

# **Patent Owner's Demonstrative**

## **U.S. Patent No. 7,848,439**

**IPR2018-01555 and -01581**  
**January 8, 2019**  
**Oral Hearing**

U.S. Patent No. 7,848,439

11

US 7,848,439 B2

14

is a parameter deciding section that decides modulation parameters and coding parameters per subband group comprised of a plurality of the subbands, based on a result of the channel estimation per subband;

is a parameter deciding section that decides modulation parameters and coding parameters per subband group comprised of a plurality of the subbands based on a result of the channel estimation per subband;

(12) United States Patent  
She et al.

(10) Patent No.:  
US 7,848,439 B2

(45) Date of Patent:  
Dec. 7, 2010

(54) COMMUNICATION APPARATUS,  
COMMUNICATION SYSTEM, AND  
COMMUNICATION METHOD

(75) Inventors: Xiaoming She, Beijing (CN); Jifeng Li, Kanagawa (JP)

(73) Assignee: Panasonic Corporation

(\*) Notice: Subject to any disclaimer, this patent is extended under U.S.C. 154(b) by:

(21) Appl. No.: 11/719,611

(22) PCT Filed: Nov. 18, 2005

(86) PCT No.: PCT/JP2005/023710

(87) PCT Pub. No.: WO/2006/054000

(87) PCT Pub. Date: May 26, 2006

(65) Prior Publication:  
US 2006/0147866 A1 Jan. 12, 2006

(30) Foreign Application:  
Nov. 19, 2004 (CN) 200410088888.8

(51) Int. Cl. H04L 1/00 (2006.01)

(52) U.S. Cl. 375/267

(58) Field of Classification Search: 375/267

(56) References Cited:  
U.S. PATENT DOCUMENTS  
6,351,499 B1 \* 2/2002 Paulraj et al. 375/267

(10) Patent No.:  
US 7,848,439 B2

(45) Date of Patent:  
Dec. 7, 2010

(54) COMMUNICATION APPARATUS,  
COMMUNICATION SYSTEM, AND  
COMMUNICATION METHOD

(75) Inventors: Xiaoming She, Beijing (CN); Jifeng Li, Kanagawa (JP)

(73) Assignee: Panasonic Corporation, Osaka (JP)

6,836,484 B2 12/2004 Suzuki

7,505,529 B2 \* 3/2009 Kwak et al. ....

2003/0231706 A1 12/2003 Hwang

2006/0008020 A1 \* 1/2006 Blankenship et al. ...

FOREIGN PATENT DOCUMENTS

501

ADAPTIVE TRANSMISSION CONTROL

502

307

PARAMETER RECEPTION/EXTRACTION

306

301

302

303

304

305

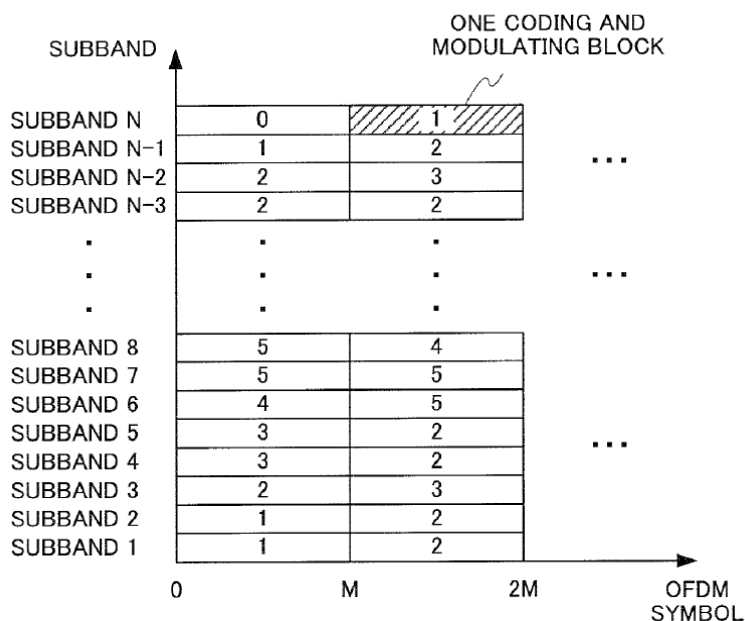
11 Claims, 16 Drawing Sheets

is a parameter deciding section that decides modulation parameters and coding parameters per subband group comprised of a plurality of the subbands based on a result of the channel estimation per subband;

DOCKETALARM

Find authenticated court documents without watermarks at [docketalarm.com](http://docketalarm.com).

