ ДЛЯ МУЛЬТИМЕДИЙНОЙ ВЕЩАТЕЛЬНОЙ/МНОГОАДРЕСНОЙ УСЛУГИ В СИСТЕМЕ ПОДВИЖНОЙ СВЯЗИ МДКР

1. Способ передачи вещательных данных от соседних узлов В на один из множества терминалов абонентов (ТА), при котором терминал абонента перемещается в область передачи обслуживания между соседними узлами В, в системе подвижной связи многостанционного доступа с кодовым разделением каналов (МДКР), имеющей по меньшей мере два соседних узла В, контроллер радиосети (КРС), подсоединенный к узлам В, и терминалы абонентов, расположенные в сотах, занятых соответствующими узлами В, причем узлы В передают данные асинхронно и общие вещательные данные передают на терминалы абонентов в пределах сот узлов В, согласно которому:

передают первую разность между моментом времени начала передачи первого системного кадра от первого узла В соседних узлов В и моментом времени начала приема второго системного кадра, соответствующего первому системному кадру, принятому от второго узла В из соседних узлов В, от первого узла В на контроллер радиосети (КРС);

передают вторую разность между моментом времени начала передачи второго системного кадра от второго узла В и моментом времени начала приема первого системного кадра, соответствующего второму системному кадру, принятому от первого узла В, от второго узла В на контроллер радиосети;

вычисляют разность между моментами времени начала передачи первых и вторых системных кадров из первой и второй разности; и

информируют первый и второй узлы В о моменте времени передачи кадров вещательных данных в соответствии с полученной разностью.

2. Способ по п.1, согласно которому первый системный кадр представляет собой кадр, передаваемый по общему пилотному каналу (ОПК) от первого узла В.

3. Способ по п.1, согласно которому второй системный кадр представляет собой кадр, передаваемый по ОПК от второго узла В.

4. Способ по п.1, согласно которому момент времени начала передачи первого системного кадра представляет собой номер системного кадра первого узла В в момент времени, когда первый узел В

начинает передачу первого системного кадра.

5. Способ по п.4, согласно которому момент времени начала приема второго системного кадра представляет собой номер системного кадра первого узла В в момент времени, когда первый узел В начинает прием второго системного кадра.

6. Способ по п.1, согласно которому момент времени начала передачи второго системного кадра представляет собой номер системного кадра второго узла В в момент времени, когда второй узел В начинает передачу второго системного кадра.

7. Способ по п.6, согласно которому момент времени начала приема первого системного кадра представляет собой номер системного кадра второго узла В в момент времени, когда второй узел В начинает прием первого системного кадра.

8. Способ по п.1, согласно которому разность между моментами времени начала передачи первых и вторых системных кадров вычисляют посредством деления разности между первой и второй разностью на 2.

9. Способ по п.1, согласно которому смещение для обозначения момента времени, когда второй узел В должен передавать кадры вещательных данных, вычисляют посредством суммирования основанной на кадре разности между моментами времени начала передачи первого и второго узла В, разности между моментами времени начала передачи первых и вторых системных кадров и номера кадра соединения момента времени передачи первого узла В.

10. Способ по п.1, согласно которому момент времени начала приема второго системного кадра представляет собой момент времени начала приема, ближайший к моменту времени начала передачи первого системного кадра из числа моментов времени начала приема вторых системных кадров, принимаемых от второго узла В.

11. Способ по п.1, согласно которому момент времени начала приема первого системного кадра представляет собой момент времени начала приема, ближайший к моменту времени начала передачи второго системного кадра из числа моментов времени приема первых системных кадров, принимаемых от первого узла В.

12. Способ передачи вещательных данных от соседних узлов В на один из множества терминалов абонентов (ТА), при котором терминал абонента перемещается в область передачи обслуживания между соседними узлами В, в системе подвижной связи многостанционного доступа с кодовым разделением каналов (МДКР), имеющей по меньшей мере два соседних узла В, контроллер радиосети (КРС), подсоединенный к узлам В, и терминалы абонентов, расположенные в сотах, занятых соответствующими узлами В, причем узлы В передают данные асинхронно и передают общие вещательные данные на терминалы абонентов в пределах сот узлов В, согласно которому:

передают разность между моментом времени начала передачи первого системного кадра от первого узла В из числа соседних узлов В и моментом времени начала передачи второго системного кадра от второго узла В из числа соседних узлов В, от терминала абонента, расположенного в области передачи обслуживания, на контроллер радиосети;

умножают конкретное целое число из целых чисел от 0 до 255 на суммарное количество чипов, составляющих один номер системного кадра, суммируют результат умножения с конкретным целым числом из целых чисел от 0 до 38399 и передают результат суммирования в виде первого смещения для определения момента времени начала передачи кадров вещательных данных посредством контроллера радиосети;

суммируют разностное значение между моментами времени начала и первого смещения и передают результат суммирования в виде второго смещения, позволяющего второму узлу В передавать кадры вещательных данных одновременно с первым узлом В.

13. Способ по п.12, согласно которому разность между моментами времени начала вычисляют посредством умножения разности между номером системного кадра первого системного кадра от первого узла В из числа соседних узлов В в пределах эффективной области и номером системного кадра второго системного кадра от второго узла В из соседних узлов В на суммарное количество чипов, составляющих один номер системного кадра, а последующего суммирования результата

умножения и разности между моментом времени начала приема первого системного кадра и моментом времени начала приема второго системного кадра, ближайшего к моменту времени начала приема первого системного кадра.

14. Способ по п.12, согласно которому терминал абонента передает информацию о принимаемой мощности первых и вторых системных кадров на контроллер радиосети.

15. Способ по п.12, согласно которому первый системный кадр представляет собой кадр, передаваемый по общему пилотному каналу (ОПК) от первого узла В.

16. Способ по п.12, согласно которому второй системный кадр представляет собой кадр, передаваемый по общему пилотному каналу ОПК от второго узла В.

17. Способ по п.12, согласно которому момент времени начала передачи первого системного кадра представляет собой номер системного кадра в момент времени, когда первый узел В начинает передачу первого системного кадра.

18. Способ по п.17, согласно которому момент времени начала передачи второго системного кадра представляет собой номер системного кадра в момент времени, когда второй узел В начинает передачу второго системного кадра.

19. Способ по п.12, согласно которому разность между моментами времени начала вычисляют при помощи момента времени передачи от второго узла В второго системного кадра, ближайшего к первому системному кадру из числа вторых системных кадров, принимаемых от второго узла В.

20. Способ передачи вещательных данных от соседних узлов В

на один из множества терминалов абонентов (ТА), при котором терминал абонента перемещается в область передачи обслуживания между соседними узлами В, в системе подвижной связи многостанционного доступа с кодовым разделением каналов (МДКР), имеющей по меньшей мере два соседних узла В, контроллер радиосети (КРС), подсоединенный к узлам В, и терминалы абонентов, расположенные в сотах, занятых соответствующими узлами В, причем узлы В передают данные асинхронно и общие вещательные данные передают на терминал абонента в пределах сот узлов В, согласно которому:

запрашивают через контроллер радиосвязи соседние узлы В о наблюдаемой разности моментов времени номера межсистемных кадров от аналогичного узла В до соседних узлов В;

сообщают с каждого соседнего узла В на контроллер радиосети разность между моментом времени начала передачи его первого системного кадра и моментом времени начала приема второго системного кадра, соответствующего первому системному кадру, принимаемому от аналогичного узла В;

определяют посредством контроллера радиосети смещение момента времени передачи каждого соседнего узла В с возможностью передачи соседними узлами В кадров вещательных данных одновременно, основываясь на величинах разности, сообщаемых от соседних узлов В с последующей передачей определенных смещений момента времени передачи на соответствующие соседние узлы В; и

передают с каждого соседнего узла В кадры вещательных данных в момент времени передачи, к которому прикладывают смещение, получаемое с контроллера радиосети.

21. Способ по п.20, согласно которому контроллер радиосвязи передает определенные смещения момента времени передачи на терминал абонента, расположенный в области передачи обслуживания.

22. Способ по п.20, согласно которому первые и вторые системные кадры представляют собой кадры, передаваемые по общему пилотному каналу (ОПК) от первых и вторых узлов В соответственно.

23. Способ по п.20, согласно которому моменты времени начала передачи и приема первого

системного кадра и моменты времени начала передачи и приема второго системного кадра определяются номерами системных кадров.

24. Способ по п.20, согласно которому момент времени начала приема второго системного кадра представляет собой момент времени начала приема, ближайший к моменту времени начала передачи первого системного кадра из числа моментов времени начала приема вторых системных кадров, принимаемых от второго узла В.

25. Способ передачи вещательных данных от соседних узлов В на один из множества терминалов абонентов (ТА), при котором терминал абонента перемещается в область передачи обслуживания между соседними узлами В, в системе подвижной связи многостанционного доступа с кодовым разделением каналов (МДКР), имеющей по меньшей мере два соседних узла В, контроллер радиосети (КРС), подсоединенный к узлам В, и терминалы абонентов, расположенные в сотах, занятых соответствующими узлами В, причем узлы В передают данные асинхронно и общие вещательные данные передают на терминалы абонентов в пределах сот узлов В, согласно которому:

запрашивают через контроллер радиосети у терминала абонента, расположенного в области передачи обслуживания, наблюдаемую разность моментов времени номера межсистемных кадров между соседними узлами В;

принимают посредством ТА системные кадры от соседних узлов В, измеряют наблюдаемую разность моментов времени номера межсистемных кадров, основываясь на моменте времени, в который системные кадры были переданы от соседних узлов В, и сообщают результат измерения на контроллер радиосети;

определяют посредством контроллера радиосети смещение момента времени передачи каждого соседнего узла В с возможностью передачи соседними узлами В кадров вещательных данных одновременно, основываясь на наблюдаемой разности моментов времени номера межсистемных кадров от ТА, с последующей передачей определенных смещений моментов времени передачи на соответствующие соседние узлы В; и

передают с каждого соседнего узла В кадры вещательных данных в момент времени передачи, к которому применяется смещение, прикладываемое с контроллера радиосети.

26. Способ по п.25, согласно которому с контроллера радиосети передают определенные смещения моментов времени передачи на терминал абонента, расположенный в области передачи обслуживания.

27. Способ по п.25, согласно которому наблюдаемую разность моментов времени номера межсистемных кадров вычисляют посредством умножения разности между номером системного кадра первого системного кадра от первого узла В из числа соседних узлов В в пределах эффективной области и номером системного кадра второго системного кадра от второго узла В из числа соседних узлов В, на суммарное количество чипов, составляющих один номер системного кадра, с последующим суммированием результата умножения и разности между моментом времени начала приема первого системного кадра и моментом времени начала приема второго системного кадра, ближайшего к моменту времени начала приема первого системного кадра.

28. Способ по п.27, согласно которому на этапе определения смещений моментов времени передачи:

определяют первое смещение момента времени передачи для первого узла В посредством умножения конкретного целого числа из целых чисел от 0 до 255 на суммарное количество чипов, составляющих один номер системного кадра, с последующим суммированием результата умножения на конкретное целое число из чисел от 0 до 38399; и

определяют второе смещение момента времени передачи для второго узла В посредством суммирования наблюдаемой разности моментов времени номера межсистемных кадров и величины первого смещения момента времени передачи для первого узла В.

METHOD FOR TRANSFERRING SERVICE OF CLIENT STATION BETWEEN BASE STATIONS OF VARIOUS CELL PHONE NETWORKS, ONE OF WHICH HAS PRIORITY RELATIVELY TO ANOTHER ONE, AND DEVICE FOR REALIZATION OF METHOD

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Abstract of **RU 2291568 (C1)**

FIELD: radio engineering, possible use for transferring service of client station between base stations of two various cell networks (inter-system "hand-off"), one of which has priority relatively to another one. ^ SUBSTANCE: method includes introducing intermediate state of simultaneous connection of client station to priority base station and non-priority base station, set by two thresholds for power of base station signal of priority network and four given time intervals, determining base station signal power comparison intervals of priority network to given two thresholds.; Intermediate state of simultaneous connection of client station and base station of priority network and non-priority network allows in case of feeding effecting to increased quality and reliability of communication during transfer of service of client station between base stations of various cell networks by decreased frequency of client service transfer from source base station to adjacent base station of network and vice versa (decreased frequency of ping-pong effect). ^ EFFECT: increased quality and reliability of communication during transfer of service to client station. ^ 2 cl, 4 dwg

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(54) СПОСОБ ПЕРЕДАЧИ ОБСЛУЖИВАНИЯ АБОНЕНТСКОЙ СТАНЦИИ МЕЖДУ БАЗОВЫМИ СТАНЦИЯМИ ДВУХ РАЗЛИЧНЫХ СОТОВЫХ СЕТЕЙ, ОДНА ИЗ КОТОРЫХ ЯВЛЯЕТСЯ ПРИОРИТЕТНОЙ ПО ОТНОШЕНИЮ КО ВТОРОЙ, И УСТРОЙСТВО ДЛЯ ЕГО ОСУЩЕСТВЛЕНИЯ

1. Способ передачи обслуживания абонентской станции между базовыми станциями двух различных сотовых сетей, одна из которых является приоритетной по отношению ко второй, при котором на абонентской станции, обслуживаемой исходной базовой станцией неприоритетной сети, определяют соседнюю базовую станцию приоритетной сети, заключающийся в том, что на АС сравнивают мощность сигнала соседней БС приоритетной сети P_c с порогом поддержки связи одновременной связи с приоритетной и не приоритетной сетями P_{2c}, если мощность сигнала соседней БС приоритетной сети P_c не превышает порог одновременной связи с приоритетной и неприоритетной сетями P_{ac} или превышает его в течение времени Т, меньшем заданного интервала T_{2c}, то на АС сравнивают мощность сигнала соседней БС приоритетной сети P_c с порогом P_{2c} до тех пор, пока сигнал соседней БС приоритетной сети P_c превысит заданный порог P_{2c} в течение времени, большем заданного интервала T_{2c}, если мощность сигнала соседней БС приоритетной есть P_c превышает порог одновременной связи с приоритетной и неприоритетной сетями P_{2c} в течение времени, большем заданного интервала T_{2c}, на АС устанавливают связь с БС соседней приоритетной сети и поддерживают связь одновременно с базовыми станциями приоритетной и неприоритетной сетей, после установления связи АС с БС приоритетной сети, на АС с периодом T_1 сравнивают мощность сигнала БС приоритетной сети P_c с порогом одновременной связи с приоритетной и неприоритетной сетей P_{2c} и порогом связи только с приоритетной сетью $P_{пр}$, где порог $P_{пр}$ больше порога P_{2c}, если порог связи только с приоритетной сетью $P_{пр}$ не превышен, а порог одновременной связи с приоритетной и неприоритетной сетями P_{2c} превышен, то на АС снова с периодом T_1 сравнивают мощность сигнала БС приоритетной сети P_c с порогами P_{2c} и $P_{пр}$, если порог одновременной связи с приоритетной и неприоритетной сетями P_{2c} не превышен в течение времени, большем заданного интервала $T_{вых2c}$, то на АС поддерживают связь с БС только неприоритетной сети, если порог связи с приоритетной сетью $P_{пр}$ превышен в течение времени, большем заданного интервала $T_{пр}$, на АС поддерживают связь только с БС приоритетной сети, и с периодом T_2 сравнивают мощность сигнала БС приоритетной сети P_c с порогом одновременной связи с приоритетной и неприоритетной сетями P_{2c} и с порогом связи только с приоритетной сетью $P_{пр}$, если порог связи только с приоритетной сетью $P_{пр}$ превышен или меньше его в течение времени Т, меньшем заданного интервала $T_{выхпр}$, то на АС снова с периодом T_2 сравнивают мощность сигнала БС приоритетной сети P_c с порогом

одновременной связи с приоритетной и неприоритетной сетями P_{2c} и порогом связи только с приоритетной сетью $P_{пр}$ до тех пор, пока мощность сигнала соседней БС приоритетной есть будет меньше порога $P_{пр}$ и больше порога P_{2c} в течение времени Т, равном или большем заданного интервала $T_{вых\ пр}$, если мощность сигнала соседней БС приоритетной сети P_c будет меньше порога $P_{пр}$ и больше порога P_{2c} в течение времени Т, большем заданного интервала $T_{вых\ пр}$, то на АС устанавливают связь с БС соседней неприоритетной сети и поддерживают связь одновременно с БС приоритетной и неприоритетной сетей, после чего снова на АС с периодом T_1 сравнивают мощность сигнала БС приоритетной сети P_c с порогом одновременной связи с приоритетной и неприоритетной сетями P_{2c} и порогом установления связи с приоритетной сетью $P_{пр}$.

