



US008102833B2

(12) **United States Patent**
Lee et al.

(10) **Patent No.:** **US 8,102,833 B2**
(45) **Date of Patent:** **Jan. 24, 2012**

(54) **METHOD FOR TRANSMITTING UPLINK SIGNALS**

(75) Inventors: **Dae Won Lee**, Gyeonggi-do (KR); **Bong Hoe Kim**, Gyeonggi-do (KR); **Young Woo Yun**, Gyeonggi-do (KR); **Ki Jun Kim**, Gyeonggi-do (KR); **Dong Wook Roh**, Gyeonggi-do (KR); **Hak Seong Kim**, Gyeonggi-do (KR); **Hyun Wook Park**, Gyeonggi-do (KR)

(73) Assignee: **LG Electroics Inc.**, Seoul (KR)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 725 days.

(21) Appl. No.: **12/209,136**

(22) Filed: **Sep. 11, 2008**

(65) **Prior Publication Data**

US 2009/0097466 A1 Apr. 16, 2009

Related U.S. Application Data

(60) Provisional application No. 60/972,244, filed on Sep. 13, 2007, provisional application No. 60/987,427, filed on Nov. 13, 2007, provisional application No. 60/988,433, filed on Nov. 16, 2007.

(30) **Foreign Application Priority Data**

Jul. 15, 2008 (KR) 10-2008-0068634

(51) **Int. Cl.**
H04B 7/208 (2006.01)

(52) **U.S. Cl.** **370/344**; 370/319

(58) **Field of Classification Search** 370/206, 370/278, 344, 208, 252, 294, 295, 315, 319, 370/328, 329, 330, 335, 336, 338; 455/450, 455/509

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2003/0185159	A1 *	10/2003	Seo et al.	370/278
2005/0232138	A1	10/2005	Byun et al.	
2005/0286402	A1	12/2005	Byun et al.	
2006/0098568	A1 *	5/2006	Oh et al.	370/206
2008/0304467	A1 *	12/2008	Papasakellariou et al.	370/344

FOREIGN PATENT DOCUMENTS

EP	1569403	8/2005
EP	1806867	7/2007
EP	1811701	7/2007
KR	10-2004-0056976	7/2004
KR	10-2005-0114569	12/2005

* cited by examiner

Primary Examiner — Derrick Ferris

Assistant Examiner — Mang Yeung

(74) *Attorney, Agent, or Firm* — Lee, Hong, Degerman, Kang & Waimey

(57) **ABSTRACT**

A method for transmitting uplink signals, which include ACK/NACK signals, control signals other than the ACK/NACK signals, and data signals, is disclosed. The method comprises serially multiplexing the control signals and the data signals; sequentially mapping the multiplexed signals within a specific resource region in accordance with a time-first mapping method, the specific resource region including a plurality of symbols and a plurality of virtual subcarriers; and arranging the ACK/NACK signals at both symbols near symbols to which a reference signal of the plurality of symbols is transmitted. Thus, the uplink signals can be transmitted to improve receiving reliability of signals having high priority.

