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**Banerjee et al.**

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(54) **QUALITY OF SERVICE FOR WLAN AND  
BLUETOOTH COMBINATIONS**

(56) **References Cited**

U.S. PATENT DOCUMENTS

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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	Kammerman 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	A1	2/2010	Cavalcanti et al.	

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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

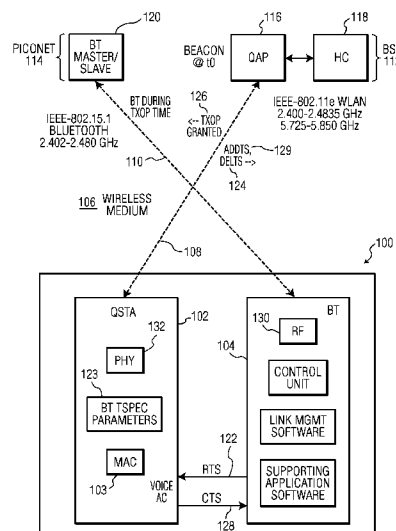
- (51) **Int. Cl.**  
**H04B 7/005** (2006.01)  
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- (52) **U.S. Cl.**  
CPC ..... **H04W 16/14** (2013.01); **H04W 74/08**  
(2013.01)  
USPC ..... **370/278**; **370/338**; **455/450**
- (58) **Field of Classification Search**  
USPC ..... **370/277–278**, **328–330**, **338**, **345**, **350**;  
**455/450–452.2**

See application file for complete search history.

(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 BLUETOOTH 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**

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

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](http://www.eetimes.com/General/PrintView/4009268), 53 pages. (Dec. 2003).