2. Способ по п.1, отличающийся тем, что на АС определяют соседнюю БС приоритетной сети, осуществляя поиск сигналов БС соседних сот приоритетной сети в заданной частотно-временной области, запоминая мощности сигналов обнаруженных сигналов соседних сот БС приоритетной сети, усредняя их, выбирая сигнал с максимальной средней мощностью, принимая решение о том, что выбранный сигнал является сигналом соседней БС приоритетной сети, запоминая частотно-временное положение сигнала соседней БС приоритетной сети.

3. Устройство передачи обслуживания абонентской станции, содержащее первый и второй блоки сравнения с порогом, первый и второй логические элементы И, первый и второй счетчики, генератор тактовых импульсов, первый и второй триггеры, при этом входы первого и второго блоков сравнения с порогом объединены, образуя первый вход устройства, выход первого блока сравнения с порогом соединен с первым входом первого логического элемента И, выход второго блока сравнения с порогом соединен с первым входом второго логического элемента И, вторые входы первого и второго логических элементов И объединены, образуя второй вход устройства, выход генератора тактовых импульсов соединен с первыми входами первого и второго счетчиков, выход второго счетчика соединен с первым входом второго триггера, выход которого является вторым выходом устройства, а выход первого триггера - первым выходом устройства, отличающееся тем, что введены первый, второй и третий логические элементы НЕ, третий, четвертый и пятый логические элементы И, третий и четвертый счетчики, первый, второй и третий логические элементы ИЛИ, при этом выход первого логического элемента И соединен со входом первого логического элемента НЕ и вторым входом второго счетчика, выход второго логического элемента И соединен со входом второго логического элемента НЕ и первым входом третьего логического элемента И, выход первого логического элемента НЕ соединен со вторым входом третьего логического элемента И, выход которого соединен со вторым входом первого счетчика и первым входом четвертого логического элемента И, выход второго логического элемента НЕ соединен с первыми входами первого и третьего логических элементов ИЛИ и пятого логического элемента И, первые входы третьего и четвертого счетчиков соединены с выходом генератора тактовых импульсов, выход первого счетчика соединен с первым входом второго логического элемента ИЛИ и вторым входом третьего логического элемента ИЛИ, второй вход второго логического элемента ИЛИ соединен с выходом второго счетчика, третьи входы второго и третьего логических элементов ИЛИ соединены с выходом третьего счетчика, выход четвертого счетчика соединен со вторым входом первого логического элемента ИЛИ и четвертым входом третьего логического элемента ИЛИ, выход которого соединен со вторым входом второго триггера, выходы первого и второго логических элементов ИЛИ соединены соответственно с первым и вторым входами первого триггера, выход первого триггера соединен со вторыми входами четвертого и пятого логических элементов И, выход четвертого логического элемента И соединен со вторым входом третьего счетчика, выход пятого логического элемента И соединен со вторым входом четвертого счетчика, выход второго триггера соединен со входом третьего логического элемента НЕ и третьим входом пятого логического элемента И, выход третьего логического элемента НЕ соединен с третьим входом четвертого логического элемента И.

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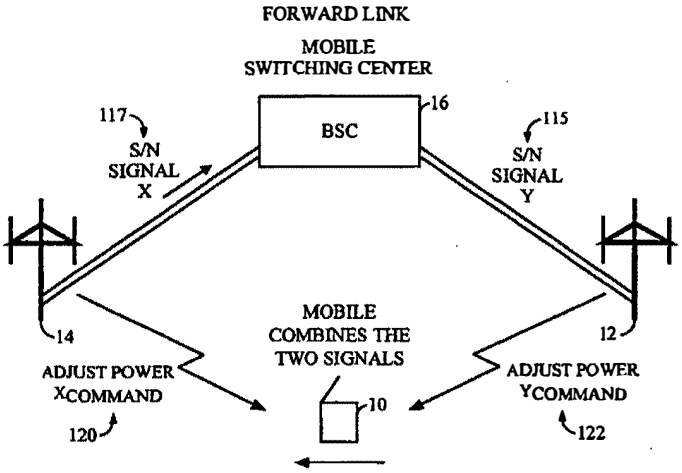
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(54) Title: FORWARD LINK TRANSMISSION POWER CONTROL DURING SOFT HANDOFF



(57) Abstract: Forward power control for a mobile communication system is provided on a frame by frame basis during a soft handoff of a mobile station from a source base station to a target base station. Each base station runs independent but identical algorithms. A selector runs the same power control algorithm as each base station and coordinates power control between the two base stations and the mobile station during the soft handoff. The results of the algorithm run by the selector are delayed because of backhaul. The selector provides the base stations with traffic gain and frame delay information corresponding to the traffic gain. The base station ASIC, modifies the base station power output according to the SNR data received from the mobile station and the traffic gain and frame delay information received from the selector. Providing the frame delay information permits forward power control even when there is delay from when the selector computes the traffic gain and the traffic gain is programmed into the base station application specific integrated circuit.

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FORWARD LINK TRANSMISSION POWER CONTROL DURING SOFT HANDOFF

BACKGROUND OF THE INVENTION

I. Field of the Invention

The present invention relates generally to forward power control in a code division multiple access ("CDMA") mobile communications system and particularly to power control using the forward channel in a CDMA system.

II. Description of the Related Art

CDMA modulation for utilizing the RF spectrum for mobile communications is one of several techniques in which a communication system serves a large number of users. CDMA technology improves the quality of service by providing robust operation in fading environments and transparent or "soft" handoffs. A soft handoff occurs when a mobile station establishes a connection to a target base station, while briefly maintaining the connection with a source base station and on occasion a third base station. As the mobile moves from its current cell (source cell) to the next cell (target cell), a traffic channel connection is simultaneously maintained with both cells.

A smooth soft handoff is accomplished by the aid of the mobile station. FIG. 1 illustrates the forward link in a soft handoff and FIG. 2 illustrates the reverse link. On the forward link, the mobile 10 uses a rake receiver (not shown) to demodulate two separate signals from two different base stations 12, 14. The two signals are combined to yield a composite signal of better quality. On the reverse link in FIG. 2, the mobile's

10 transmit signal is received by both base stations 12, 14. The two cells demodulate the signal separately and send the demodulated frames back to the base station controller 16. The base station controller ("BSC") 16 contains a selector 18 that selects the best frame out of the two that are sent back.

The CDMA system accomplishes smooth operation by strict power control. Because all users share the same RF band through the use of PN codes, each user looks like random noise to other users. The power of each individual user must be carefully controlled such that no one user is unnecessarily interfering with others who are sharing the same band. This is also true during soft handoffs, where the mobile station transmits on the reverse link a power control message to the base station. The IS-95 standard specified that the mobile must report back to the base station the quality, related to the signal-to-noise ratio ("SNR"), of the forward link. The mobile station gathers statistics on error performance on whether it is decoding the base station signals correctly and informs the base station via a power control message. The base station then adjusts its power to the specific user accordingly. Symbols transmitted on the forward and reverse channels are formatted into frames, each frame having a 20 millisecond length. U.S. Patent No. 5,504, 773, entitled "METHOD AND APPARATUS FOR THE FORMATTING OF DATA FOR TRANSMISSION" issued April 2, 1996 of Padovani et al., and assigned to the assignee of the present invention, recites a more detailed explanation of these frames.

The mobile station updates the power control on a frame by frame basis. The high update rate of power control messages enable the base stations to fine tune their transmit power to each individual mobile station, keeping their transmit power at the minimum level required to maintain a link, thus minimizing the total interference of the

system and improving the capacity of the system. The frame by frame power control process is disclosed in U.S. Patent No. 5,383,219, entitled "FAST FORWARD LINK POWER CONTROL IN A CODE DIVISION MULTIPLE ACCESS SYSTEM" issued to Wheatley III, et al., and assigned to the assignee of the present invention, the disclosure of which is hereby incorporated by reference as if fully set forth herein.

A selector is responsible for base station processing requirements. The selector of the land network determines a traffic rate at which a frame is sent to a mobile station and sends the frame to all base stations communicating with that particular mobile. The number of bits per frame transmitted on the reverse channel varies according to the traffic rate. A more detailed description of the traffic rate will be provided below.

During a soft handoff, a plurality of base stations transmit the frame to the mobile. After combining data from possible multiple base stations, the mobile determines whether the last frame has been received and decoded correctly. If the mobile correctly decoded the last frame, the mobile sets the power control bit in the next frame that is transmitted to the base stations. The selector monitors and synchronizes communication when multiple base stations simultaneously communicate with a mobile station. Since the selector knows the rate at which the base stations transmitted the last frame to the mobile and now has feedback from the mobile on whether that frame was correctly decoded, the selector compiles a table of statistics on the error rates that the mobile station is incurring at each rate. As an example, for a given traffic rate, the selector calculates an error rate of "E1."

The selector determines the power level or traffic gain at which the next frame is to be transmitted by comparing to zero the respective difference just calculated. For example, if the frame is to be transmitted at a full rate and $El > 0$, the power level

will be $P_{nominal} + P$, where P is a function of the value of E1 and $P_{nominal}$ is the power level set by the carrier for that geographical area. If E1=0, the power level will be $P_{nominal}$. If E1<0, the power level is $P_{nominal} - P$. The selector forwards the next frame to be transmitted to the mobile to the base stations that are communicating with the mobile. An indication of the power level at which the frame is to be transmitted is included with this frame.

The problem with the type of power control described above is that there is delay between the time the selector calculates the traffic gain, and when the traffic gain is transmitted to the base stations and programmed into the application specific integrated circuit ("ASIC"). Each base station and the selector run identical power control algorithms, but the result of the selector algorithm is delayed due to backhaul.

During a soft handoff operation one of the base stations communicating with the mobile station may receive an erroneous SNR signal from the mobile, or may receive no command signal from the mobile station. Because power control signals on the forward channel are transmitted at a high rate, the base station may transmit at an undesirably high or low power level for several frames prior to receiving the most reliable traffic gain from the selector. If the base station transmits at a power level too high, the overall interference of the system is increased. If the base station transmits at a power level too low, then communication quality is degraded.

SUMMARY OF THE INVENTION

There is a resulting need for a process by which the selector provides the base stations with the traffic gain and frame delay information corresponding to that gain, so as to compensate for the delay due to backhaul.

It is an object of the present invention to provide an arrangement in which the power control algorithm run by the selector determines and transmits the most reliable traffic gain for each base station during a soft handoff operation. In addition, the selector sends each base station frame delay information corresponding to the traffic gain. The mobile station measures and sends signal-to-noise ratio information rather than error rate information. The base station ASIC, modifies the base station power output according to the SNR data received from the mobile station and the traffic gain and frame delay information received from the selector. Both base stations simultaneously run the power control algorithm. When the correct gain commands sent from the selector to one of the base stations are delayed, the soft handoff may become noisy or disrupted. In such a case, the DSP inserts the correct gain into a previous frame chosen according to the delay information, and re-applies all corrections thereafter, and thus resynchronizes the gain information from the selector to both base stations.

This invention utilizes the sliding window buffer to listen for the power control signal. In this regard, the ASIC keeps track of adjustments when it gets correct signal information from a base station controller or selector.

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings:

FIG. 1 shows a forward link for a mobile station, a source base station and target base station during a soft handoff operation;

FIG. 2 shows a reverse link for a mobile station, source base station and target base station during a soft handoff operation;

FIG. 3 is a timing chart showing exemplary timings power control signals in traffic channels received and transmitted between the mobile station, base stations, and base station controller, during a soft handoff operation in the CDMA communication system of FIG 4;

FIG. 4 illustrates the reverse link path in the CDMA architecture showing communication between a mobile station, source and target base stations, and the selector during a soft handoff operation;

FIG. 5 illustrates forward link power control signals during a soft handoff operation; and

FIG. 6 shows the reverse link after the selector has selected a power gain for the base stations.

DETAILED DESCRIPTION OF THE INVENTION

The symbols transmitted on the forward and reverse channels are formatted into frames, each frame having a 20 millisecond length. The amount of data transmitted in each frame depends on the data rate. Each frame contains out of bound signaling on the reverse channels. In forward power control, the mobile sends the desired change in forward SNR, out of band on the reverse channel.

FIG. 3 illustrates the frame by frame signal processing of the SNR signals and power control signals between the mobile station 10, the base stations 12, 14, and the base station controller 16 or selector 18 during a soft handoff operation. Each time period T, T+1, etc., represents a frame of information transmitted. It is noted that although the SNR signal in the following example is transmitted once per frame, the SNR updates over the airwaves from the mobile station may be sent more often than

once per frame, and more often than the updates between the base station controller 16 and the selector 18. What follows is an example of a scenario in which the present invention is applicable.

At time T, the mobile station 10 determines the mean SNR 110 of the forward channel gain. At time T + 1, the mobile station 10 transmits 112 a delta SNR signal Y corresponding to the difference between forward channel SNR and the desired forward channel SNR to both base stations 12, 14. The delta SNR signal instructs the base stations that they should be transmitting at a gain Y_{gain} for optimal power control for the mobile station. Also at time T + 1, the source base station 12 receives delta SNR signal Y 114. However, suppose the target station 14 receives an erroneous delta SNR signal X or receives no signal 116. At time T + 2, the base station controller 16 receives delta SNR signal Y 118 sent 115 from the source base station 12 and error signal X 118 sent 117 from the target base station 14. The selector 18 (not shown in FIG. 4) or base station controller 16 receives both gain values and determines the gain value at which each base station should be transmitting. Suppose in this example that the optimal gain corresponds to the received delta SNR signal is Y_{gain}. The selector 18 then transmits a command $Y_{command}$ to each base station instructing the base station to transmit at a traffic gain Y_{gain} 118. By the time T + 2, the source base station 12 has adjusted its traffic gain to Y_{gain} 122, and the target base station 14 has adjusted its power gain to X_{gain} 120. At time T + 4, the base stations 12, 14 have received the traffic gain control signal $Y_{command}$ 122 from the base station controller 16 and each transmits at a power level of Y_{gain} 124, 126. However, due to backhaul one of the base stations 12, 14 may receive the new gain information later than the other. Because both base stations are simultaneously running the same power control algorithm, gain instructions become unsynchronized on

a frame by frame basis. To avoid the base stations becoming unsynchronized and transmitting at inconsistent power levels, frame delay information is also included with the gain information.

The base stations 12, 14 will utilize the frame delay information and gain information and set the gain at time T + 2 to Y_{gain}. Using the frame delay information, the base stations 12, 14 re-apply all the corrections between time T+2 forward. In this manner, each base station 12, 14 is resynchronized with the appropriate gain. Therefore, the same frame of information sent and received from the mobile station 10 to each base station 12, 14 properly correspond and no disruption occurs during soft handoff.

It is noted that in this illustrative example, frame timing is not strict. For example, the base station controller 16 may receive error signal Y 114 from source base station 12 at a time - or more than one frame - later than T + 3. Similarly, the base stations 12, 14 may receive the traffic gain control signal 120, 122 from the base station controller and transmit at a power level of Y_{gain} 124, 126 at a time or more than one frame later than T + 4.

FIGS. 4-6 illustrate the scenario when inconsistent power control signals are received at the source base station 12 and the target base station 14. Continuing the previous example, suppose the mobile station 10 sends a SNR signal Y 114 to the source base station 12. The source base station 12 responds by adjusting its transmit power to Y_{gain} 122. The mobile station 10 also transmits a SNR signal Y 112 to target base station 14. Suppose the target base station receives the SNR signal as X 116 or perhaps does not receive any error signal. The target base station 14 responds by adjusting its transmit power to X_{gain} 120.

During the soft handoff, the base station controller 16 or selector 18 synchronizes the control of the source base station 12 and the target base station 14. To accomplish this control, the source base station 12 forwards the SNR signal Y 115, and the target base station 14 forwards its received SNR signal X 117 to the selector 18. The selector 18 transmits to the source base station 12 and the target base station 14 the chosen power transmission level Y_{gain} corresponding to the most reliable SNR signal. In this example, the selector determines that the SNR signal Y is more reliable, and thus sends a command signal $Y_{command}$ 124, 126 to instruct each base station 12, 14 to transmit at a traffic gain of Y_{gain}. When one base station receives the gain adjustment one or more frames later than the other base station, a frame delay signal is also included. Frame delay is determined either statistically or by using a message time stamp. (not shown.) The base station ASIC resets the power transmission level at the appropriate time, or in the appropriate frame, and reapplies corrected gain signals in each frame following the first corrected frame. The base stations thus transmit at the same power Y_{gain} to the mobile station 10 and the ASIC of the respective base stations are synchronized.

The previous description of the preferred embodiments are provided to enable any person skilled in the art to make or use the present invention. Various modifications to these embodiments will be readily apparent to those skilled in the art, and the generic principles defined herein may be applied to other embodiments without the use of the inventive faculty. Thus, the present invention is not intended to be limited to the embodiments shown herein, but is to be accorded the widest scope consistent with the principals and novel features disclosed herein. The scope of the invention should be

determined by the appended claims and their legal equivalents, rather than by the examples given.

