

US008929259B2

(12) United States Patent

Banerjee et al.

(54) QUALITY OF SERVICE FOR WLAN AND BLUETOOTH COMBINATIONS

- (75) Inventors: Kaberi Banerjee, San Jose, CA (US); Gunnar Nitsche, Radebeul (DE)
- (73) Assignee: NXP, B.V., Eindhoven (NL)
- (*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 204 days.
- (21) Appl. No.: 13/453,706
- (22) Filed: Apr. 23, 2012

(65) **Prior Publication Data**

US 2012/0207143 A1 Aug. 16, 2012

Related U.S. Application Data

- (62) Division of application No. 12/520,293, filed as application No. PCT/IB2007/055268 on Dec. 21, 2007, now Pat. No. 8,184,582.
- (60) Provisional application No. 60/876,782, filed on Dec. 21, 2006.

(2006.01)

(51) Int. Cl. *H04B 7/005*

| 1104D //003 | (2000.01) |
|-------------|-----------|
| H04W 16/14 | (2009.01) |
| H04W 74/08 | (2009.01) |

(52) U.S. Cl. CPC *H04W 16/14* (2013.01); *H04W 74/08* (2013.01)

USPC **370/278**; 370/338; 455/450 (58) Field of Classification Search

See application file for complete search history.

(10) Patent No.: US 8,929,259 B2

(45) **Date of Patent:** Jan. 6, 2015

(56) **References Cited**

U.S. PATENT DOCUMENTS

| 7,406,296 | B2 | 7/2008 | Haartsen |
|--------------|------|---------|------------------------|
| 7,414,986 | B2 * | 8/2008 | Kandala et al 370/310 |
| 7,508,781 | B2 * | 3/2009 | Liu et al 370/311 |
| 7,899,396 | B2 | 3/2011 | Meylan et al. |
| 2005/0271010 | A1 | 12/2005 | Capretta |
| 2005/0276241 | A1* | 12/2005 | Kamerman et al 370/328 |
| 2006/0215601 | A1* | 9/2006 | Vleugels et al 370/328 |
| 2006/0274704 | A1* | 12/2006 | Desai et al 370/338 |
| 2006/0292986 | A1* | 12/2006 | Bitran et al 455/41.2 |
| 2007/0002782 | A1 | 1/2007 | Kneckt et al. |
| 2007/0066222 | A1* | 3/2007 | Tao et al 455/41.2 |
| 2007/0177542 | A1 | 8/2007 | Hirsch |
| 2008/0101320 | A1* | 5/2008 | Krahn et al 370/342 |
| 2008/0144597 | A1* | 6/2008 | Chen 370/345 |
| 2010/0039973 | Al | 2/2010 | Cavalcanti et al. |

FOREIGN PATENT DOCUMENTS

| EP | 1 729 463 | A1 | 12/2006 |
|----|-------------|----|---------|
| WO | 2005/067212 | A1 | 7/2005 |

OTHER PUBLICATIONS

IEEE 802.15.2 part 15.2—Coexistence of Wireless Personal Area Networks With Other Wireless Devices ..., 43 pgs. (2003).

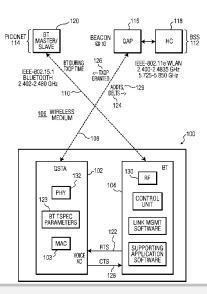
(Continued)

Primary Examiner - Jeffrey M Rutkowski

(57) ABSTRACT

A hybrid device includes both an IEEE-802.11e type WLAN client station (QAP) and a BLUETOOTH piconet unit interconnected such that the BLUETOOTH transmissions are scheduled to occur according to a transmission opportunity (TXOP) that was granted by a quality of service (QoS) access point (QAP) in a basic service set (BSS). Requests for BLUE-TOOTH traffic are handled by the associated QSTA which generates an add traffic service (ADDTS) to the QAP.