14 Claims, 9 Drawing Sheets

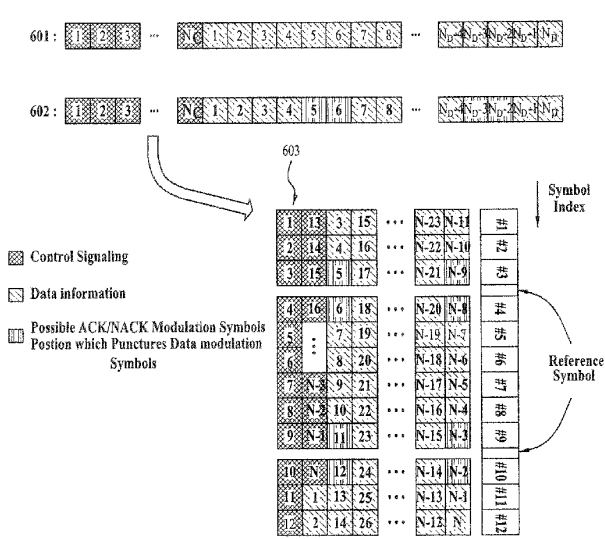


FIG. 1

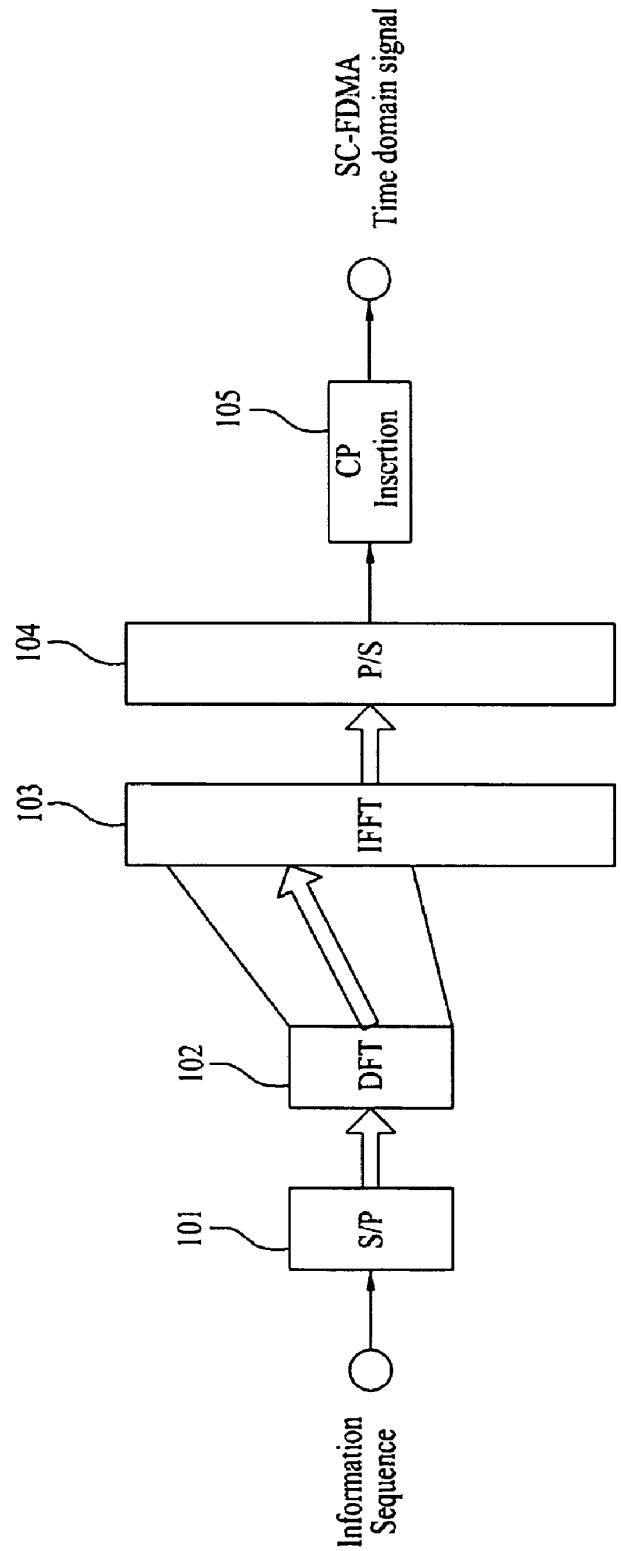


FIG. 2

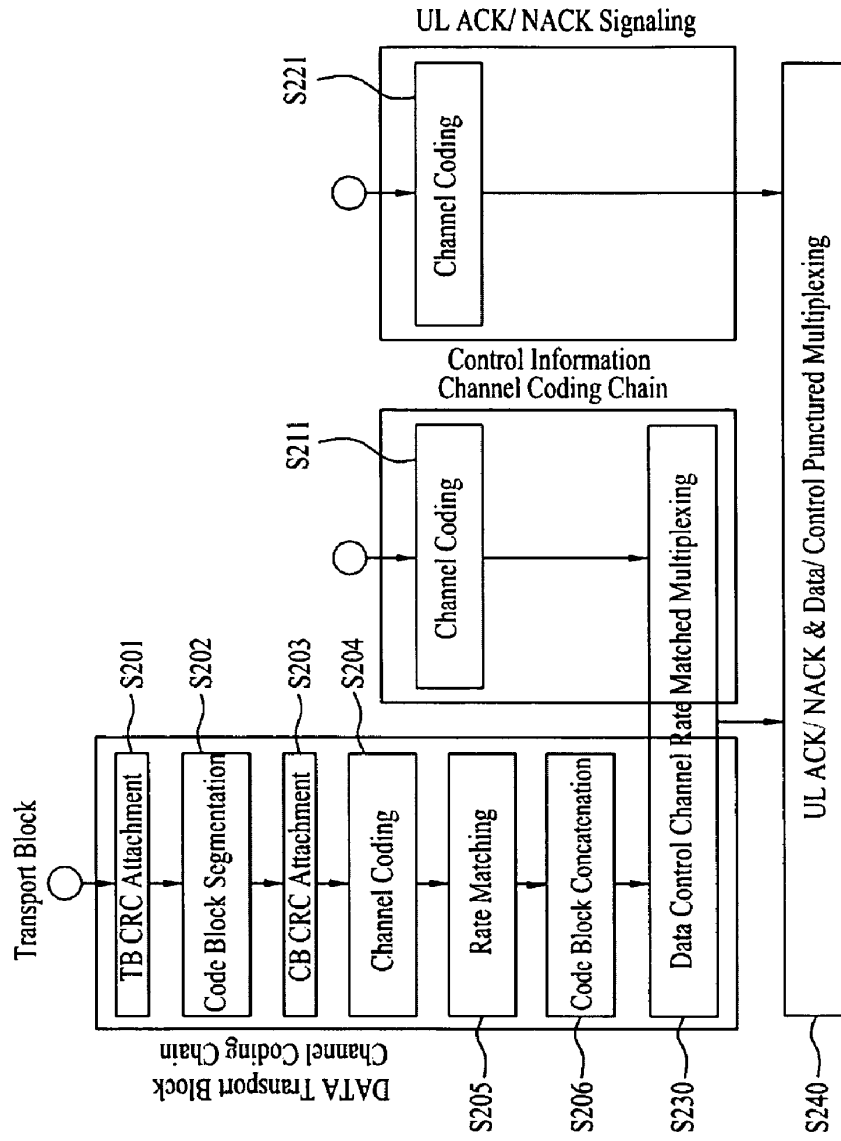