What is claimed is:

CLAIMS

1. A mobile communication system having frame-by-frame power control comprising:

a mobile station;

a plurality of base stations;

a selector capable of controlling and synchronizing communication between said plurality of base stations and said mobile station;

said mobile station being adapted to transmit a signal-to-noise-ratio signal based on a forward channel signal power level to said plurality of base stations via a reverse link, each of said base stations capable of transmitting said signal-to-noise-ratio signal to said selector;

said selector being adapted to transmit a transmission gain command corresponding to said signal-to-noise-ratio and a frame delay information signal to each of said base stations; and

each of said base stations being adapted to adjust a transmission power level according to said gain command, wherein each base station transmits communication signals to said mobile station at a desired power level in synchronized frames.

2. The mobile communication system of claim 1, wherein each of said base stations utilizes said frame delay information for adjusting base station transmission power level and inserts a corrected transmission power level into at least one previous frame and to re-apply any erroneous transmission power levels in frames subsequent to said at least one previous frame.

3. A mobile communication system having frame-by-frame power control comprising:

a mobile station;

a source base station;

a target base station;

a selector capable of controlling and synchronizing communication between said source base station, said target base station, and said mobile station;

said mobile station being adapted to transmit a signal-to-noise-ratio signal based on a forward channel signal power level to said plurality of base stations via a reverse link, to said source base station and said target base station, said source base station and said target base station each being adapted to adjust power transmission level according to said signal-to-noise-ratio signal, said source base station and said target station capable of transmitting said signal-to-noise-ratio signal to said selector;

said selector being adapted to transmit a transmission gain command corresponding to said signal-to-noise-ratio and a frame delay information signal to said source base station and said target base station; and

said source base station and said target base station each being adapted to adjust transmission power level according to said transmission gain command, wherein each of said source and target base stations transmits communication signals to said mobile station at a desired power level in synchronized frames.

4. The mobile communication system of claim 3, wherein said source base station and said target base station utilize said frame delay information for adjusting

transmission power level and insert a corrected transmission power level into at least one previous frame and to re-apply any erroneous transmission power levels frames subsequent to said at least one previous frame.

5. The mobile communication system of claim 3, wherein said source base station and said target base station utilize said frame delay information for adjusting base station transmission power level and insert a corrected transmission power level into at least one previous frame and to re-apply any erroneous transmission power levels in frames subsequent to said at least one previous frame, wherein

said mobile station communicating with said source base station may transfer from communicating with said source station to said target station with minimum disruption in signal quality.

6. A mobile communication system having frame-by-frame power control comprising:

a mobile station;

a source base station;

a target base station;

a selector capable of controlling and synchronizing communication between said source base station, said target base station, and said mobile station;

said mobile station, while simultaneously communicating with said source base station and said target base station, being adapted to calculate a mean signal-to-noise-ratio based on received communication signals on a forward channel from said target and said source base stations, said mobile station being adapted to transmit

said mean signal-to-noise-ratio signal on a reverse link to said source base station and said target base station;

said source base station and said target base station being adapted to adjust power transmission level according to said mean signal-to-noise-ratio signal, said source base station and said target station being adapted to transmit said signal-to-noise-ratio signal to said selector;

said selector being capable of transmitting a transmission gain command corresponding to said mean signal-to-noise-ratio and a frame delay information signal to said source base station and said target base station; and

said source base station and said target base station being adapted to adjust transmission power level according to said transmission gain command, wherein each of said source and target base stations transmits communication signals to said mobile station at a desired power level in synchronized frames.

7. A mobile communication system as in any one of claim 1 wherein said signal-to-noise-ratio signal is transmitted out of band.

8. The mobile communication system of claim 3, wherein said source base station and said target base station are adapted to utilize said frame delay information for adjusting base station transmission power level and to insert a corrected transmission power level into at least one previous frame and to re-apply any erroneous transmission power levels in frames subsequent to said at least one previous frame, wherein

said mobile station communicating with said source base station may transfer from communicating with said source station to said target station with minimum disruption in signal quality.

9. A method for providing frame by frame data communication in a mobile communication system having a plurality of base stations, a selector, and a mobile station, said method comprising:

receiving communication signals at said mobile station from more than one of said plurality of base stations via a forward channel;

transmitting forward channel signal-to-noise-ratio information via a reverse link from said mobile station to more than one of said plurality of base stations, said signal-to-noise-ratio information corresponding to a mean signal-to-noise-ratio power level received from said plurality of base stations which are simultaneously communicating with said mobile station;

transmitting said signal-to-noise information from each base station to said selector;

determining in said selector, based on said forward channel signal-to-noise information, a desired station transmission power level;

providing each base station with said desired transmission power level and a frame delay corresponding to said desired transmission power level; and

adjusting base station transmission power level in subsequent frames according to said desired transmission power level and corresponding frame delay.

10. The method for providing data communication according to claim 9, wherein said method is executed during a soft hand-off operation.

11. The method of claim 9 wherein adjusting said desired transmission power level comprises correcting a transmission power level in a previous frame according to said frame delay and reapplying correct power levels in all frames subsequent to said previous frame, wherein transmission power levels for said plurality of base stations simultaneously communicating with said mobile station will be synchronized.

12. The method of claim 11 wherein said steps are executing during a soft-handoff operation.

13. A method for adjusting a traffic channel transmission power level in a communication system having a first and second base station, a selector, and a mobile station, said method comprising the steps of:

receiving communication signals at said mobile station from said first and second base stations;

calculating a mean signal-to-noise-ratio signal from said communication signals received from said first and second base stations, respectively;

transmitting said mean signal-to-noise-ratio signal to each of said first and second base stations, wherein each base station forwards its received mean signal-to-noise-ratio signal to said selector;

determining at the selector between the two received mean signal-to-noise-ratio signals from each base station, a most reliable mean signal-to-noise-ratio signals and calculating a desired base station transmission power level;

providing the first and second base stations with said most reliable transmission power level;

adjusting each base station traffic transmission power level according to said most reliable transmission power level received at said selector.

14. The method of claim 13, further comprising the step of:

providing frame delay information from said selector when said most reliable power transmission level being transmitted to a base station is delayed, wherein adjusting said base station traffic power transmission level comprises correcting a previous power transmission level in a previous frame according to said frame delay and reapplying correct power transmission levels in all frames following said previous frame.

15. The method of claim 13, wherein the steps are executed during a soft hand-off operation.

16. In a system having a plurality of base stations and at least one selector, said base stations capable of bi-directional communication with a mobile unit wherein information is communicated to said mobile unit from said plurality of base stations on a forward link and information is communicated to said plurality of base

stations from said mobile unit on a reverse link, a method of controlling base station gain comprising the steps of:

transmitting from the mobile unit to each base station forward link signal-to-noise data;

determining from said forward link signal-to-noise data received from each base station an improved power transmission level for each base station;

providing each base station the improved power transmission level and a frame delay corresponding to the improved power transmission level; and

adjusting base station power transmission level in subsequent frames using the improved power transmission level and corresponding frame delay.

17. A mobile communication system as in any one of claim 3 wherein said signal-to-noise-ratio signal is transmitted out of band.

18. A mobile communication system as in any one of claim 5 wherein said signal-to-noise-ratio signal is transmitted out of band.

19. The method of claim 11, wherein the steps are executed during a soft handoff operation.

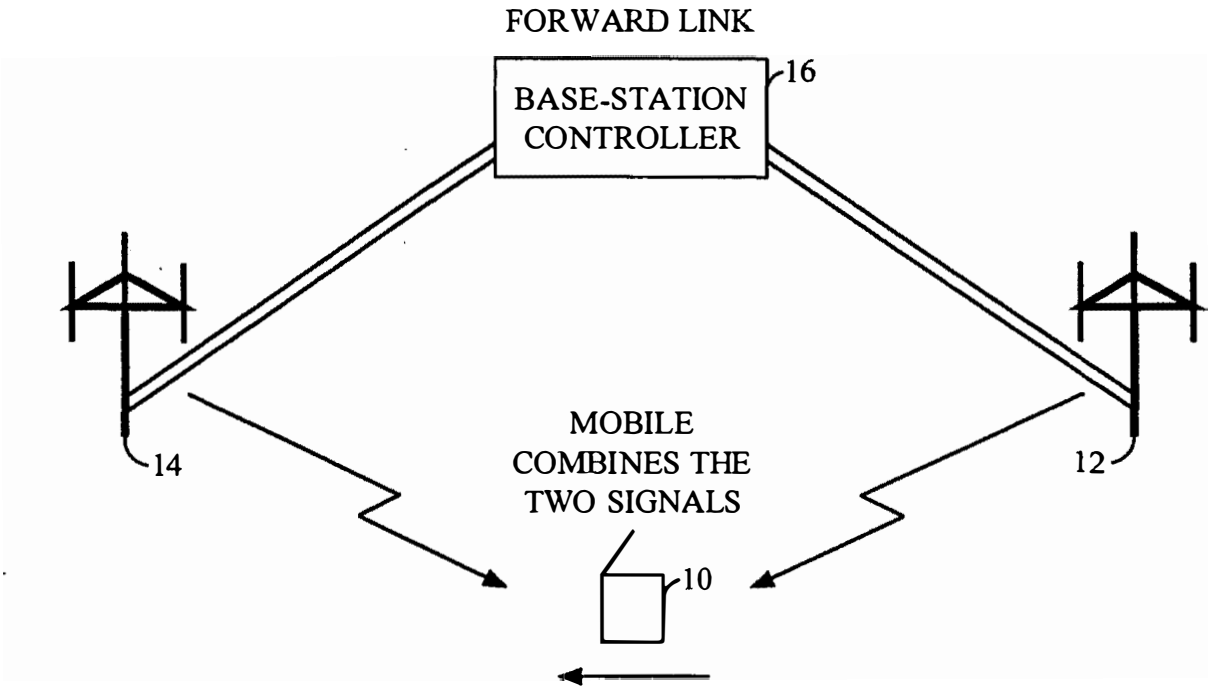

FORWARD LINK
BASE-STATION CONTROLLER
16
14
12
MOBILE COMBINES THE TWO SIGNALS
10

FIG. 1

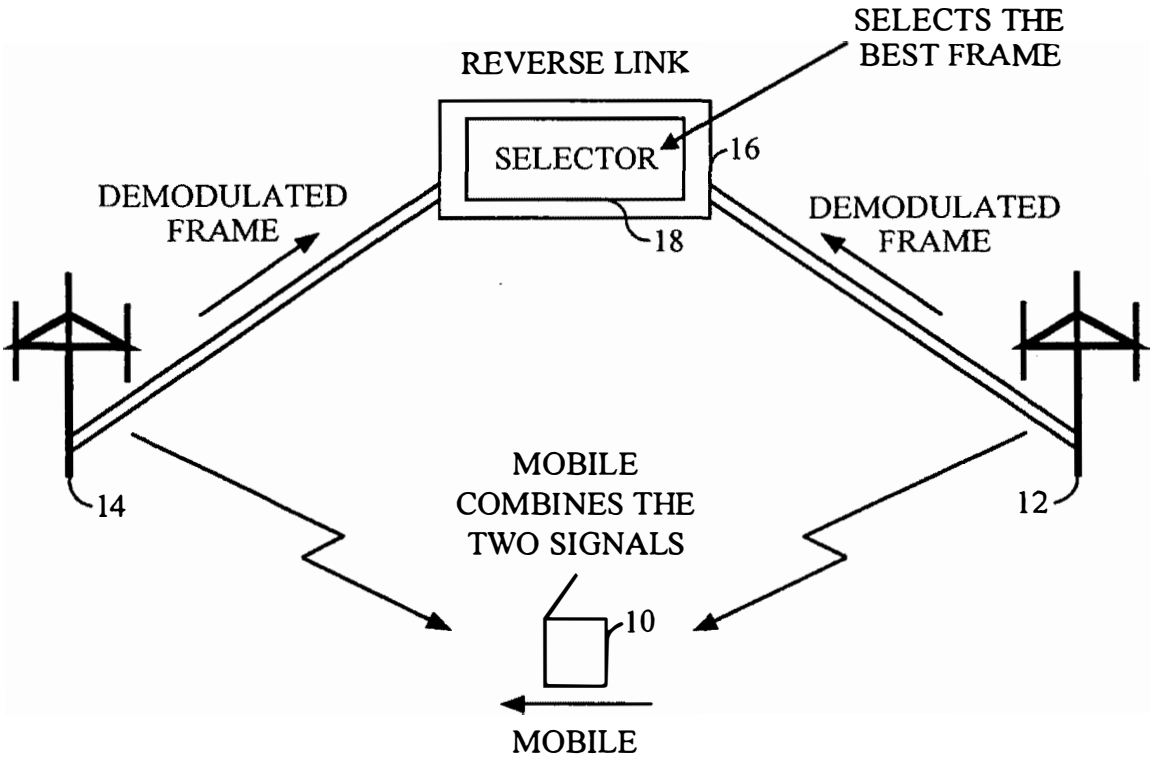

SELECTS THE BEST FRAME
REVERSE LINK
SELECTOR
16
18
DEMODULATED FRAME
DEMODULATED FRAME
14
12
MOBILE COMBINES THE TWO SIGNALS
10
MOBILE

FIG. 2

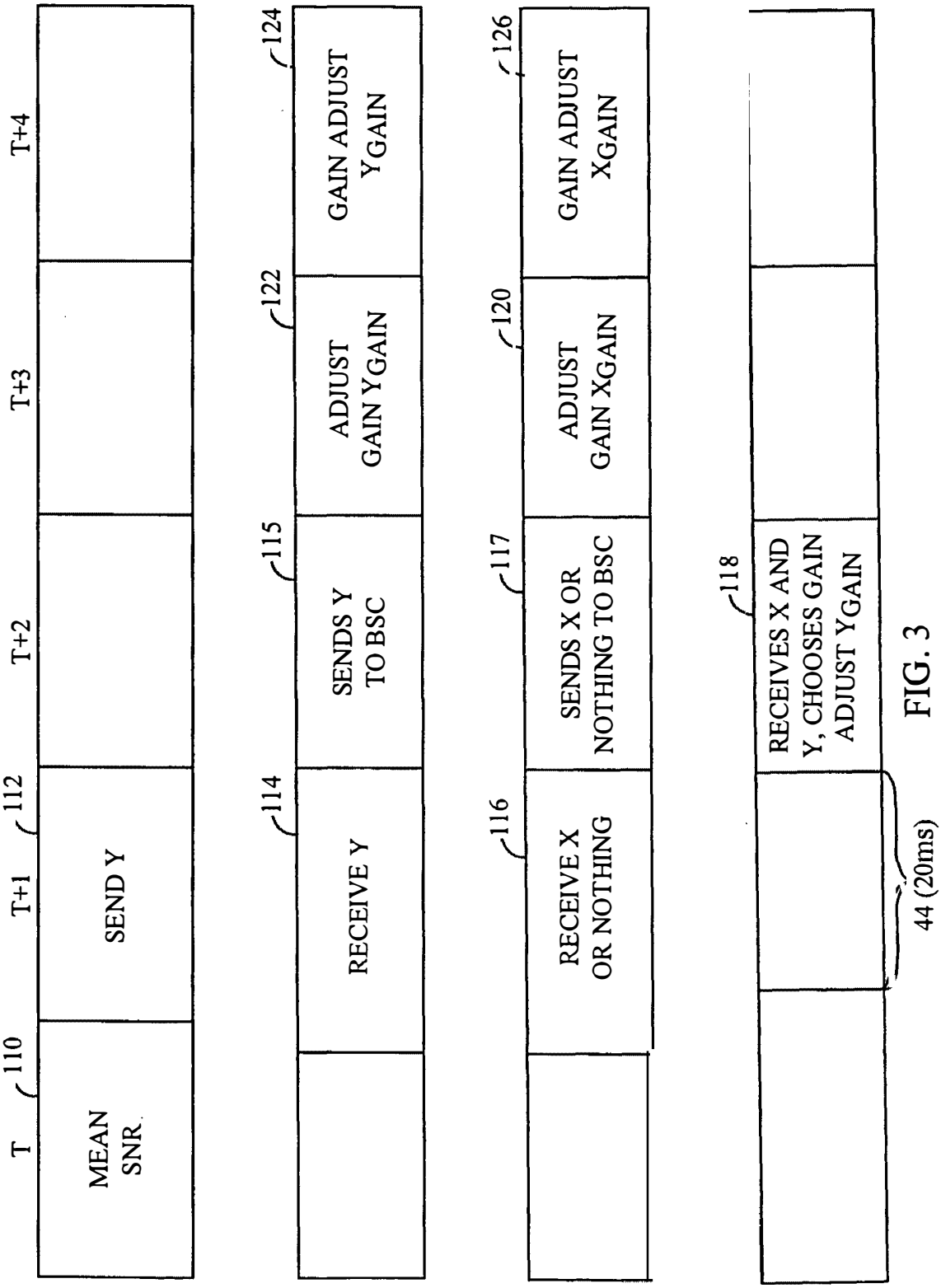

10
MS
12
SOURCE BS
14
TARGET BS
16
BSC
T
T+1
T+2
T+3
T+4
110
112
114
115
116
117
118
120
122
124
126
MEAN SNR
SEND Y
RECEIVE Y
SENDS Y TO BSC
RECEIVE X OR NOTHING
SENDS X OR NOTHING TO BSC
RECEIVES X AND Y, CHOOSES GAIN ADJUST YGAIN
ADJUST GAIN XGAIN
ADJUST GAIN YGAIN
GAIN ADJUST XGAIN
GAIN ADJUST YGAIN
44 (20ms)