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

\* cited by examiner

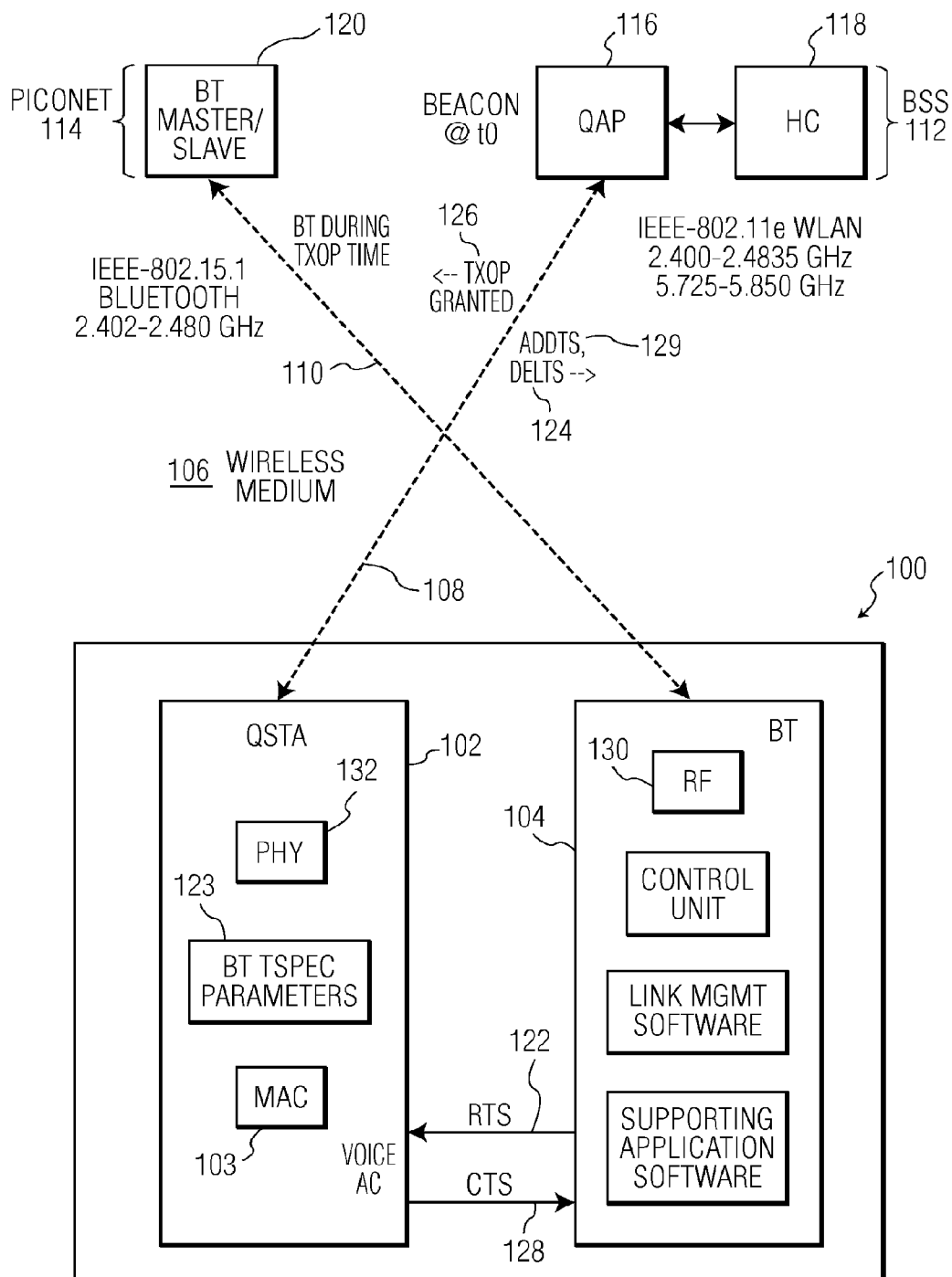


FIG. 1

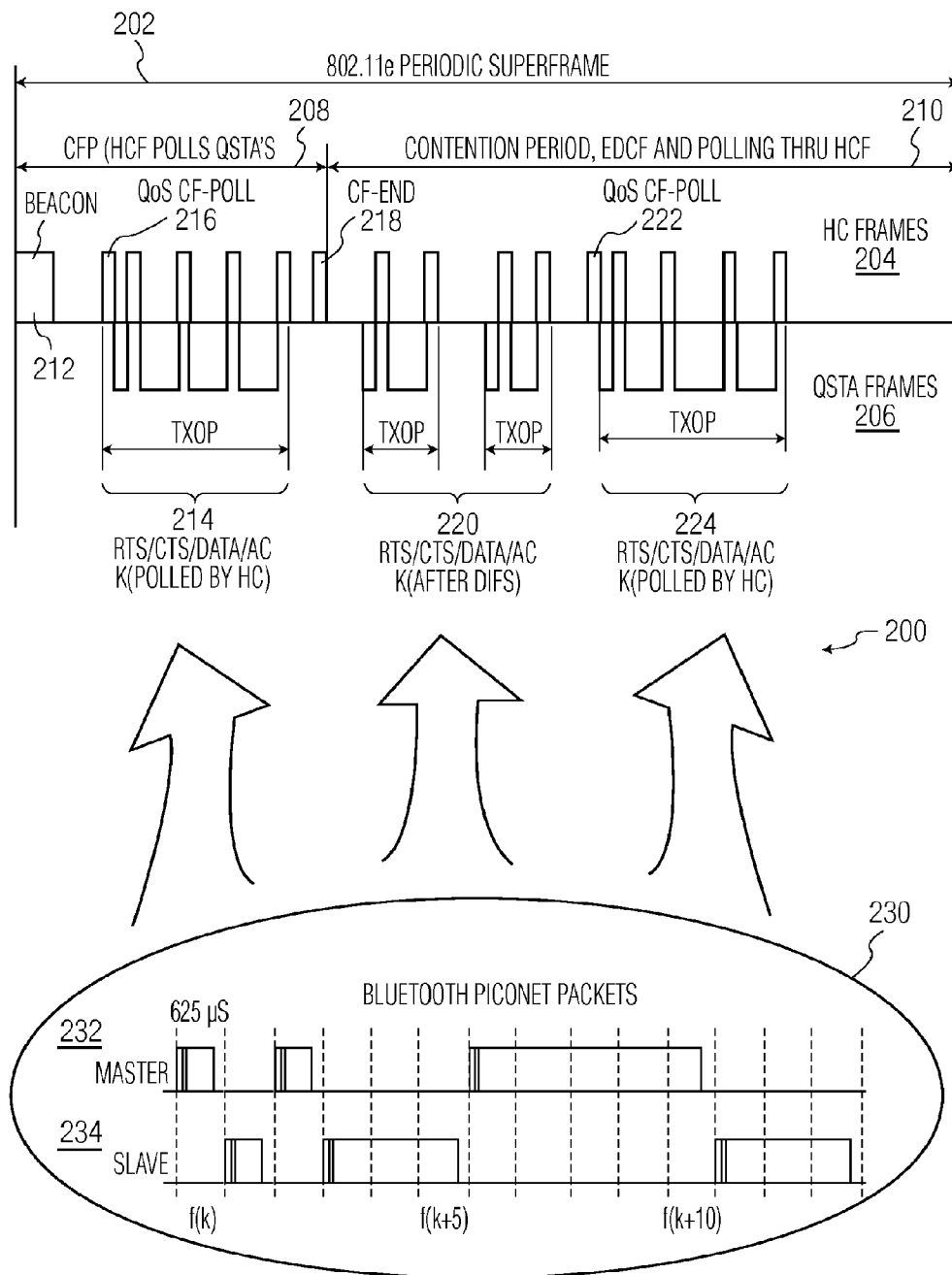


FIG. 2

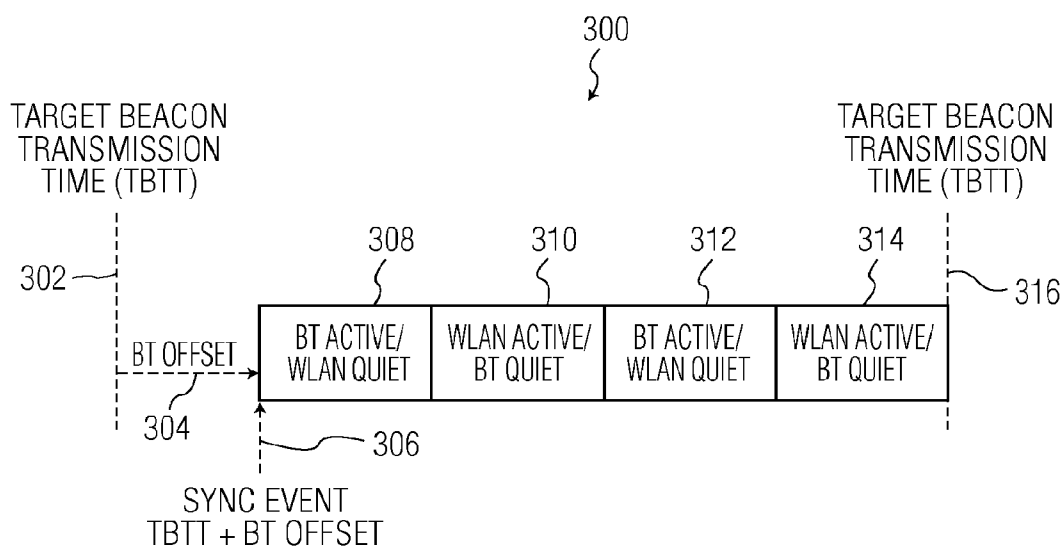


FIG. 3

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