10 Claims, 4 Drawing Sheets



(56) **References Cited**

OTHER PUBLICATIONS

Godfrey, T., et al., GlobespanVirata "Making QoS a Reality over WLAN Connections," retrieved from the Internet at www.eetimes. com/General/PrintView/4009268, 53 pages. (Dec. 2003).

Singh, H., et al.; "Enhanced Power Saving in Next Generation Wireless LANs", IEEE Veh. Techn. Conf. 2006, 5 pgs. (2006).

International Search Report for European Patent Application PCT/ IB2007/055268 (Dec. 21, 2007).

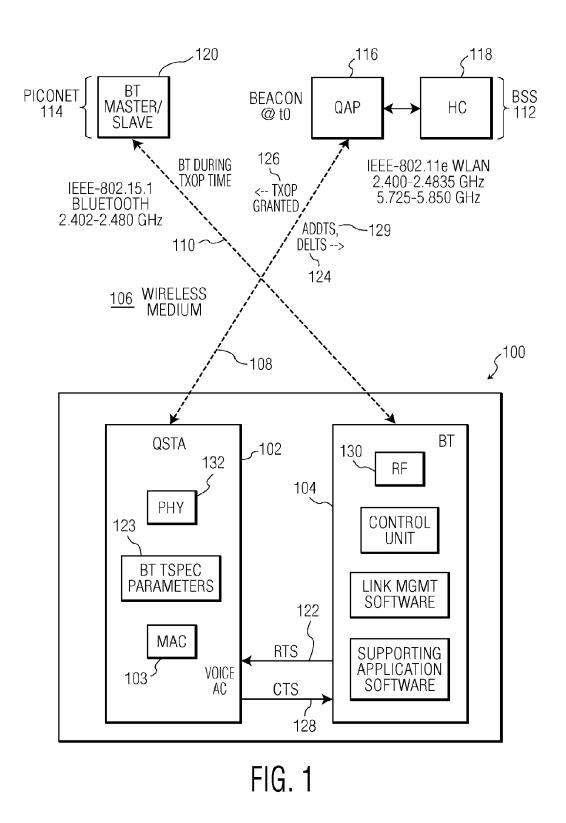
* cited by examiner

KF.

R

Μ

Α



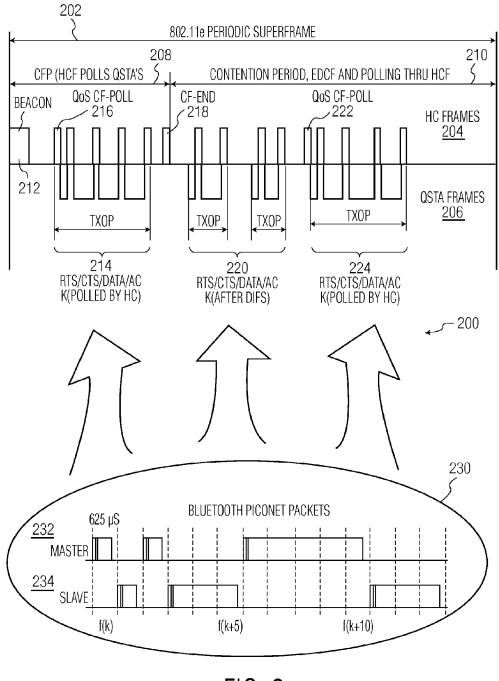


FIG. 2

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

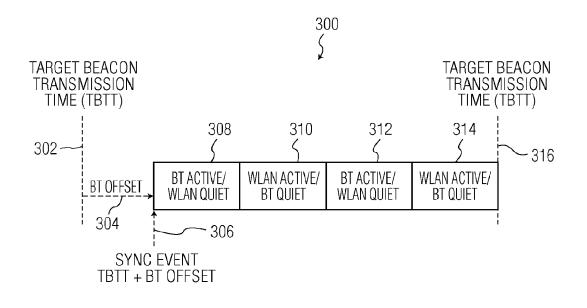


FIG. 3

DOCKET A L A R M 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.