FIG. 3

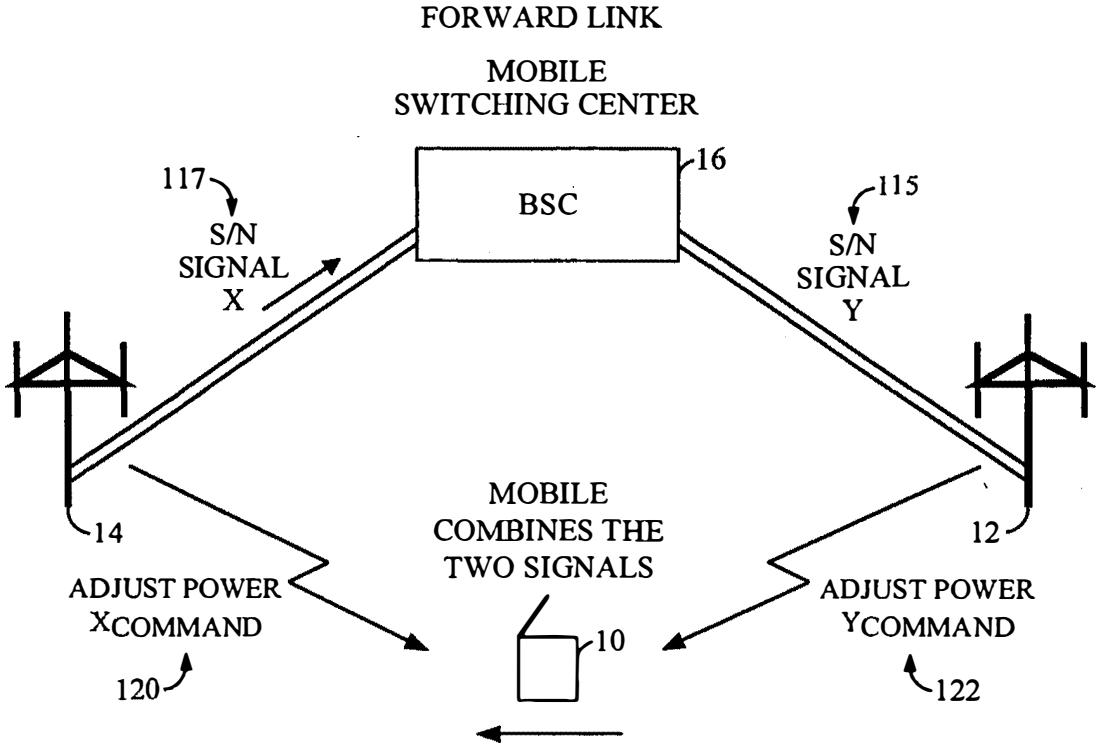

FORWARD LINK
MOBILE SWITCHING CENTER
BSC
16
117
S/N SIGNAL X
115
S/N SIGNAL Y
14
12
MOBILE COMBINES THE TWO SIGNALS
ADJUST POWER XCOMMAND
120
ADJUST POWER YCOMMAND
122
10

FIG. 5

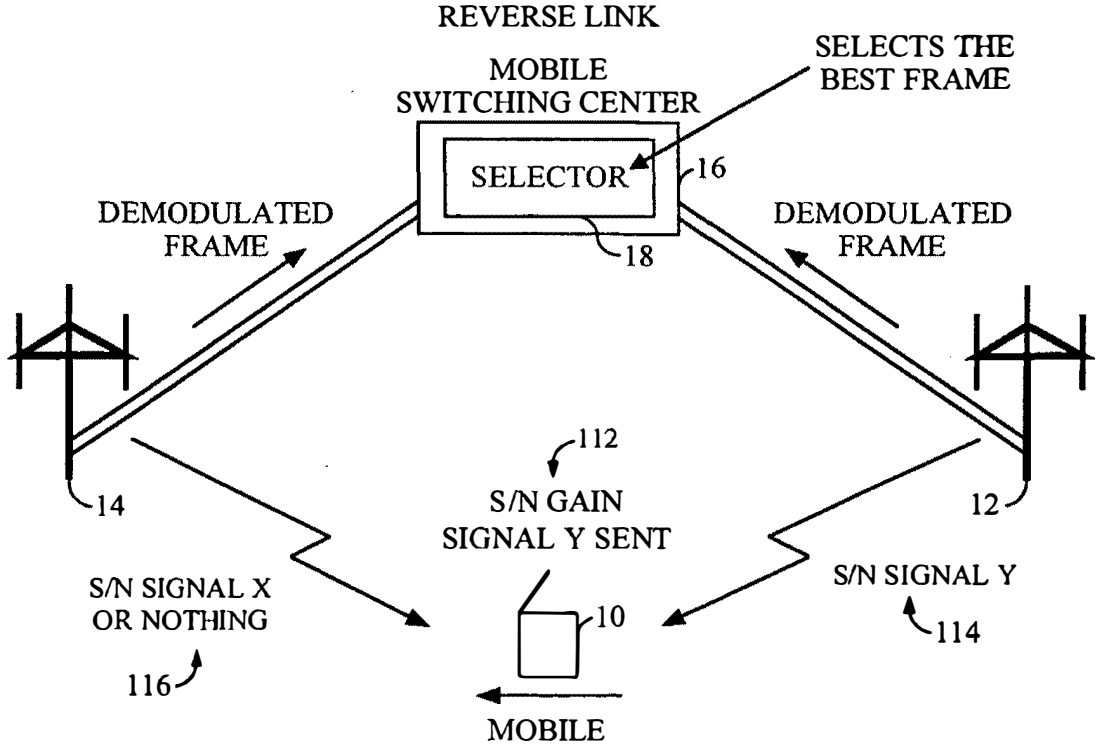

REVERSE LINK
MOBILE SWITCHING CENTER
SELECTS THE BEST FRAME
SELECTOR
16
18
DEMODULATED FRAME
DEMODULATED FRAME
14
12
112
S/N GAIN SIGNAL Y SENT
S/N SIGNAL X OR NOTHING
116
S/N SIGNAL Y
114
10
MOBILE

FIG. 4

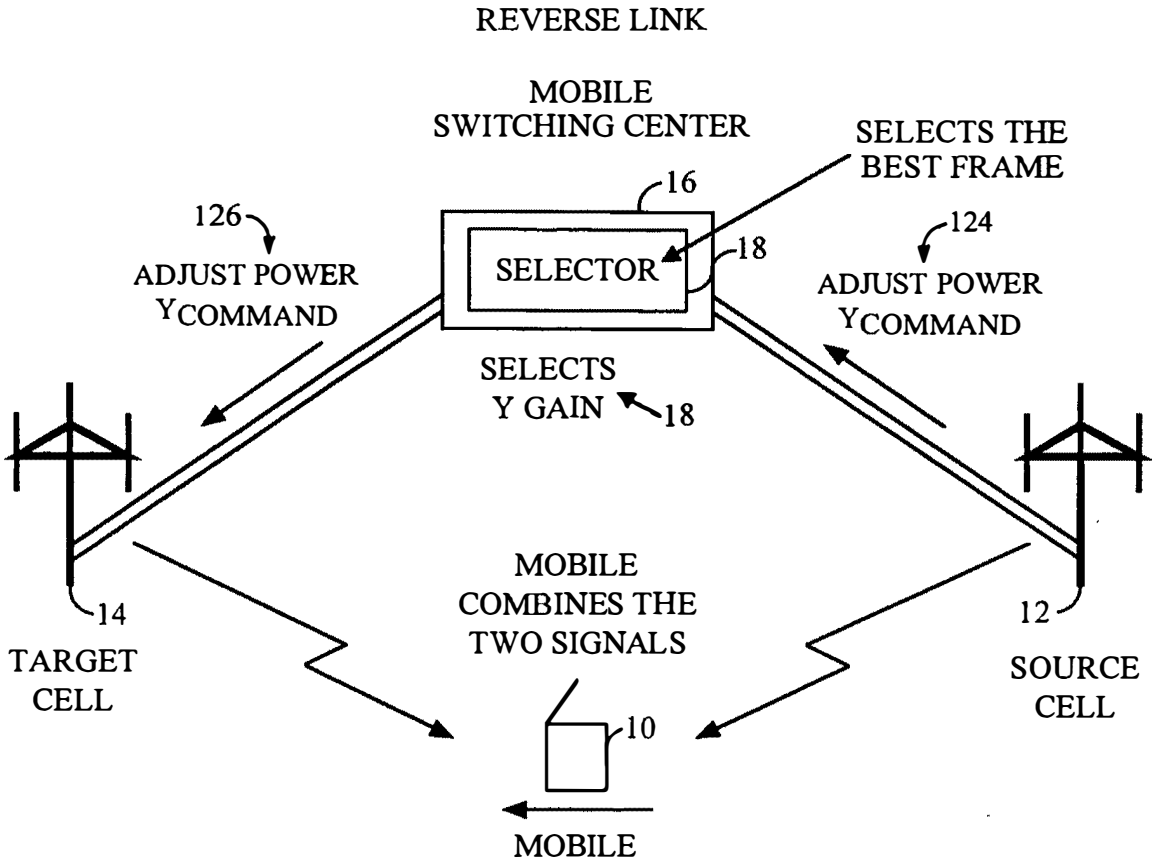

REVERSE LINK
MOBILE
SWITCHING CENTER
SELECTS THE
BEST FRAME
16
126
124
SELECTOR
18
ADJUST POWER
YCOMMAND
ADJUST POWER
YCOMMAND
SELECTS
Y GAIN
18
MOBILE
COMBINES THE
TWO SIGNALS
14
12
TARGET
CELL
SOURCE
CELL
10
MOBILE

FIG. 6

INTERNATIONAL SEARCH REPORT

Int. tional Application No
PCT/US 00/14611

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04B7/005 H04Q7/38

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)
IPC 7 H04B H04Q

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, WPI Data, PAJ, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 893 035 A (CHEN TAO) 6 April 1999 (1999-04-06)	1,3,6,9, 13,16
A	abstract column 2, line 38 -column 3, line 18 column 4, line 3 - line 33 column 6, line 39 - line 64 figures 2,3	2,4,5,7, 8,10,11, 14,15,17

A	WO 99 13675 A (QUALCOMM INC) 18 March 1999 (1999-03-18) abstract page 4, line 3 - line 26	1,3,6,9, 13,16

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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"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	Date of mailing of the international search report
16 October 2000	20/10/2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Lustrini, D

2

Form PCT/ISA/210 (second sheet) (July 1992)

IPR2023-01270 Page 276

INTERNATIONAL SEARCH REPORT

Int. ional Application No
PCT/US 00/14611

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
A	WO 98 56120 A (ERICSSON TELEFON AB L M) 10 December 1998 (1998-12-10) abstract page 5, line 2 -page 6, line 12 page 9, line 13 - line 26 claim 1	1,3,6,9, 13,16
A	US 5 383 219 A (ZEHAVI EPHRAIM ET AL) 17 January 1995 (1995-01-17) cited in the application abstract column 3, line 42 -column 4, line 7	1,3,6,9, 13,16

2

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

IPR2023-01270 Page 277

INTERNATIONAL SEARCH REPORT

Information on patent family members

Int. ional Application No
PCT/US 00/14611

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5893035 A	06-04-1999	AU 4413997 A	02-04-1998
		CN 1235718 A	17-11-1999
		EP 0925653 A	30-06-1999
		NO 991256 A	05-05-1999
		WO 9811677 A	19-03-1998
WO 9913675 A	18-03-1999	AU 9308998 A	29-03-1999
		EP 1013127 A	28-06-2000
		FI 20000518 A	08-05-2000
		NO 20001152 A	03-05-2000
		ZA 9808166 A	09-03-1999
WO 9856120 A	10-12-1998	AU 7702498 A	21-12-1998
		AU 8048298 A	21-12-1998
		CN 1266561 T	13-09-2000
		CN 1265792 T	06-09-2000
		EP 0986862 A	22-03-2000
		WO 9856200 A	10-12-1998
		ZA 9804892 A	19-01-1999
		ZA 9804893 A	19-01-1999
US 5383219 A	17-01-1995	AU 678874 B	12-06-1997
		AU 1187295 A	13-06-1995
		BR 9405789 A	12-12-1995
		CN 1116475 A	07-02-1996
		EP 0680675 A	08-11-1995
		FI 953501 A	20-07-1995
		IL 111689 A	16-08-1998
		JP 8506467 T	09-07-1996
		RU 2128397 C	27-03-1999
		WO 9515038 A	01-06-1995
		US 5461639 A	24-10-1995
		ZA 9408424 A	29-06-1995

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the **PATENT APPLICATION** of: Guodong Zhang et al. **Application No.:** 11/434,330 **Confirmation No.:** 5166 **Filed:** May 15, 2006 For: SUPPORTING ENHANCED UPLINK TRANSMISSION DURING SOFT HANDOVER Group: 2419 Examiner: Brian S. Roberts	Our File: I-2-0674.2US Date: April 27, 2009

REPLY PURSUANT TO 37 C.F.R. §1.111

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Reply is being timely filed in response to the Office Action dated February 4, 2009.

Please amend the application without prejudice or disclaimer as follows:

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-8. (Canceled)

9. (Currently Amended) A method for universal mobile telecommunication system (UMTS) frequency division duplex (FDD) enhanced uplink communication during soft handover implemented in a primary Node-B of a plurality of Node-Bs, comprising:

selecting a primary Node-B out of a plurality of Node-Bs supporting soft handover;

transmitting to a UE specified scheduling information, wherein the specified scheduling information is not transmitted to the UE by any non-primary Node-B of the plurality of Node-Bs;

receiving enhanced uplink packets from the UE;

performing a cyclic redundancy check (CRC);

transmitting an acknowledgement (ACK) or a negative acknowledgment (NACK) to the UE in response to the received enhanced uplink data packet wherein the transmission of either the ACK or NACK is based on the results of the CRC and the ACK or NACK is transmitted by the primary Node-B of the plurality of Node-Bs;

delivering successfully received enhanced uplink data packets to a radio network controller (RNC); and

receiving enhanced uplink data packets from the UE.

10. (Previously presented) The method of claim 9, further comprising:

soft combining an initial transmission of an enhanced uplink data packet, stored in a buffer, with a retransmission of the enhanced uplink data packet.

11-13. (Canceled).

REMARKS/ARGUMENTS

After the foregoing Amendment, claims 9 and 10 are currently pending in this application. Claim 9 is amended. In the present reply, Claims 5 and 13 have been canceled without prejudice.

Election of Claims

In response to the Examiner's restriction requirement, the Applicant hereby elects the claims listed in Group 2 (claims 9 and 10) without traverse. Claims 5 and 13 have been cancelled without prejudice. Accordingly, withdrawal of the restriction requirement is respectfully requested. Applicant reserves the right to prosecute all unelected claims in one or more divisional applications or other filings.

Claim Rejections - 35 USC § 103

Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 7,346,035 to Lee et al. (hereinafter "Lee") in view of U.S. Patent Publication No. 2002/0191544 to Cheng et al. (hereinafter "Cheng"). This rejection relies on the proposition that Lee suggests the entire subject matter of claim 9, upon which claim 10 depends. For at least the reasons that Lee does not teach selecting a primary Node-B out of a plurality of Node-B's and the selected primary Node-B then transmitting to the UE both specified scheduling information

and acknowledgement ("ACK") or negative acknowledgement ("NACK") information based on the results of a cyclic redundancy check ("CRC"), Lee does not render claim 9 obvious.

Lee teaches that the UE transmits uplink data to a plurality of active Node-Bs and then each Node-B checks errors in the received uplink data and each Node-B transmits ACK or NACK information to the UE. Since Lee teaches using a plurality of Node-Bs to communicate with a UE instead of selecting a primary Node-B and does not teach using that primary Node-B to transmit scheduling information as well as ACK or NACK information, based on the results of a cyclic redundancy check, Lee does not anticipate claim 9.