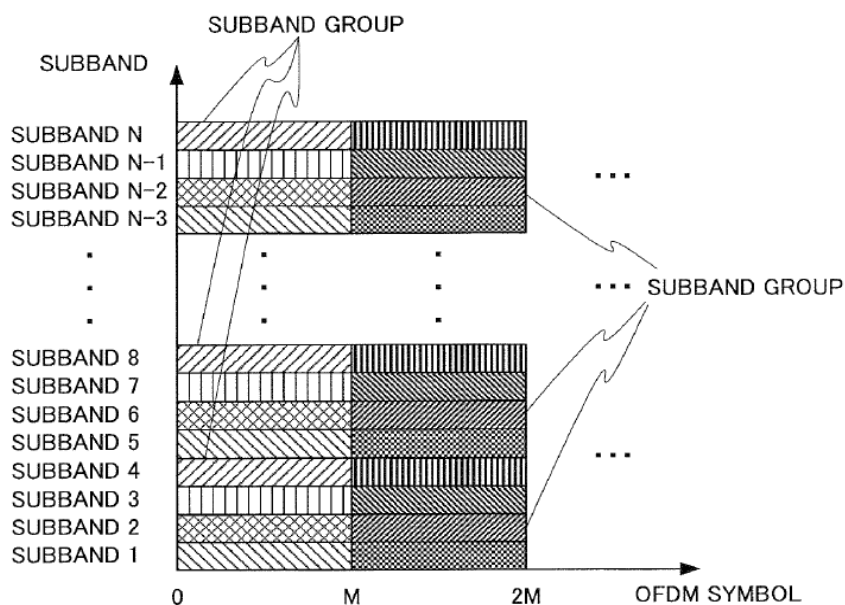
# U.S. Patent No. 7,848,439



adaptivity in this case refers to adaptivity at two time domain and frequency domain. Currently, a configuration, AMC in OFDM is divided into based on subcarriers and AMC based on subband based on subcarriers referred to here refers to transmission using a modulation method and a method that are different per OFDM subcarrier subcarrier as a minimum unit of adaptivity. However, based on subcarriers is very difficult to be implemented in addition, has the problem that feedback overhead is large. Typically, it is difficult to implement an AMC based on subcarriers in an actual system. As another configuration in OFDM, a subband configuration independent coding, namely, a subband adaptive modulation related art is, relatively, typically used.

FIG. 2 shows subband adaptive modulation and the related art.

# U.S. Patent No. 7,848,439

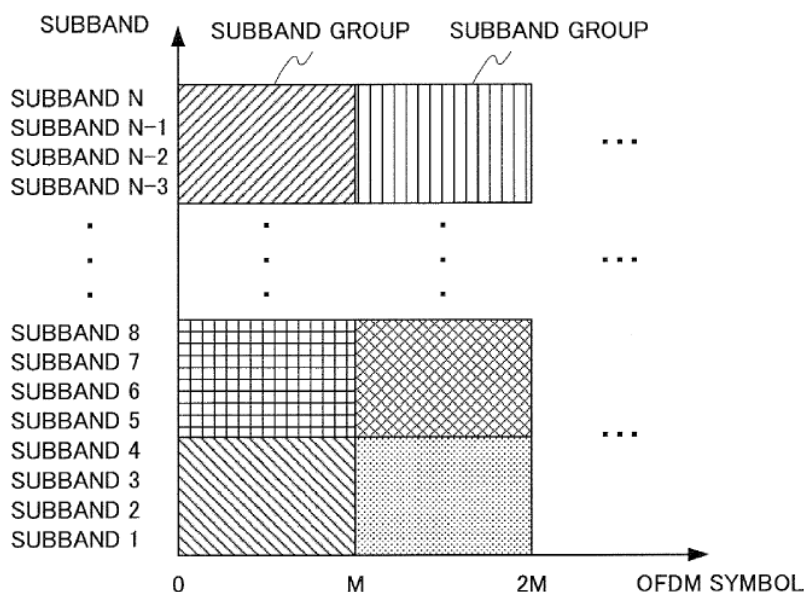


## DISCLOSURE OF THE INVENTION

### Problems to be Solved by the Invention

The object of the present invention is therefore to provide a communication apparatus, a communication method capable of increasing the utilization rate of a system and particularly increasing the utilization rate based on high-speed fading and channel estimation error, reducing the degree of difficulty of channel estimation and reducing the feedback overhead compared with the adaptive methods of the related art by combining subbands on a frequency domain of a subcarrier in a communication system based on a fixed rule to as to give subbands into groups, and then selecting modulation and coding schemes for use during joint coding with respect to each group.

# U.S. Patent No. 7,848,439



## DISCLOSURE OF THE INVENTION

### Problems to be Solved by the Invention

The object of the present invention is therefore to provide a communication apparatus, a communication method capable of increasing the utilization rate of a system and particularly increasing the utilization rate based on high-speed fading and channel estimation error, reducing the degree of difficulty of channel estimation and reducing the feedback overhead compared with adaptive methods of the related art by combining subbands on a frequency domain of a subcarrier in a communication system based on a fixed rule to as to give subbands to groups, and then selecting modulation and coding schemes for use during joint coding with respect to each group.

# 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.