FIG. 3

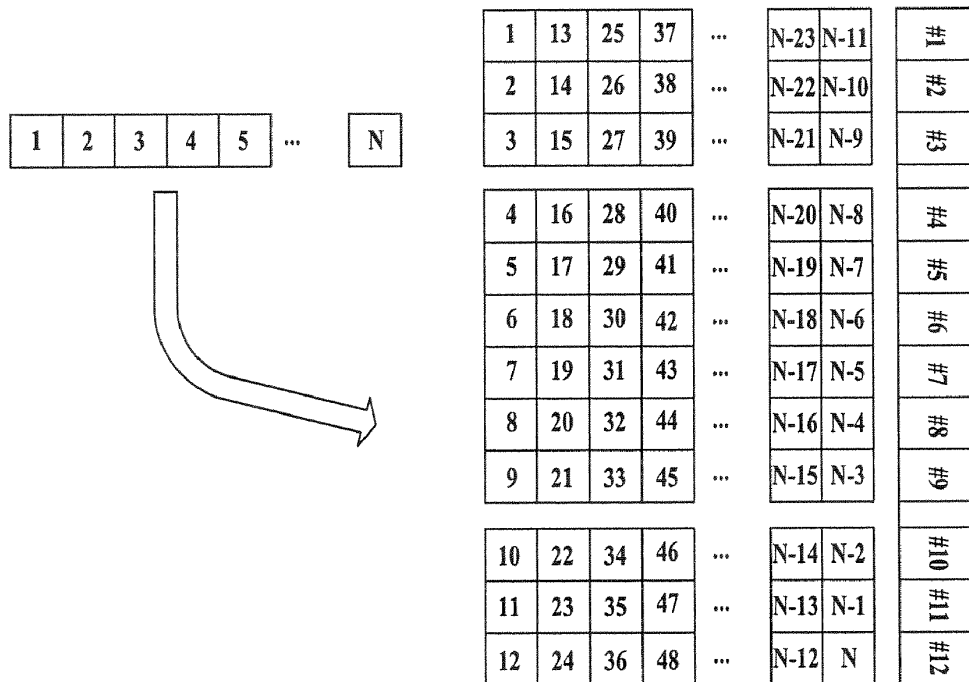
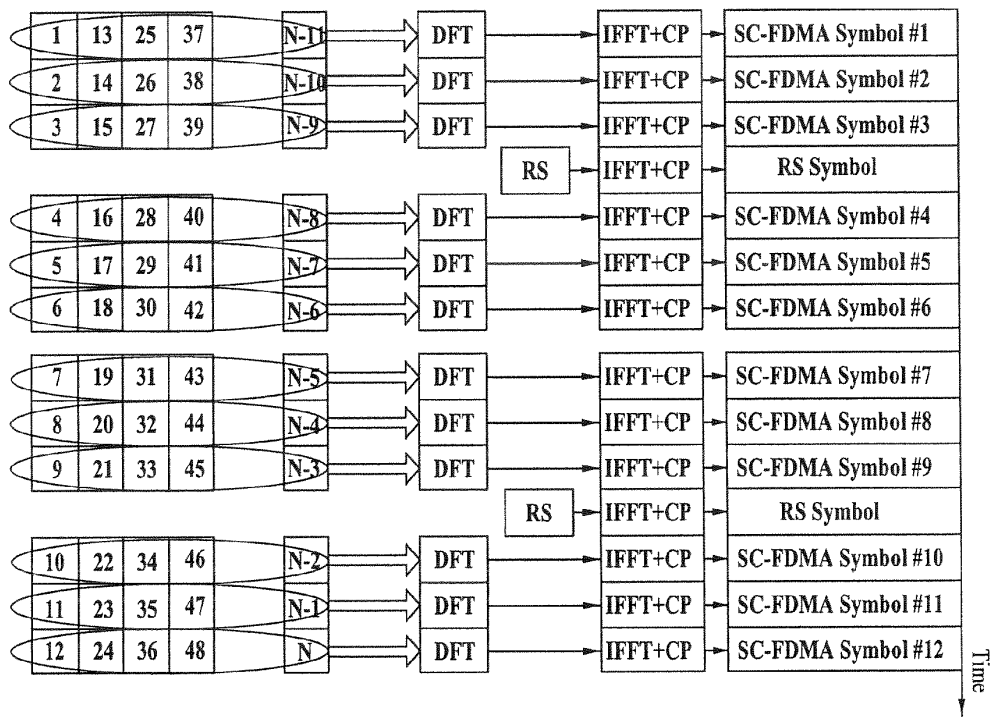


FIG. 4



Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.