Cheng was cited by the Examiner as teaching a cyclic redundancy check. Cheng does not teach or remotely suggest using the results of the cyclic redundancy check to send ACK or NACK to the UE by a primary Node-B as recited in claim 9 and so does not render claim 9 obvious. Nothing in the combination of Lee and Cheng would suggest the elements of claim 9. For at least this reason, claim 9 is patentable over the combination of Lee and Cheng, whether taken alone or in combination with one another. Claim 10 is patentable over Lee and Cheng, whether taken alone or in combination with one another, at least by virtue of its dependence upon claim 9.

For the reasons presented above, withdrawal of the 35 U.S.C. § 103 rejection

of claims 9 and 10 is respectfully requested.

Conclusion

If the Examiner believes that any additional minor formal matters need to be addressed in order to place this application in condition for allowance, or that a telephonic interview will help to materially advance the prosecution of this application, the Examiner is invited to contact the undersigned by telephone at the Examiner's convenience.

In view of the foregoing amendment and remarks, Applicants respectfully submit that the present application is in condition for allowance and a notice to that effect is respectfully requested.

Respectfully submitted,

Guodong Zhang et al.

By /Thomas A. Mattioli/
Thomas A. Mattioli
Registration No. 56,773

Volpe and Koenig, P.C.
United Plaza
30 South 17th Street
Philadelphia, PA 19103-4009
Telephone: (215) 568-6400
Facsimile: (215) 568-6499

TAM/MDD/kmc

Electronic Acknowledgement Receipt

EFS ID:	5225085
Application Number:	11434330
International Application Number:	
Confirmation Number:	5166
Title of Invention:	Supporting enhanced uplink transmission during soft handover
First Named Inventor/Applicant Name:	Guodong Zhang
Customer Number:	24374
Filer:	Robert D. Leonard/Katie Carlson
Filer Authorized By:	Robert D. Leonard
Attorney Docket Number:	I-2-0674.2US
Receipt Date:	27-APR-2009
Filing Date:	15-MAY-2006
Time Stamp:	16:04:41
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		20090427_I_2_0674_1US_Reply.pdf	90652 2f2e45d3616734d9bf7059161555debec4ct642e	yes	6

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	3
	Applicant Arguments/Remarks Made in an Amendment	4	6

Warnings:	
Information:	
Total Files Size (in bytes):	90652

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
11/434,330	05/15/2006	

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY ☐ RATE ($)	SMALL ENTITY FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	04/27/2009	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 2	Minus	** 20	= 0	X $ =		OR	X $52=	0
	Independent (37 CFR 1.16(h))	* 1	Minus	***3	= 0	X $ =		OR	X $220=	0
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/DANTE r. SMITH/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/434,330	05/15/2006	Guodong Zhang	I-2-0674.2US	5166

24374 7590 06/15/2009

VOLPE AND KOENIG, P.C.
DEPT. ICC
UNITED PLAZA, SUITE 1600
30 SOUTH 17TH STREET
PHILADELPHIA, PA 19103

EXAMINER	
ROBERTS, BRIAN S	

ART UNIT	PAPER NUMBER
2419	

MAIL DATE	DELIVERY MODE
06/15/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	11/434,330	ZHANG ET AL.	
	Examiner	Art Unit	
	BRIAN ROBERTS	2419	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 April 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *9 and 10* is/are pending in the application.

4a) Of the above claim(s) ___ is/are withdrawn from consideration.

5)☐ Claim(s) ___ is/are allowed.

6)☒ Claim(s) *9 and 10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) ___ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date ____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

- Claims 9-10 remain pending.

Claim Objections

Claim 9 is objected to because of the following informalities:

- Claim 9 line 7, "UE" should read --user equipment (UE)--.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 9-10 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

- In reference to claim 9

Claim 9 is directed to a method "implemented in a primary Node-B of a plurality of Node-Bs" as stated in line 3. The specification, such as in paragraph 0028, describes either a RNC or WRTU selecting a primary Node-B. The specification does not describe a method implemented in a primary Node-B wherein a primary Node-B selects a

primary Node-B out of a plurality of Node-Bs. Therefore, the limitation "selecting a primary Node-B out of a plurality of Node-Bs supporting handover" in lines 5-6 was not described in the original disclosure and thus is considered new matter.

- In reference to claim 10

Claim 10 is rejected as being dependent on rejected independent claim 9.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 9-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- In reference to claim 9

Claim 9 recites the limitation "the primary Node-B" in line 14. It is unclear if the antecedent basis for this limitation is "a primary Node-B" of line 3 or line 5.

- In reference to claim 10

Claim 10 is rejected as being dependent on rejected independent claim 9.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 9-10, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (US 7346035) in view of Cheng et al. (US 2002/0191544).

- In reference to claim 9

In Figure 8, Lee et al. teaches a method for a UMTS FDD enhanced uplink communication during soft handover in a primary Node-B (*The Examiner interprets a primary Node-B to be any Node-B in the UMTS network that the UE is communicating with such as Figure 8, 820*) of a plurality of Node-Bs (*The Examiner interprets non-primary Node-Bs to be any Node-Bs in the UMTS network that the UE is not communicating with*) that includes: inherently selecting a primary Node-B (*820*) out a plurality of Node-Bs supporting handover, transmitting to a UE (*850*) specified scheduling information, wherein the specified scheduling information is not transmitted to the UE (*850*) by any non-primary Node-B of the plurality of Node-Bs (*as shown in Figure 2, steps 203,204 col. 2 line 47-55 scheduling occurs prior to the transmission of data packets between a Node-B and UE*); receiving enhanced uplink packets from the UE (*850*) (*Figure 8, step 821*); transmitting an acknowledgement or a negative acknowledgment to the UE (*850*) in response to the received enhanced uplink data packet; delivering successfully received enhanced uplink data packets to a radio network controller (*810*) (*Figure 8 step 817*); and receiving enhanced uplink data packets from the UE (*Figure 8 step 821*). (column 8 line 66 - column 9 line 51)

Lee et al. does not explicitly teach performing a cyclic redundancy check wherein the transmission of either the ACK or NACK is based on the results of the CRC.

In Figure 2, Cheng et al. teaches performing a cyclic redundancy check (s6) to determine if a received packet is valid and the transmission of either the ACK or NACK (s9) is based on the results of the CRC. (paragraph 0044)

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the by the primary Node-B of Lee et al. to include performing a cyclic redundancy check wherein the transmission of either the ACK or NACK is based on the results of the CRC as suggested by Cheng et al. because it allows for determining whether a received packet is valid and retransmission of the packet if it is not valid in order to decrease the error rate of a communication between a UE and a Node-B.

- In reference to claim 10

The combination of Lee et al. and Cheng et al. teaches a system and method that covers substantially all limitations of the parent claim. In Figure 8, Lee et al. teaches soft combining an initial transmission of an enhanced uplink data packet stored in a buffer (826) with a retransmission of the enhanced uplink data packet (Figure 8, step 824). (column 8 line 66 - column 9 line 51)

Response to Arguments

Applicant's arguments filed 04/27/2009 have been fully considered but they are not persuasive.

- On pg 5 of the Remarks, the Applicant contends that Lee does not teach selecting a primary Node-B then transmitting to the UE both specified scheduling information and ACK or NACK information based on the results of a CRC.
- Lee inherently teaches selecting a primary Node-B (*The Examiner interprets a primary Node-B to be any Node-B in the UMTS network that the UE is communicating with such as Figure 8, 820*) which to communicate with since a UE (*850*) communicates with a Node-B such as Node-B (820) in Figure 8, and that Node-B must have been selected for the UE (*850*) to be able to communicate with it. The Examiner does not rely on Lee to teach transmitting to the UE ACK or NACK information based on the results of a CRC. The Examiner has relied on the combination of Lee in view of Cheng et al. to meet the limitation as described in the above rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRIAN ROBERTS whose telephone number is (571)272-3095. The examiner can normally be reached on M-F 10:00-7:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, DANIEL RYMAN can be reached on (571) 272-3152. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

BSR
06/09/2009

/Daniel J. Ryman/
Supervisory Patent Examiner, Art Unit 2419

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11434330	ZHANG ET AL.
	Examiner	Art Unit
	BRIAN ROBERTS	2419

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	06/09/2009								
	1	-								
	2	-								
	3	-								
	4	-								
	5	-								
	6	-								
	7	-								
	8	-								
	9	✓								
	10	✓								
	11	-								
	12	-								
	13	-								

FEB 10 2009
PATENT & TRADEMARK OFFICE

FORM PTO-1449 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use several sheets if necessary)	ATTY. DOCKET NO. I-2-0674.2US	SERIAL NO. 11/434,330
	APPLICANT Zhang et al.	
	FILING DATE May 15, 2006	GROUP 2616

U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
		6,678,249	01/2004	Toskala et al.			
		6,778,830	08/2004	Oizumi et al.			
		6,892,071	05/2005	Park et al.			
		7,013,143	03/2006	Love et al.			
		7,346,035	03/2008	Lee et al.			
		2002/0095635	07/2002	Wager et al.			
		2003/0007480	01/2003	Kim et al.			
		2003/0054824	03/2003	Choi et al.			
		2003/0081692	05/2003	Kwan et al.			
		2003/0161284	08/2003	Chen			
		2003/0210668	11/2003	Malladi et al.			
		2004/0004954	01/2004	Terry et al.			
		2004/0072567	04/2004	Cao et al.			
		2004/0085934	05/2004	Balachandran et la.			
		2004/0120306	06/2004	Wigard et al.			
	*	2004/0160925	08/2004	Heo et al.[1]			
		2004/0202129	10/2004	Kolding et al.			
		2004/0203991	10/2004	Chen et al.			
		2004/0219917	11/2004	Love et al.			
		2004/0219919	11/2004	Whinnett et al.			
		2004/0219920	11/2004	Love et al.			
		2004/0228313	11/2004	Cheng et al.			
		2005/0041694	02/2005	Liu			
		2005/0047354	03/2005	Zeira et al.			
		2005/0048920	03/2005	Liu			

EXAMINER	DATE CONSIDERED
/Brian Roberts/	06/09/2009

EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.R./

FORM PTO-1449 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use several sheets if necessary)	ATTY. DOCKET NO. I-2-0674.2US	SERIAL NO. 11/434,330
	APPLICANT Zhang et al.	
	FILING DATE May 15, 2006	GROUP 2616

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
		2005/0083888	04/2005	Smee et al.			
	*	2007/0047501	03/2007	Usuda et al. [2]			

FOREIGN PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES	TRANSLATION NO
		2 353 439	02/2001	GB				
		2001-128209	05/2001	JP			X**	
	*	2003112283	12/2005	RU			X**	
	*	2005110767	10/2006	RU			X**	
		02/01893	01/2002	WO				
		03/053087	06/2003	WO				
		03/067953	08/2003	WO				
		03/088545	10/2003	WO				
	*	00/074263	12/2000	WO[3]				

OTHER DOCUMENTS

EXAMINER INITIAL		DESCRIPTION (Including Author, Title, Date, Pertinent Pages, Etc.)
		3GPP, "Third Generation Partnership Project; Technical Specification Group Radio Access Network; FDD Enhanced Uplink; Overall Description; Stage 2 (Release 6)," 3GPP TS 25.309 V6.0.0 (September 2004).
		3GPP2 C.20003-C, "Medium Access Control (MAC) Standard for cdma2000 Spread Spectrum Systems", 3rd Generation Partnership Project 2 "3GPP2", Version 2.0, Release C, August 2004.
		3GPP2 C.S0004-C, "Signaling Link Access Control (LAC) Standard for cdma2000 Spread Spectrum Systems", 3rd Generation Partnership Project 2 "3GPP2", Version 2.0, Revision C, July 23, 2004.
		3GPP2 C.S0005-C, "Upper Layer (Layer 3) Signaling Standard for cdma2000 Spread Spectrum Systems", 3rd Generation Partnership Project 2 "3GPP2", Version 2.0, Revision c, July 23, 2004.

EXAMINER	DATE CONSIDERED
/Brian Roberts/	06/09/2009

EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.R./

FORM PTO-1449 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use several sheets if necessary)	ATTY. DOCKET NO. I-2-0674.2US	SERIAL NO. 11/434,330
	APPLICANT Zhang et al.	
	FILING DATE May 15, 2006	GROUP 2616

EXAMINER INITIAL		DESCRIPTION (Including Author, Title, Date, Pertinent Pages, Etc.)
		GPP2 C.S0002-C, "Physical Layer Standard for cdma2000 Spread Spectrum Systems", 3rd Generation Partnership Project 2 "3GPP2", Version 2.0, Revision C, July 23, 2004.

X** Abstract only

[1] Corresponds to RU 2004104196; [2] Corresponds to RU 2006130462; [3] Corresponds to RU 2001135846.

EXAMINER	DATE CONSIDERED
/Brian Roberts/	06/09/2009

EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.R./

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
~~S168~~	120	370/229.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/09 15:53
S169	174	370/230.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/09 16:20
S170	160	370/235.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/09 16:23
S171	795	370/328.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/09 16:39
S172	743	370/331.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/09 16:45
S173	45	370/343.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	~~US-PGPUB~~; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/09 16:49
S174	14	370/344.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/09 17:06
S175	904	455/436.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/09 17:08
S176	177	455/439.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/09 17:11

S178	7	714/746.ccls. and ((Node adj B) or Node-B) and (H-ARQ or HARQ)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/09 17:26
S177	41	455/442.ccls. and ((Node adj B) or Node-B) and (H-ARQ or HARQ)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/09 17:26
S180	28	primary near2 node near b and umts	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/09 17:29
S179	233	enhanced near uplink with schedul$3	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/09 17:29
S181	107	chase near combin$3 and (ACK or NACK) with((cyclic near redundan$3 near check) or CRC)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/09 17:30
S183	7	370/229.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/09 17:31
S182	10	soft near combin$3 and utms	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/09 17:31
S186	40	370/328.ccls. and enhanced near uplink	~~US-PGPUB;~~ USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/09 17:32
S185	10	370/235.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/09 17:32
S184	7	370/230.ccls. and enhanced near uplink	~~US-PGPUB;~~ USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/09 17:32

S187	25	370/331.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/09 17:36
S189	0	370/343.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/09 17:38
S190	0	370/344.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/09 17:39
S191	23	455/436.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/09 17:44
S192	30	455/442.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/09 17:47

6/9/2009 5:51:33 PM
C:\Documents and Settings\broberts\My Documents\EAST\Workspaces\11434330a.wsp

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11434330	ZHANG ET AL.
	Examiner	Art Unit
	BRIAN ROBERTS	2419

SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
Updated search focused on: 370/229,230,235,328,331,343,344 455/436,439,442	6/9/2009	BSR
Updated EAST text search: see search history printout	6/9/2009	BSR

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

PTO/SB/30EFS (06-09)
Approved for use through 06/30/2009. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	11/434,330	Filing Date	2006-05-15	Docket Number (if applicable)	I-2-0674.2US	Art Unit	2619
First Named Inventor	Guodong Zhang			Examiner Name	Brian S. Roberts		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

- ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
- ☐ Other _____

☒ Enclosed

- ☒ Amendment/Reply
- ☐ Information Disclosure Statement (IDS)
- ☐ Affidavit(s)/ Declaration(s)
- ☐ Other _____

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____ (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

☒ **The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 090435

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

PTO/SB/30EFS (06-09)
Approved for use through 06/30/2009. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Signature of Registered U.S. Patent Practitioner			
Signature	/Thomas A. Mattioli/	Date (YYYY-MM-DD)	2009-09-15
Name	Thomas A. Mattioli	Registration Number	56773

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal

Application Number:	11434330
Filing Date:	15-May-2006
Title of Invention:	Supporting enhanced uplink transmission during soft handover
First Named Inventor/Applicant Name:	Guodong Zhang
Filer:	Robert D. Leonard/Katie Carlson
Attorney Docket Number:	I-2-0674.2US

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Request for continued examination	1801	1	810	810
		Total in USD ($)		**810**

Electronic Acknowledgement Receipt

EFS ID:	6077457
Application Number:	11434330
International Application Number:	
Confirmation Number:	5166
Title of Invention:	Supporting enhanced uplink transmission during soft handover
First Named Inventor/Applicant Name:	Guodong Zhang
Customer Number:	24374
Filer:	Robert D. Leonard/Katie Carlson
Filer Authorized By:	Robert D. Leonard
Attorney Docket Number:	I-2-0674.2US
Receipt Date:	15-SEP-2009
Filing Date:	15-MAY-2006
Time Stamp:	16:36:43
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$810
RAM confirmation Number	3071
Deposit Account	090435
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1		20090915_I_2_0674_2US_Reply.pdf	94794 cf760d0841469510afe17e9b916e37a267d72d03	yes	8

Multipart Description/PDF files in .zip description		
Document Description	**Start**	**End**
Amendment After Final	1	1
Claims	2	3
Applicant Arguments/Remarks Made in an Amendment	4	8

Warnings:					
Information:					
2	Request for Continued Examination (RCE)	20090915_I_2_0674_2US_RCE.PDF	882903 92581acaac15eaa368c8b5aeb8b11142d1f2cc9d	no	3
Warnings:					
Information:					
3	Fee Worksheet (PTO-875)	fee-info.pdf	30253 8ea3b9b7df880d953433a720c08340d8369295c	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	1007950		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the **PATENT APPLICATION** of:	
Zhang et al.	
Application No.: 11/434,330	Our File: I-2-0674.2US
Confirmation No.: 5166	Date: September 15, 2009
Filed: May 15, 2006	
For: SUPPORTING ENHANCED UPLINK TRANSMISSION DURING SOFT HANDOVER	
Group: 2419	
Examiner: Brian S. Roberts	

REPLY PURSUANT TO 37 C.F.R. §1.114

Mail Stop RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Reply is being timely filed in response to the Office Action dated June 15, 2009. A Request for Continued Examination (RCE) is filed concurrently herewith.

