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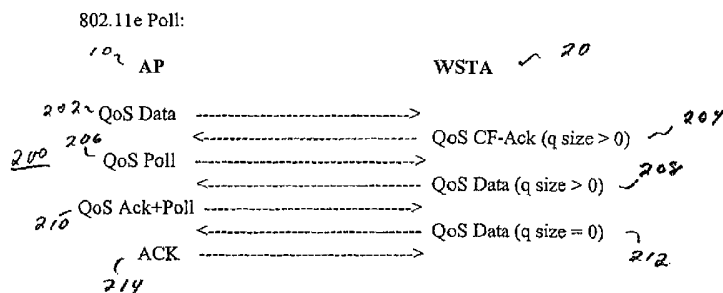
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27 January 2005

For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: METHOD FOR PRIORITASING ACCESS BY AN ACCESS POINT AND FOR THE IMPLEMENTATION OF A
SIMPLE 802.11E HCF (HYBRID COORDINATION FUNCTION)



(57) Abstract: A Hybrid Coordination Function (HCF) implementation wherein an access point's existing (E)DCF Enhanced Dis-
tributed Coordination Function transmit queues are augmented by at least one strict priority HCF transmit queue. The HCF queues
are only used to schedule downlink data and CF-Poll transmissions are used for admitted downlink flows and for uplink flows. The
802.1D user priority value is used to select the HCF queue for an admitted flow. The strict priority HCF transmit queues are always
serviced first, in priority order before any other (E)DCF transmit queue. The channel is considered busy to (E)DCF transmit queues
while the strict priority queues are being serviced. An admissions control mechanism is used to control data flows and prevents the
strict priority traffic from starving (E)DCF traffic. A single, simple AP scheduler is used for scheduling both polling times and station
wakeup times. Different embodiments of the invention includes assigning a fixed size to all transmission opportunities, the estab-
lishment of a wakeup schedule for a power-save station, the implementation of a polling schedule for the station, the establishment
of a schedule based on a timer wheel, and the allocation of a token bucket for a data stream with a predetermined number of tokens.

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INTERNATIONAL SEARCH REPORT

Int. Patent Application No
PCT/JP2004/008337

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04L12/28

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	MANGOLD S ET AL: "IEEE 802.11e Wireless LAN for Quality of Service" IEEE JOURNALS, February 2002 (2002-02), XP002251598	1-3
Y		4-33, 42-60
A	paragraphs 2.2, 3, 3.1, 3.2 figures 4-6	34-41
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Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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- *&* document member of the same patent family

Date of the actual completion of the international search

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Name and mailing address of the ISA

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INTERNATIONAL SEARCH REPORT

International Application No
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y A	WO 02/37754 A (AT & T CORP) 10 May 2002 (2002-05-10) abstract page 25, line 9 - line 17 page 55, line 11 - line 20 page 56, line 1 - line 7 page 59, line 21 - page 61, line 5 tables 2,5 -----	1-3 30, 33 4-29, 31, 32, 34-60
Y A	US 6 404 772 B1 (BEACH ROBERT E ET AL) 11 June 2002 (2002-06-11) abstract column 1, line 55 - column 2, line 50 column 6, line 11 - column 8, line 10 -----	5-7, 13, 30 1, 3, 42
X Y	J. DEL PRADO ET AL - PHILIPS; OHTANI & KOWALSKI - SHARP; LIM WEI LIH - MATSUSHITA; SIMPSON - MOTOROLA: "Normative text for mandatory TSPEC parameters and informative text for a simple scheduler" DOCUMENT LIST 802.11, 'Online! no. ieee 802.11-02/705r0, 12 November 2002 (2002-11-12), pages 1-4, XP002301241 INTERNET Retrieved from the Internet: URL: http://grouper.ieee.org/groups/802/11/ Documents/D2T701-750.html 'retrieved on 2004-10-18! the whole document ----- -/--	34-37 14, 18-22, 27, 28, 31, 32, 38-41

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2004/008337

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	M. BENVENISTE - AVAYA LABS; K. AMANN, SPECTRALINK CORP.; B. MEIER, CISCO SYSTEMS INC.: "Proposed normative text for simplified APSD" DOCUMENT LIST 802.11, 'Online! no. IEEE 802.11-03/107r0, 16 January 2003 (2003-01-16), pages 1-4, XP002301242 INTERNET Retrieved from the Internet: URL:http://grouper.ieee.org/groups/802/11/Documents/D3T101-150.htm1> 'retrieved on 2004-10-18!	15-17, 23-26, 29,42-60
A	the whole document	
Y	WO 00/52951 A (IPMOBILE INC) 8 September 2000 (2000-09-08)	38-41
A	page 1, line 8 - page 5, line 12 figures 2,6,7,8a	57-60
Y	EP 1 035 751 A (LUCENT TECHNOLOGIES INC) 13 September 2000 (2000-09-13) paragraphs 25-27	8-12
Y	BOBBY JOSE: "Contention Free TXOP Request and allocation issues" DOCUMENT LIST 802.11, 'Online! no. IEEE 802.11-02/248r0, 14 March 2002 (2002-03-14), pages 1-27, XP002301243 INTERNET Retrieved from the Internet: URL:http://grouper.ieee.org/groups/802/11/Documents/D2T201-250.htm1> 'retrieved on 2004-10-18!	4
A	slides 4 and 6	34,35,42
A	WO 02/056539 A (INTERSIL INC) 18 July 2002 (2002-07-18) abstract page 26, line 17 - page 27, line 23	3,42

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2004/008337

Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-33 and 42-60

A method for controlling channel access by an access point according to priority of queues, wherein a strict priority queue is created and serviced prior to servicing EDCF queues.

2. claims: 34-41

A method for controlling access by an access point according to a polling schedule, wherein a fixed transmission window is allocated to a target station, a polling schedule is established and said station is polled according to the polling schedule.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2004/008337

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 0237754	A	10-05-2002	EP 1338125 A2	27-08-2003
			WO 0237754 A2	10-05-2002
			US 2002163933 A1	07-11-2002
US 6404772	B1	11-06-2002	BR 0107091 A	18-06-2002
			CA 2389109 A1	07-02-2002
			EP 1210830 A1	05-06-2002
			JP 2004505573 T	19-02-2004
			WO 0211476 A1	07-02-2002
			US 2002054574 A1	09-05-2002
WO 0052951	A	08-09-2000	AU 3509300 A	21-09-2000
			WO 0052951 A1	08-09-2000
			US 6522628 B1	18-02-2003
EP 1035751	A	13-09-2000	US 6594268 B1	15-07-2003
			CA 2299111 A1	11-09-2000
			EP 1035751 A2	13-09-2000
			JP 2000286896 A	13-10-2000
WO 02056539	A	18-07-2002	US 2002089927 A1	11-07-2002
			TW 563308 B	21-11-2003
			TW 563309 B	21-11-2003
			WO 02056539 A2	18-07-2002
			WO 02056544 A2	18-07-2002
			WO 02056553 A2	18-07-2002
			US 2002089994 A1	11-07-2002
			US 2002089959 A1	11-07-2002