Case 2:22-md-03034-TGB ECF No. 28-5, PageID.152 Filed 07/20/22 Page 1 of 22

# Exhibit 4

**DOCKET A L A R M** Find authenticated court documents without watermarks at <u>docketalarm.com</u>.



US010447450B2

## (12) United States Patent

### Li et al.

#### (54) METHOD AND SYSTEM FOR MULTI-CARRIER PACKET COMMUNICATION WITH REDUCED OVERHEAD

- (71) Applicant: Neocific, Inc., Bellevue, WA (US)
- Inventors: Xiaodong Li, Kirkland, WA (US);
  Haiming Huang, Bellevue, WA (US);
  Titus Lo, Bellevue, WA (US); Ruifeng
  Wang, Sammamish, WA (US)
- (73) Assignee: Neocific, Inc., Bellevue, WA (US)
- (\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

- (21) Appl. No.: 15/676,421
- (22) Filed: Aug. 14, 2017

#### (65) **Prior Publication Data**

US 2018/0183558 A1 Jun. 28, 2018

#### **Related U.S. Application Data**

- (63) Continuation of application No. 14/720,554, filed on May 22, 2015, now Pat. No. 9,735,944, which is a continuation of application No. 14/248,243, filed on Apr. 8, 2014, now Pat. No. 9,042,337, which is a continuation of application No. 13/115,055, filed on May 24, 2011, now Pat. No. 8,693,430, which is a continuation of application No. 11/908,257, filed as (Continued)
- (51) Int. Cl. *H04L 5/00* (2006.01) *H04L 27/26* (2006.01)

DOCKF

### (10) Patent No.: US 10,447,450 B2

### (45) **Date of Patent:** \*Oct. 15, 2019

H04L 1/00	(2006.01)
H04W 72/04	(2009.01)
H04J 11/00	(2006.01)
H04W 52/14	(2009.01)
	. ,

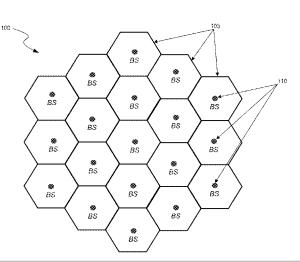
- (58) Field of Classification Search CPC ..... H04L 5/0053; H04L 1/0003; H04J 11/005 See application file for complete search history.

Primary Examiner — Chandrahas B Patel (74) Attorney, Agent, or Firm — Perkins Coie LLP

#### (57) **ABSTRACT**

A method and system for minimizing the control overhead in a multi-carrier wireless communication network that utilizes a time-frequency resource is disclosed. In some embodiments, one or more zones in the time-frequency resource are designated for particular applications, such as a zone dedicated for voice-over-IP (VoIP) applications. By grouping applications of a similar type together within a zone, a reduction in the number of bits necessary for mapping a packet stream to a portion of the time-frequency resource can be achieved. In some embodiments, modular coding schemes associated with the packet streams may be selected that further reduce the amount of necessary control information. In some embodiments, packets may be classified for transmission in accordance with application type, QoS parameters, and other properties. In some embodiments, improved control messages may be constructed to facilitate the control process and minimize associated overhead.

#### 18 Claims, 12 Drawing Sheets

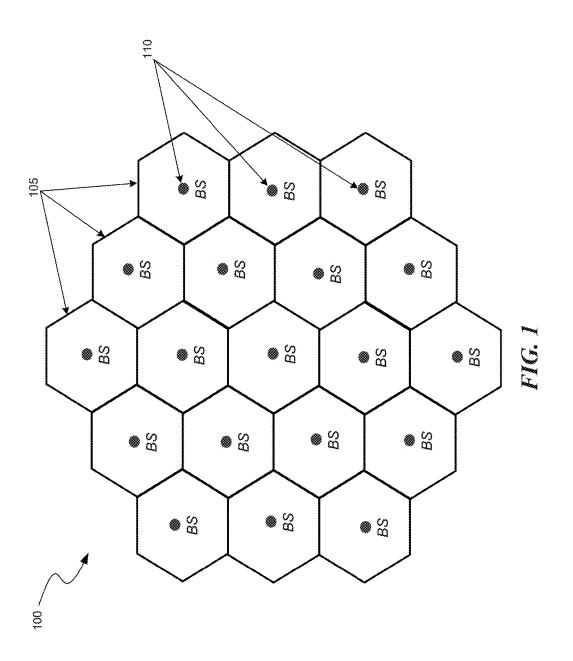


### **Related U.S. Application Data**

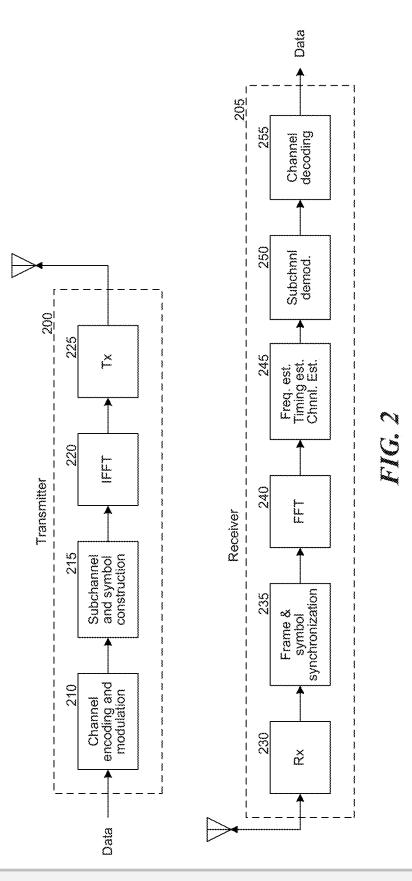
application No. PCT/US2006/038149 on Sep. 28, 2006, now Pat. No. 7,948,944.

(60) Provisional application No. 60/721,451, filed on Sep. 28, 2005.

**DOCKET A L A R M** Find authenticated court documents without watermarks at <u>docketalarm.com</u>.



**DOCKET A L A R M** Find authenticated court documents without watermarks at <u>docketalarm.com</u>.



# DOCKET ALARM Find authenticated court documents without watermarks at <u>docketalarm.com</u>.

# DOCKET A L A R M



# 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.