Please amend the application without prejudice or disclaimer as follows:

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-8. (Canceled)

9. (Currently Amended) A method for universal mobile telecommunication system (UMTS) frequency division duplex (FDD) enhanced uplink communication during soft handover implemented in a Node-B operating as a primary Node-B ~~primary Node-B of a plurality of Node-Bs~~, comprising:

~~selecting a primary Node-B out of a plurality of Node-Bs supporting soft handover;~~

transmitting to a user equipment (UE) and non-primary Node-B(s) specified scheduling information, wherein the specified scheduling information is not transmitted to the UE by any non-primary Node-B ~~of the plurality of Node-Bs~~;

receiving enhanced uplink packets from the UE;

performing a cyclic redundancy check (CRC);

transmitting an acknowledgement (ACK) or a negative acknowledgment (NACK) to the UE in response to the received enhanced uplink data packet wherein the transmission of either the ACK or NACK is based on the results of the CRC ~~and the ACK or NACK is transmitted by the primary Node-B of the plurality of Node-Bs~~; and

delivering successfully received enhanced uplink data packets to a radio network controller (RNC)~~; and~~

~~receiving enhanced uplink data packets from the UE~~.

10. (Previously Presented) The method of claim 9, further comprising:

soft combining an initial transmission of an enhanced uplink data packet, stored in a buffer, with a retransmission of the enhanced uplink data packet.

11-13. (Canceled).

REMARKS/ARGUMENTS

After the foregoing Amendment, claims 9 and 10 are currently pending in this application. Claims 1-8 and 11-13 were canceled previously without prejudice. Claim 9 is amended in the present reply.

Claim Objections

The Examiner objected to claim 9 line 7, because "UE" should read user equipment (UE). The claim language has been updated to correct this informality and withdrawal of the claim objection is respectfully requested.

Claim Rejections - 35 USC § 112

Claims 9-10 are rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. The examiner indicated that claim 9 contains subject matter which was not described in the specification. More specifically, the examiner states that the specification does not describe a method implemented in a primary Node-B wherein a primary Node-B selects a primary Node-B out of a plurality of Node-Bs. Claim 9 has been amended and withdrawal of the 35 U.S.C. § 112 rejection of claims 9 and 10 is respectfully requested.

Claim Rejections – 35 USC § 103

Claims 9-10 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 7,346,035 to Lee et al. (hereinafter "Lee") in view of U.S. Patent Publication No. 2002/0191544 to Cheng et al. (hereinafter "Cheng").

Lee does not individually render independent claim 9 obvious since Lee does not teach, suggest or disclose the elements of independent claim 9. Lee teaches retransmitting uplink (UL) packet data from a user equipment (UE) to a plurality of Node-Bs in an asynchronous Code Division Multiple Access (CDMA) mobile communication system servicing an enhanced uplink dedicated transport channel (EUDCH) where each Node-B checks errors in the received UL data and each Node-B transmits ACK/NACK data to the UE according to the result.

Accordingly, Lee does not disclose, teach or suggest "A method for universal mobile telecommunication system (UMTS) frequency division duplex (FDD) enhanced uplink communication during soft handover implemented in a Node-B operating as a primary Node-B" where a primary Node-B is "transmitting to a user equipment (UE) and non-primary Node-B(s) specified scheduling information, wherein the specified scheduling information is not transmitted to the UE by any non-primary Node-B" and "performing a cyclic redundancy check (CRC)" then "transmitting an acknowledgement (ACK) or a negative acknowledgment (NACK) to

the UE … wherein the transmission of either the ACK or NACK is based on the results of the CRC."

Lee does not teach the elements of claim 9 described above and does not individually render claim 9 obvious.

Cheng teaches inter layer control at a network node by receiving and decoding a protocol data unit (PDU) from a lower protocol layer at an upper layer. A CRC is performed to determine if the PDU is valid. If the PDU is not valid a NACK is scheduled, if the PDU is valid an ACK is scheduled. While Cheng teaches the performance of a CRC, it does not teach, suggest or disclose "A method for universal mobile telecommunication system (UMTS) frequency division duplex (FDD) enhanced uplink communication during soft handover implemented in a Node-B operating as a primary Node-B" where a primary Node-B is "transmitting to a user equipment (UE) and non-primary Node-B(s) specified scheduling information, wherein the specified scheduling information is not transmitted to the UE by any non-primary Node-B" and "performing a cyclic redundancy check (CRC)" then "transmitting an acknowledgement (ACK) or a negative acknowledgment (NACK) to the UE … wherein the transmission of either the ACK or NACK is based on the results of the CRC." Accordingly, Cheng fails to cure the deficiencies of the Lee reference.

Further, nothing in the combination of Lee and Cheng suggest the above-argued elements of independent claim 9.

For at least this reason independent claim 9 is patentable over the combination of Lee and Cheng. In addition, claim 10 is patentable over Lee and Cheng at least by virtue of its dependence upon independent claim 9.

For the reasons presented above, withdrawal of the 35 USC § 103 rejection of claims 9 and 10 is respectfully requested.

Conclusion

If the Examiner believes that any additional minor formal matters need to be addressed in order to place this application in condition for allowance, or that a telephonic interview will help to materially advance the prosecution of this application, the Examiner is invited to contact the undersigned by telephone at the Examiner's convenience.

In view of the foregoing amendment and remarks, Applicants respectfully submit that the present application is in condition for allowance and a notice to that effect is respectfully requested.

Respectfully submitted,

Zhang et al.

By /Thomas A. Mattioli/
Thomas A. Mattioli
Registration No. 56,773

Volpe and Koenig, P.C.
United Plaza
30 South 17th Street
Philadelphia, PA 19103-4009
Telephone: (215) 568-6400
Facsimile: (215) 568-6499

MDD/TAM/kmc
Enclosure(s) (1)

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
11/434,330	05/15/2006	

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	09/15/2009	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 2	Minus	** 20	= 0	X $ =		OR	X $52=	0
	Independent (37 CFR 1.16(h))	* 1	Minus	***3	= 0	X $ =		OR	X $220=	0
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/DORIS M. KING/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Entered w/RCE
dtd 9/15/09

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the **PATENT APPLICATION** of:	
	Zhang et al.
Application No.:	11/434,330
Confirmation No.:	5166
Filed:	May 15, 2006
For:	SUPPORTING ENHANCED UPLINK TRANSMISSION DURING SOFT HANDOVER
Group:	2419
Examiner:	Brian S. Roberts

Our File: I-2-0674.2US

Date: September 15, 2009

DMK
9/25/09

REPLY PURSUANT TO 37 C.F.R. §1.114

Mail Stop RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Reply is being timely filed in response to the Office Action dated June 15, 2009. A Request for Continued Examination (RCE) is filed concurrently herewith.

Please amend the application without prejudice or disclaimer as follows:

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/434,330	05/15/2006	Guodong Zhang	I-2-0674.2US	5166

24374 7590 12/08/2009

VOLPE AND KOENIG, P.C.
DEPT. ICC
UNITED PLAZA, SUITE 1600
30 SOUTH 17TH STREET
PHILADELPHIA, PA 19103

EXAMINER	
ROBERTS, BRIAN S	

ART UNIT	PAPER NUMBER
2466	

MAIL DATE	DELIVERY MODE
12/08/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	11/434,330	ZHANG ET AL.	
	Examiner	Art Unit	
	BRIAN ROBERTS	2466	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 September 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *9 and 10* is/are pending in the application.

4a) Of the above claim(s) ___ is/are withdrawn from consideration.

5)☐ Claim(s) ___ is/are allowed.

6)☒ Claim(s) *9-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) ___ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date ____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: ____.

DETAILED ACTION

- Claims 9-10 remain pending.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 09/15/2009 has been entered.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 9-10 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

- In reference to claim 9

The limitation "transmitting to a user equipment (UE) and non-primary Node-B(s) specified scheduling information, wherein the specified scheduling information is not transmitted to the UE by any non-primary Node-B" in lines 7-9 was not described in the original disclosure, and thus constitutes new matter. The specification supports a Node-B, operating as a primary Node-N, transmitting to a user equipment (UE) specified scheduling information, wherein the specified scheduling information is not transmitted to the UE by any non-primary Node-B. However, the specification does not support a Node-B, operating as a primary Node-N, transmitting the claimed specified scheduling information to non-primary Node-B(s).

- In reference to claim 10

Claim 10 is rejected as depending on a rejected base claim.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 9-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- In reference to claim 9

The limitation "Node-B(s)" renders the claim indefinite because it is unclear if the applicant is attempting to claim a single Node-B or plural Node-Bs.

Claim 9 recites the limitation "the received enhanced uplink data packet" in line 13. There is insufficient antecedent basis for this limitation in the claim. The Examiner recommends amending the limitation "receiving enhanced uplink packets from the UE" in line 10 to --receiving an enhanced uplink packet from the UE-- to overcome the rejection.

The limitation "performing a cyclic redundancy check (CRC)" in line 14 is confusing because it is unclear whether the CRC is performed after receiving packets or the CRC is performed for each received packet. The examiner recommends amending "performing a cyclic redundancy check (CRC)" in line 14 to --performing a cyclic redundancy check (CRC) for the received enhanced uplink packet--.

- In reference to claim 10

Claim 10 is rejected as depending on a rejected base claim.

Response to Arguments

Applicant's arguments with respect to claim 9 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRIAN ROBERTS whose telephone number is (571)272-3095. The examiner can normally be reached on M-F 10:00-7:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, DANIEL RYMAN can be reached on (571) 272-3152. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

BSR
12/03/2009

/Daniel J. Ryman/
Supervisory Patent Examiner, Art Unit 2466

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11434330	ZHANG ET AL.
	Examiner	Art Unit
	BRIAN ROBERTS	2466

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	12/03/2009								
	1	-								
	2	-								
	3	-								
	4	-								
	5	-								
	6	-								
	7	-								
	8	-								
	9	✓								
	10	✓								
	11	-								
	12	-								
	13	-								

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11434330	ZHANG ET AL.
	Examiner	Art Unit
	BRIAN ROBERTS	2466

SEARCHED

Class	Subclass	Date	Examiner

SEARCH NOTES

Search Notes	Date	Examiner
Updated search focused on: 370/229,230,235,328,331,343,344 455/436,439,442	12/3/2009	BSR
Updated EAST text search: see search history printout	12/3/2009	BSR

INTERFERENCE SEARCH

Class	Subclass	Date	Examiner

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S203	1459	schedul$3 with node near b	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/03 12:49
S204	359	schedul$3 with node near b with (active or primary or serv$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/03 12:50
S205	193	schedul$3 with node near b near2 (active or primary or serv$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/03 12:50
S206	2	"6678523".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/03 13:11
S207	1692	hs near dsch	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/03 17:11
S208	130	370/229.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/03 18:26
S209	7	370/229.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/03 18:27
S210	9	370/230.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/03 18:27

S211	11	370/235.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/03 19:00
S212	49	370/328.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/03 19:02
S213	29	370/331.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/03 19:02
S214	0	370/343.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/03 19:05
S215	1	370/344.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/03 19:05
S216	24	455/436.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/03 19:05
S217	34	455/442.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/03 19:05
S218	110	primary near3 (base near station or BS or BTS or node near b) with schedul $5	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/03 19:06
S219	984	(base near station or BS or BTS or node near b) with schedul$5 near3 uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/03 19:06
S220	522	"370"/$.ccls. and (base near station or BS or BTS or node near b) with schedul$5 near3 uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/03 19:06

S221	350	"455"/$.ccls. and (base near station or BS or BTS or node near b) with schedul$5 near3 uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/03 19:11
S222	130	370/229.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/03 19:13
S223	185	370/230.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/03 19:14
S224	186	370/235.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/03 19:14
S225	943	370/328.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/03 19:14
S226	842	370/331.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/03 19:14
S227	56	370/343.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/03 19:14
S228	17	370/344.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/03 19:15
S229	989	455/436.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/03 19:16
S230	187	455/439.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/03 19:16

S231	267	455/442.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/03 19:16

12/3/2009 8:19:20 PM
C:\Documents and Settings\broberts\My Documents\EAST\Workspaces\11434330a.wsp

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the **PATENT APPLICATION** of:	
	Zhang et al.
Application No.:	11/434,330
Confirmation No.:	5166
Filed:	May 15, 2006
For:	SUPPORTING ENHANCED UPLINK TRANSMISSION DURING SOFT HANDOVER
Group:	2466
Examiner:	Brian S. Roberts

Our File: I-2-0674.2US

Date: March 8, 2010

REPLY PURSUANT TO 37 C.F.R. §1.111

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Reply is being timely filed in response to the Office Action dated December 8, 2009.

Please amend the application without prejudice or disclaimer as follows:

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-8. (Canceled)

9. (Currently Amended) A method for universal mobile telecommunication system (UMTS) frequency division duplex (FDD) enhanced uplink communication during soft handover implemented in a Node-B operating as a primary Node-B, comprising:

transmitting to a wireless transmit/receive unit (WTRU) ~~user equipment (UE)~~ and non-primary ~~Node-B(s)~~ Node-Bs specified scheduling information, wherein the specified scheduling information is not transmitted to the WTRU ~~UE~~ by any non-primary Node-B;

receiving enhanced uplink data packets from the WTRU ~~UE~~;

performing a cyclic redundancy check (CRC) on the enhanced uplink data packets;

transmitting an acknowledgement (ACK) or a negative acknowledgment (NACK) to the WTRU ~~UE~~ in response to the received enhanced uplink data packets wherein the transmission of either the ACK or NACK is based on the results of the CRC; and

delivering successfully received enhanced uplink data packets to a radio network controller (RNC).

10. (Previously Presented) The method of claim 9, further comprising:

soft combining an initial transmission of an enhanced uplink data packet, stored in a buffer, with a retransmission of the enhanced uplink data packet.

11-13. (Canceled).

REMARKS/ARGUMENTS

After the foregoing Amendment, claims 9 and 10 are currently pending in this application. Claims 1-8 and 11-13 were canceled previously without prejudice. Claim 9 is amended in the present reply.

Claim Rejections - 35 USC § 112

Claims 9-10 are rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. The examiner indicated that claim 9 contains subject matter which was not described in the specification. More specifically, the examiner states that the specification does not describe a Node-B, operating as a primary Node-B, transmitting specified scheduling information to non-primary Node-Bs. Support for claim 9 is found throughout the application as originally filed, included but not limited to paragraph [0025] which states:

> *However, the primary Node-B 210A cannot send the scheduling information to the non-primary Node-Bs 210B in every transmission time interval (TTI).*

Claims 9-10 are rejected under 35 U.S.C. § 112, second paragraph, as indefinite. Claim 9 is amended to traverse the rejection. Applicant submits that claim 9 complies with 35 U.S.C. § 112, first and second paragraphs.

Claim 10 is dependent upon claim 9, and the Applicant believes this claim complies with 35 U.S.C. § 112, first and second paragraphs for the same reasons provided above.

Based on the arguments presented above, withdrawal of the 35 U.S.C. § 112 rejection of claims 9-10 is respectfully requested.

Conclusion

If the Examiner believes that any additional minor formal matters need to be addressed in order to place this application in condition for allowance, or that a telephonic interview will help to materially advance the prosecution of this application, the Examiner is invited to contact the undersigned by telephone at the Examiner's convenience.

In view of the foregoing amendment and remarks, Applicants respectfully submit that the present application is in condition for allowance and a notice to that effect is respectfully requested.

Respectfully submitted,

Zhang et al.

By /Melissa D. Doogan/
Melissa D. Doogan
Registration No. 63,025

Volpe and Koenig, P.C.
United Plaza
30 South 17th Street
Philadelphia, PA 19103-4009
Telephone: (215) 568-6400
Facsimile: (215) 568-6499

MDD/kmc

Electronic Acknowledgement Receipt

EFS ID:	7162284
Application Number:	11434330
International Application Number:	
Confirmation Number:	5166
Title of Invention:	Supporting enhanced uplink transmission during soft handover
First Named Inventor/Applicant Name:	Guodong Zhang
Customer Number:	24374
Filer:	Robert D. Leonard/Katie Carlson
Filer Authorized By:	Robert D. Leonard
Attorney Docket Number:	I-2-0674.2US
Receipt Date:	08-MAR-2010
Filing Date:	15-MAY-2006
Time Stamp:	15:50:21
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		20100308_I_2_0674_2US_Reply.pdf	108405 67ec1d5f2308175e75d94b2b4480f283690 1d8cb	yes	6

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	3
	Applicant Arguments/Remarks Made in an Amendment	4	6

Warnings:	
Information:	
Total Files Size (in bytes):	108405

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/434,330	05/15/2006	Guodong Zhang	I-2-0674.2US	5166

24374 7590 04/08/2010
VOLPE AND KOENIG, P.C.
DEPT. ICC
UNITED PLAZA, SUITE 1600
30 SOUTH 17TH STREET
PHILADELPHIA, PA 19103

EXAMINER	
ROBERTS, BRIAN S	
ART UNIT	PAPER NUMBER
2466	
MAIL DATE	DELIVERY MODE
04/08/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	11/434,330	ZHANG ET AL.	
	Examiner	Art Unit	
	BRIAN ROBERTS	2466	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 March 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *9 and 10* is/are pending in the application.

4a) Of the above claim(s) ___ is/are withdrawn from consideration.

5)☐ Claim(s) ___ is/are allowed.

6)☒ Claim(s) *9-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) ___ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date ____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: ____.

DETAILED ACTION

- Claims 9-10 remain pending.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 9-10 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

- In reference to claim 9

The limitation "transmitting to a wireless transmit/receive unit (WTRU) and non-primary Node-Bs specified scheduling information, wherein the specified scheduling information is not transmitted to the WTRU by any non-primary Node-B" in lines 5-8 is described in Figure 2, paragraph 0025 and pertains to a first disclosed embodiment of the invention.

The limitations "receiving enhanced uplink data packets from the WTRU; performing a cyclic redundancy check (CRC) on the enhanced uplink data packets; transmitting an acknowledgement (ACK) or a negative acknowledgment (NACK) to the WTRU in response to the received enhanced uplink data packets wherein the transmission of either the ACK or NACK is based on the results of the CRC; and delivering successfully received enhanced uplink data

packets to a radio network controller (RNC)" in lines 10-18 is described in Figure 3, paragraph 0034 and pertains to a second disclosed embodiment of the invention (*see par. 0033 "In a separate embodiment Figure 3 shows a wireless multi-cell communications system 300, similar to the system 200 as shown in Figure 2"*)

Because lines 5-8 of claim 9 pertain to a first disclosed embodiment of the invention and lines 10-18 of claim 9 pertain to a second disclosed embodiment of the invention that is separate from the first disclosed embodiment of the invention, claim 9 contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention (*i.e. a third disclosed embodiment of the invention containing the claimed aspects of the first embodiment with the claimed aspects of the second embodiment*).

- In reference to claim 10

Claim 10 is rejected as depending on a rejected base claim.

Response to Arguments

Applicant's arguments filed on 03/08/2010 have been fully considered but they are not persuasive.

- On page 4 of the Remarks, the Applicant contends that support for the limitation "transmitting to a wireless transmit/receive unit (WTRU) and non-primary Node-Bs specified scheduling information, wherein the specified scheduling information is not transmitted to the WTRU by any non-primary Node-B" in lines 5-8 is described

in Figure 2, paragraph 0025 and pertains to a first disclosed embodiment of the invention.

- The Examiner agrees that support for the limitation "transmitting to a wireless transmit/receive unit (WTRU) and non-primary Node-Bs specified scheduling information, wherein the specified scheduling information is not transmitted to the WTRU by any non-primary Node-B" in lines 5-8 is described in Figure 2, paragraph 0025 of the specification. However, Figure 2 and paragraph 0025 of the specification pertain to a first disclosed embodiment of the invention, while the remaining limitations "receiving enhanced uplink data packets from the WTRU; performing a cyclic redundancy check (CRC) on the enhanced uplink data packets; transmitting an acknowledgement (ACK) or a negative acknowledgment (NACK) to the WTRU in response to the received enhanced uplink data packets wherein the transmission of either the ACK or NACK is based on the results of the CRC; and delivering successfully received enhanced uplink data packets to a radio network controller (RNC)" in lines 10-18, described in Figure 3 and paragraph 0034 of the specification, pertain to a second disclosed embodiment of the invention. The original disclosure fails to describe a single embodiment of the invention containing the claimed aspects of the first embodiment and the claimed aspects of the second embodiment. Therefore claim 9 was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRIAN ROBERTS whose telephone number is (571)272-3095. The examiner can normally be reached on M-F 10:00-7:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, DANIEL RYMAN can be reached on (571) 272-3152. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

BSR
04/03/2010

/Daniel J. Ryman/
Supervisory Patent Examiner, Art Unit 2466

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11434330	ZHANG ET AL.
	Examiner	Art Unit
	BRIAN ROBERTS	2466

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	04/02/2010								
	1	-								
	2	-								
	3	-								
	4	-								
	5	-								
	6	-								
	7	-								
	8	-								
	9	✓								
	10	✓								
	11	-								
	12	-								
	13	-								

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11434330	ZHANG ET AL.
	Examiner	Art Unit
	BRIAN ROBERTS	2466

SEARCHED

Class	Subclass	Date	Examiner

SEARCH NOTES

Search Notes	Date	Examiner
Updated search focused on: 370/229,230,235,328,331,343,344 455/436,439,442	4/2/2010	BSR
Updated EAST text search: see search history printout	4/2/2010	BSR

INTERFERENCE SEARCH

Class	Subclass	Date	Examiner

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S232	1570	schedul$3 with node near b	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/04/03 19:20
S233	385	schedul$3 with node near b with (active or primary or serv$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/04/03 19:20
S234	203	schedul$3 with node near b near2 (active or primary or serv$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/04/03 19:22
S235	132	370/229.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/04/03 19:23
S236	9	370/229.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/04/03 19:23
S237	11	370/230.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/04/03 19:23
S238	14	370/235.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/04/03 19:23
S239	56	370/328.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/04/03 19:24

S240	33	370/331.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/04/03 19:24
S241	1	370/343.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/04/03 19:25
S242	1	370/344.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/04/03 19:25
S243	26	455/436.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/04/03 19:25
S244	198	455/439.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/04/03 19:26
S245	35	455/442.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/04/03 19:27
S246	119	primary near3 (base near station or BS or BTS or node near b) with schedul $5	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/04/03 19:28
S247	1118	(base near station or BS or BTS or node near b) with schedul$5 near3 uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/04/03 19:28
S248	607	"370"/$.ccls. and (base near station or BS or BTS or node near b) with schedul$5 near3 uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/04/03 19:29
S249	390	"455"/$.ccls. and (base near station or BS or BTS or node near b) with schedul$5 near3 uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/04/03 19:29

S250	132	370/229.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/04/03 19:30
S251	201	370/230.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/04/03 19:31
S252	203	370/235.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/04/03 19:31
S253	1075	370/328.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/04/03 19:32
S254	942	370/331.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/04/03 19:32
S255	65	370/343.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/04/03 19:32
S256	23	370/344.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/04/03 19:32
S257	1065	455/436.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/04/03 19:32
S258	198	455/439.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/04/03 19:32
S259	284	455/442.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/04/03 19:32

EAST Search History (Interference)

<This search history is empty>

4/3/2010 8:09:23 PM
C:\Documents and Settings\broberts\My Documents\EAST\Workspaces\11434330a.wsp

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the **PATENT APPLICATION** of:	
Zhang et al.	
Application No.: 11/434,330	Our File: I-2-0674.2US
Confirmation No.: 5166	Date: June 7, 2010
Filed: May 15, 2006	
For: SUPPORTING ENHANCED UPLINK TRANSMISSION DURING SOFT HANDOVER	
Group: 2466	
Examiner: Brian S. Roberts	

REPLY PURSUANT TO 37 C.F.R. §1.116

Mail Stop AF (VIA EFS)
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Reply is being timely filed in response to the Office Action dated April 8, 2010 within the time for expedited handling. Expedited handling is requested.

Please amend the application without prejudice or disclaimer as follows:

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1-8. (Canceled)

9. (Currently Amended) A method for ~~universal mobile telecommunication system (UMTS) frequency division duplex (FDD)~~ enhanced uplink communication during soft handover implemented in a Node-B operating as a primary Node-B, comprising:

transmitting to a wireless transmit/receive unit (WTRU) ~~and non-primary Node-Bs~~-specified scheduling information, wherein the specified scheduling information is not transmitted to the WTRU by any non-primary Node-B;

receiving enhanced uplink data packets from the WTRU in response to transmitting the specified scheduling information;

performing a cyclic redundancy check (CRC) on the enhanced uplink data packets;

transmitting an acknowledgement (ACK) or a negative acknowledgment (NACK) to the WTRU in response to the received enhanced uplink data packets wherein the transmission of either the ACK or NACK is based on the results of the CRC; and

~~delivering~~ further transmitting successfully received enhanced uplink data packets to a radio network controller (RNC).

10. (Currently Amended) The method of claim 9, further comprising:

soft combining the ~~an initial transmission of an~~ enhanced uplink data packet, stored in a buffer, with a retransmission of the enhanced uplink data packet.

11-13. (Canceled).

REMARKS/ARGUMENTS

After the foregoing Amendments, claims 9 and 10 are currently pending in this application. Claims 11-13 were previously canceled without prejudice. Claims 9 and 10 are amended.

Examiner Interview

Applicants thank the Examiner for granting a telephonic interview with the Applicants' representative on April 29, 2010. During the telephonic interview the language of claim 9 was discussed in relation to paragraphs [0032] – [0034] of the specification. In addition, Figures 2 and 3 were discussed, so as to point out that Figure 3 includes the features of Figure 2, including the UL Scheduler.

Claim Rejections - 35 USC §112

Claims 9-10 are rejected under 35 U.S.C. § 112, first paragraph as failing to comply with the written description requirement. The Examiner states that part of the claim language of claim 9 is found in Figure 2 and part is found in Figure 3, and that Figure 3 is a separate embodiment of Figure 2. While Figure 3 is another embodiment in the specification, Figure 3 incorporates all of the features of Figure 2 and adds an ACK/NACK element. As stated in paragraph [0033] "Figure 3 shows a

wireless multi-cell communication system 300, similar to the system 200 shown in Figure 2."

Figure 3 shows elements of Figure 2 and even retains the same numbering of elements as shown in Figure 2. While Figure 3 does not explicitly show all the elements of Figure 2, it is inherent that the features of Figure 2 are incorporated in Figure 3. Since the features of Figure 2 are inherent in Figure 3, the Uplink Scheduler of Figure 2 is incorporated into Figure 3, and the elements of claim 9 are fully supported.

Claim 10 is dependent upon claim 9, and therefore is patentable for the same reasons provided above.

Based on the arguments presented above, withdrawal of the 35 USC §112 rejection of claims 9 and 10 is respectfully requested.

Conclusion

If the Examiner believes that any additional minor formal matters need to be addressed in order to place this application in condition for allowance, or that a telephonic interview will help to materially advance the prosecution of this application, the Examiner is invited to contact the undersigned by telephone at the Examiner's convenience.

In view of the foregoing remarks, Applicants respectfully submit that the present application is in condition for allowance and a notice to that effect is respectfully requested.

Respectfully submitted,

Zhang et al.

By/Melissa D. Doogan/
Melissa D. Doogan
Registration No. 63,025

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Facsimile: (215) 568-6499

MDD/kmc

Electronic Acknowledgement Receipt

EFS ID:	7756076
Application Number:	11434330
International Application Number:	
Confirmation Number:	5166
Title of Invention:	Supporting enhanced uplink transmission during soft handover
First Named Inventor/Applicant Name:	Guodong Zhang
Customer Number:	24374
Filer:	Robert D. Leonard/Katie Carlson
Filer Authorized By:	Robert D. Leonard
Attorney Docket Number:	I-2-0674.2US
Receipt Date:	07-JUN-2010
Filing Date:	15-MAY-2006
Time Stamp:	11:43:45
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		20100607_I_2_0674_2US_Reply.pdf	102927 6e52defc733bdcee953357e71e0e911bd6c11ebf	yes	6

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment After Final	1	1
	Claims	2	3
	Applicant Arguments/Remarks Made in an Amendment	4	6
Warnings:			
Information:			
	Total Files Size (in bytes):	102927	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
11/434,330	05/15/2006	

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY ☐ RATE ($)	SMALL ENTITY FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	06/07/2010	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 2	Minus	** 20	= 0	X $ =		OR	X $52=	0
	Independent (37 CFR 1.16(h))	* 1	Minus	***3	= 0	X $ =		OR	X $220=	0
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/VIOLA ROGERS/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the **PATENT APPLICATION** of:	
Zhang et al.	
Application No.: 11/434,330	Our File: I-2-0674.2US
Confirmation No.: 5166	Date: June 7, 2010
Filed: May 15, 2006	
For: SUPPORTING ENHANCED UPLINK TRANSMISSION DURING SOFT HANDOVER	
Group: 2466	
Examiner: Brian S. Roberts	

DO NOT ENTER: /B.R./

REPLY PURSUANT TO 37 C.F.R. §1.116

Mail Stop AF (VIA EFS)
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Reply is being timely filed in response to the Office Action dated April 8, 2010 within the time for expedited handling. Expedited handling is requested.

Please amend the application without prejudice or disclaimer as follows:

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/434,330	05/15/2006	Guodong Zhang	I-2-0674.2US	5166

24374 7590 06/21/2010

VOLPE AND KOENIG, P.C.
DEPT. ICC
UNITED PLAZA, SUITE 1600
30 SOUTH 17TH STREET
PHILADELPHIA, PA 19103

EXAMINER	
ROBERTS, BRIAN S	

ART UNIT	PAPER NUMBER
2466	

MAIL DATE	DELIVERY MODE
06/21/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Advisory Action Before the Filing of an Appeal Brief	**Application No.** 11/434,330	**Applicant(s)** ZHANG ET AL.	
	Examiner BRIAN ROBERTS	**Art Unit** 2466	

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

THE REPLY FILED 07 June 2010 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

1. ☒ The reply was filed after a final rejection, but prior to or on the same day as filing a Notice of Appeal. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114. The reply must be filed within one of the following time periods:
   a) ☐ The period for reply expires _____months from the mailing date of the final rejection.
   b) ☒ The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.

   Examiner Note: If box 1 is checked, check either box (a) or (b). ONLY CHECK BOX (b) WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. ☐ The Notice of Appeal was filed on ____. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

AMENDMENTS

3. ☒ The proposed amendment(s) filed after a final rejection, but prior to the date of filing a brief, will not be entered because
   (a) ☒ They raise new issues that would require further consideration and/or search (see NOTE below);
   (b) ☐ They raise the issue of new matter (see NOTE below);
   (c) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
   (d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.

   NOTE: *See Continuation Sheet*. (See 37 CFR 1.116 and 41.33(a)).

4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).
5. ☐ Applicant's reply has overcome the following rejection(s): _____.
6. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
7. ☒ For purposes of appeal, the proposed amendment(s): a) ☒ will not be entered, or b) ☐ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.
   The status of the claim(s) is (or will be) as follows:
   Claim(s) allowed: ____.
   Claim(s) objected to: ____.
   Claim(s) rejected: *9 and 10*.
   Claim(s) withdrawn from consideration: ____.

AFFIDAVIT OR OTHER EVIDENCE

8. ☐ The affidavit or other evidence filed after a final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).
9. ☐ The affidavit or other evidence filed after the date of filing a Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing a good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).
10. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

11. ☐ The request for reconsideration has been considered but does NOT place the application in condition for allowance because: _____.
12. ☐ Note the attached Information *Disclosure Statement*(s). (PTO/SB/08) Paper No(s). _____
13. ☐ Other: _____.

/Chirag G Shah/
Supervisory Patent Examiner, Art Unit 2477

Continuation of 3. NOTE: The deletion of the limitation "and non-primary Node-Bs" and the addition of the limitation "in response to transmitting the specified scheduling information" in independent claim 9 raises new issues that would require further consideration and search.

IPR2023-01270 Page 367

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	11/434,330	Filing Date	2006-05-15	Docket Number (if applicable)	I-2-0674.2US	Art Unit	2466
First Named Inventor	Guodong Zhang			Examiner Name	Brian S. Roberts		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

- ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
- ☐ Other _____

☒ Enclosed

- ☒ Amendment/Reply
- ☐ Information Disclosure Statement (IDS)
- ☐ Affidavit(s)/ Declaration(s)
- ☐ Other _____

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____ (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

☒ **The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 090435

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Signature of Registered U.S. Patent Practitioner			
Signature	/Melissa D. Doogan/	Date (YYYY-MM-DD)	2010-07-08
Name	Melissa D. Doogan	Registration Number	63025

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal

Application Number:	11434330
Filing Date:	15-May-2006
Title of Invention:	Supporting enhanced uplink transmission during soft handover
First Named Inventor/Applicant Name:	Guodong Zhang
Filer:	Robert D. Leonard/Katie Carlson
Attorney Docket Number:	I-2-0674.2US

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Request for continued examination	1801	1	810	810
		Total in USD ($)		**810**

Electronic Acknowledgement Receipt

EFS ID:	7972774
Application Number:	11434330
International Application Number:	
Confirmation Number:	5166
Title of Invention:	Supporting enhanced uplink transmission during soft handover
First Named Inventor/Applicant Name:	Guodong Zhang
Customer Number:	24374
Filer:	Robert D. Leonard/Katie Carlson
Filer Authorized By:	Robert D. Leonard
Attorney Docket Number:	I-2-0674.2US
Receipt Date:	08-JUL-2010
Filing Date:	15-MAY-2006
Time Stamp:	11:40:45
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$810
RAM confirmation Number	7839
Deposit Account	090435
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1		20100708_I_2_0674_2US_Reply.pdf	102728 0af22051926659bf78433feb8d22c644f1ba5feb	yes	6

Multipart Description/PDF files in .zip description		
Document Description	**Start**	**End**
Amendment Submitted/Entered with Filing of CPA/RCE	1	1
Claims	2	3
Applicant Arguments/Remarks Made in an Amendment	4	6

Warnings:

Information:

2	Request for Continued Examination (RCE)	20100708_I_2_0674_2US_RCE.PDF	884035 4f870404581cdf096981613658e40405d9c5fdc6	no	3

Warnings:

Information:

3	Fee Worksheet (PTO-875)	fee-info.pdf	30253 baab466cbe727532ca5546aa6a269ea50e73ca68	no	2

Warnings:

Information:

Total Files Size (in bytes):	1017016

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the **PATENT APPLICATION** of:	
Zhang et al.	
Application No.: 11/434,330	Our File: I-2-0674.2US
Confirmation No.: 5166	Date: July 8, 2010
Filed: May 15, 2006	
For: SUPPORTING ENHANCED UPLINK TRANSMISSION DURING SOFT HANDOVER	
Group: 2466	
Examiner: Brian S. Roberts	

REPLY PURSUANT TO 37 C.F.R. §1.114

Mail Stop RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Reply is being timely filed in response to the Final Office Action dated April 8, 2010, and further to the Advisory Action dated June 21, 2010. A Request for Continued Examination (RCE) is filed concurrently herewith.

Please amend the application without prejudice or disclaimer as follows:

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1-8. (Canceled)

9. (Currently Amended) A method for ~~universal mobile telecommunication system (UMTS) frequency division duplex (FDD)~~ enhanced uplink communication during soft handover implemented in a Node-B operating as a primary Node-B, comprising:

transmitting to a wireless transmit/receive unit (WTRU) ~~and non-primary Node-Bs~~-specified scheduling information, wherein the specified scheduling information is not transmitted to the WTRU by any non-primary Node-B;

receiving enhanced uplink data packets from the WTRU in response to transmitting the specified scheduling information;

performing a cyclic redundancy check (CRC) on the enhanced uplink data packets;

transmitting an acknowledgement (ACK) or a negative acknowledgment (NACK) to the WTRU in response to the received enhanced uplink data packets wherein the transmission of either the ACK or NACK is based on the results of the CRC; and

~~delivering~~ further transmitting successfully received enhanced uplink data packets to a radio network controller (RNC).

10. (Currently Amended) The method of claim 9, further comprising:

soft combining the ~~an initial transmission of an~~ enhanced uplink data packet, stored in a buffer, with a retransmission of the enhanced uplink data packet.

11-13. (Canceled).

REMARKS/ARGUMENTS

After the foregoing Amendments, claims 9 and 10 are currently pending in this application. Claims 11-13 were previously canceled without prejudice. Claims 9 and 10 are amended.

Examiner Interview

Applicants thank the Examiner for granting a telephonic interview with the Applicants' representative on April 29, 2010. During the telephonic interview the language of claim 9 was discussed in relation to paragraphs [0032] – [0034] of the specification. In addition, Figures 2 and 3 were discussed, so as to point out that Figure 3 includes the features of Figure 2, including the UL Scheduler.

Claim Rejections - 35 USC §112

Claims 9-10 are rejected under 35 U.S.C. § 112, first paragraph as failing to comply with the written description requirement. The Examiner states that part of the claim language of claim 9 is found in Figure 2 and part is found in Figure 3, and that Figure 3 is a separate embodiment of Figure 2. While Figure 3 is another embodiment in the specification, Figure 3 incorporates all of the features of Figure 2 and adds an ACK/NACK element. As stated in paragraph [0033] "Figure 3 shows a

wireless multi-cell communication system 300, similar to the system 200 shown in Figure 2."

Figure 3 shows elements of Figure 2 and even retains the same numbering of elements as shown in Figure 2. While Figure 3 does not explicitly show all the elements of Figure 2, it is inherent that the features of Figure 2 are incorporated in Figure 3. Since the features of Figure 2 are inherent in Figure 3, the Uplink Scheduler of Figure 2 is incorporated into Figure 3, and the elements of claim 9 are fully supported.

Claim 10 is dependent upon claim 9, and therefore is patentable for the same reasons provided above.

Based on the arguments presented above, withdrawal of the 35 USC §112 rejection of claims 9 and 10 is respectfully requested.

Conclusion

If the Examiner believes that any additional minor formal matters need to be addressed in order to place this application in condition for allowance, or that a telephonic interview will help to materially advance the prosecution of this application, the Examiner is invited to contact the undersigned by telephone at the Examiner's convenience.

In view of the foregoing remarks, Applicants respectfully submit that the present application is in condition for allowance and a notice to that effect is respectfully requested.

Respectfully submitted,

Zhang et al.

By/Melissa D. Doogan/
Melissa D. Doogan
Registration No. 63,025

Volpe and Koenig, P.C.
United Plaza
30 South 17th Street
Philadelphia, PA 19103-4009
Telephone: (215) 568-6400
Facsimile: (215) 568-6499

MDD/kmc

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 11/434,330	Filing Date 05/15/2006	☐ To be Mailed

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

		(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
	07/08/2010	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
AMENDMENT	Total (37 CFR 1.16(i))	* 2	Minus	** 20	= 0	X $ =		OR	X $52=	0
	Independent (37 CFR 1.16(h))	* 1	Minus	***3	= 0	X $ =		OR	X $220=	0
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)					
		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
AMENDMENT	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/SHERRY A. DAVIS/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the **PATENT APPLICATION** of:	
Zhang et al.	
Application No.: 11/434,330	Our File: I-2-0674.2US
Confirmation No.: 5166	Date: July 22, 2010
Filed: May 15, 2006	
For: SUPPORTING ENHANCED UPLINK TRANSMISSION DURING SOFT HANDOVER	
Group: 2466	
Examiner: Brian S. Roberts	

SUPPLEMENTAL REPLY TO EXAMINER

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Reply is being filed in response to a telephone conference with Examiner Roberts on Tuesday, July 20, 2010.

Please amend the application without prejudice or disclaimer as follows:

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1-8. (Canceled)

9. (Currently Amended) A method for enhanced uplink communication during soft handover implemented in a Node-B operating as a primary Node-B, comprising:

transmitting to a wireless transmit/receive unit (WTRU) specified scheduling information, wherein the specified scheduling information is not transmitted to the WTRU by any non-primary Node-B;

receiving an enhanced uplink data packet[[s]] from the WTRU in response to transmitting the specified scheduling information;

performing a cyclic redundancy check (CRC) on the enhanced uplink data packet[[s]];

transmitting an acknowledgement (ACK) or a negative acknowledgment (NACK) to the WTRU in response to the received enhanced uplink data packet[[s]] wherein the transmission of either the ACK or NACK is based on the results of the CRC; and

further transmitting a successfully received enhanced uplink data packet[[s]] to a radio network controller (RNC).

10. (Currently Amended) The method of claim [[9]] 14, further comprising:

soft combining the unsuccessfully received enhanced uplink data packet, stored in [[a]] the buffer, with a retransmission of the enhanced uplink data packet for transmission to the RNC.

11-13. (Canceled).

14. (New) The method of claim 9 further comprising:

storing an unsuccessfully received enhanced uplink data packet in a buffer.

REMARKS/ARGUMENTS

After the foregoing Supplemental Amendments, claims 9, 10 and 14 are currently pending in this application. Claims 9 and 10 have been amended. Claim 14 has been added. Claims 1-8 and 11-13 were previously canceled without prejudice. No new matter has been added.

The Supplemental Amendment is in response to a telephone conversation between the Applicant's undersigned representative and the Examiner.

If the Examiner believes that any additional minor formal matters need to be addressed in order to place this application in condition for allowance, or that a telephone interview will help to materially advance the prosecution of this application, the Examiner is invited to contact the undersigned by telephone at the Examiner's convenience.

In view of the foregoing amendments, Applicants respectfully submit that the present application is in condition for allowance and a notice to that effect is respectfully requested.

Respectfully submitted,

Zhang et al.

By/Melissa D. Doogan/
Melissa D. Doogan
Registration No. 63,025

Volpe and Koenig, P.C.
United Plaza
30 South 17th Street
Philadelphia, PA 19103-4009
Telephone: (215) 568-6400
Facsimile: (215) 568-6499

MDD/kmc

Electronic Acknowledgement Receipt

EFS ID:	8068897
Application Number:	11434330
International Application Number:	
Confirmation Number:	5166
Title of Invention:	Supporting enhanced uplink transmission during soft handover
First Named Inventor/Applicant Name:	Guodong Zhang
Customer Number:	24374
Filer:	Robert D. Leonard/Katie Carlson
Filer Authorized By:	Robert D. Leonard
Attorney Docket Number:	I-2-0674.2US
Receipt Date:	22-JUL-2010
Filing Date:	15-MAY-2006
Time Stamp:	13:55:57
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Supplemental Response or Supplemental Amendment	20100722_I_2_0674_2US_SupplementalReply.pdf	83827 b7a83c0e214b98a1d65c724b2b8f7d4e32708b3d	no	5
Warnings:					
Information:					

Total Files Size (in bytes):	83827

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 11/434,330	Filing Date 05/15/2006	☐ To be Mailed

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

		(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
	07/22/2010	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
AMENDMENT	Total (37 CFR 1.16(i))	* 3	Minus	** 20	= 0	X $ =		OR	X $52=	0
	Independent (37 CFR 1.16(h))	* 1	Minus	***3	= 0	X $ =		OR	X $220=	0
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)					
		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
AMENDMENT	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

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*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/BRENDA MURPHY/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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Alexandria, Virginia 22313-1450
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/434,330	05/15/2006	Guodong Zhang	I-2-0674.2US	5166

24374 7590 08/05/2010
VOLPE AND KOENIG, P.C.
DEPT. ICC
UNITED PLAZA
30 SOUTH 17TH STREET
PHILADELPHIA, PA 19103

EXAMINER	
ROBERTS, BRIAN S	

ART UNIT	PAPER NUMBER
2466	

NOTIFICATION DATE	DELIVERY MODE
08/05/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

eoffice@volpe-koenig.com
hrivera@volpe-koenig.com

Office Action Summary	Application No.	Applicant(s)	
	11/434,330	ZHANG ET AL.	
	Examiner	Art Unit	
	BRIAN ROBERTS	2466	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 July 2010.*

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *9,10 and 14* is/are pending in the application.

4a) Of the above claim(s) ___ is/are withdrawn from consideration.

5)☐ Claim(s) ___ is/are allowed.

6)☒ Claim(s) *9,10 and 14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) ___ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date ____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: ____.

DETAILED ACTION

- Claims 9-10, and 14 remain pending.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 07/08/2010 has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 9-10 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (US 7346035) in view of Cheng et al. (US 2002/0191544).

- In reference to claim 9

Lee et al. teaches a method comprising:

- transmitting to a wireless transmit/receive unit (*e.g. Figure 2, UE 112; col. 2 lines 25-26*) specified scheduling information (*Figure 2, step 204; col. 2 lines*

33-55), wherein the specified scheduling information is not transmitted to the WTRU by any non-primary Node-B (*e.g. not Node B 110*)

- receiving an enhanced uplink data packet from the WTRU in response to transmitting the specified scheduling information (*Figure 2, step 207; col. 2 lines 64-66*)
- performing an error check on the enhanced uplink data packet (*Figure 2, step 208; col. 2 lines 66-67*)
- transmitting an acknowledgement (ACK) or a negative acknowledgment (NACK) to the WTRU in response to the received enhanced uplink data packet wherein the transmission of either the ACK or NACK is based on the results of the error check (*Figure 2, step 209; col. 3 lines 1-4*); and
- further transmitting a successfully received enhanced uplink data packet to a radio network controller (*Figure 12, step 1295; col. 2 lines 47-49*).

While Lee et al. suggest using a cyclic redundancy check (*col. 6 lines 62-65*) does not explicitly teach that the error check on the enhanced uplink data packet is a cyclic redundancy check (CRC).

In Figure 2, Cheng et al. teaches performing a cyclic redundancy check (*s6; par. 0044*) to determine if a received packet is valid and transmitting either a ACK or NACK based on the results of the CRC (*s9; par. 0044*)

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the error check of Lee et al. to be a cyclic redundancy check wherein the transmission of either the ACK or NACK is based on the results of the CRC

as suggested by Cheng et al. because it allows for a primary node-B to determine whether a received packet is valid so that the node-B may transmit either an ACK or NACK to a UE in order to reduce an error rate of a communication between the UE and the node-B.

- In reference to claim 10

The combination of Lee et al. and Cheng et al. teaches a method that covers substantially all limitations of the parent claim. Lee et al. further teaches soft combining the unsuccessfully received enhanced uplink data packet, stored in the buffer, with a retransmission of the enhanced uplink data packet for transmission to the RNC (*col. 12 lines 46-52; col. 13 lines 54-58*).

- In reference to claim 14

The combination of Lee et al. and Cheng et al. teaches a method that covers substantially all limitations of the parent claim. Lee et al. further teaches storing an unsuccessfully received enhanced uplink data packet in a buffer (*i.e. storing previous unsuccessfully received packet in memory for soft-combining with current packet; col. 12 lines 40-42; col. 13 lines 54-58*).

Response to Arguments

Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRIAN ROBERTS whose telephone number is (571)272-3095. The examiner can normally be reached on M-F 10:00-7:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, DANIEL RYMAN can be reached on (571) 272-3152. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Brian Roberts/
Examiner, Art Unit 2466
08/01/2010

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11434330	ZHANG ET AL.
	Examiner	Art Unit
	BRIAN ROBERTS	2466

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	07/27/2010								
	1	-								
	2	-								
	3	-								
	4	-								
	5	-								
	6	-								
	7	-								
	8	-								
	9	✓								
	10	✓								
	11	-								
	12	-								
	13	-								
	14	✓								

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11434330	ZHANG ET AL.
	Examiner	Art Unit
	BRIAN ROBERTS	2466

SEARCHED

Class	Subclass	Date	Examiner

SEARCH NOTES

Search Notes	Date	Examiner
PALM inventor search	7/27/2010	BSR
Search focused on: 370/310,328-334,389,392,400,401,410,427-428,431,442,443,458,462,464,469-478,498 455/403,422.1,436,442,450,451,452.1,452.2507,509,510,514,517-519,524,68,70 714/100,699,709,746-752,758,776,799,819-821,	7/27/2010	BSR
EAST text search: see search history printout	7/27/2010	BSR

INTERFERENCE SEARCH

Class	Subclass	Date	Examiner

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S260	137	370/229.ccls. and ((universal near mobile near telecommunication near system) or UMTS)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/07/23 21:04
S261	11	370/229.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/07/23 21:04
S262	15	370/230.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/07/23 21:46
S263	17	370/235.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/07/23 21:47
S264	66	370/328.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/07/23 21:48
S265	38	370/331.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/07/23 21:49
S266	38	370/331.ccls. and ~~enhanced nea~~r uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/07/23 21:50
S267	1	370/343.ccls. and enhanced near uplink	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/07/23 21:51