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(54) Title: DIRECT LINK SETUP MECHANISMS FOR WIRELESS LANS

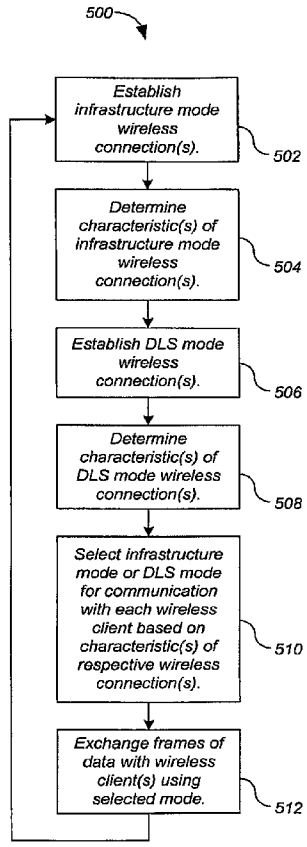

FIG. 5

(57) Abstract: Apparatus having corresponding methods and computer programs comprise a communication circuit to establish an infrastructure mode wireless connection with a wireless client through a wireless access point, and to establish a direct link setup (DLS) mode wireless connection with the wireless client; and a control circuit to select either infrastructure mode or DLS mode for communication with the wireless client based on at least one characteristic of the infrastructure mode and DLS mode wireless connections; wherein the communication circuit exchanges frames of data with the wireless client using the selected mode.

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ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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A. CLASSIFICATION OF SUBJECT MATTER
INV. 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)
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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2004/240405 A1 (OKAZAKI JUN [JP]) 2 December 2004 (2004-12-02)	1,2, 16-21, 35-40, 52,53
Y	paragraph [0010] - paragraph [0012] paragraph [0041] - paragraph [0047] paragraph [0066] - paragraph [0091] paragraph [0105] - paragraph [0112] paragraph [0127] - paragraph [0134] paragraph [0146] - paragraph [0155] paragraph [0181] - paragraph [0187] paragraph [0240] figures 5-16 ----- -/--	3-15, 22-34, 41-51, 54-64

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"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

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"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

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

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Date of the actual completion of the international search	Date of mailing of the international search report
28 April 2008	09/05/2008

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Bösch, Michael

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PCT/US2007/020294

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2004/127214 A1 (REDDY GAUTAM G [US] ET AL) 1 July 2004 (2004-07-01)	1,2, 16-21, 35-40, 52,53
Y	paragraph [0009] - paragraph [0032] paragraph [0044] - paragraph [0050] paragraph [0059]	9,28,47, 60
X	US 2004/063458 A1 (HORI MASATO [JP] ET AL) 1 April 2004 (2004-04-01)	1,2, 16-21, 35-40, 52,53
Y	paragraph [0005] - paragraph [0012] paragraph [0052] - paragraph [0057] paragraph [0069] paragraph [0100] - paragraph [0113] paragraph [0121]	6-8, 25-27, 44-46, 57-59
A	EP 1 638 259 A (SAMSUNG ELECTRONICS CO LTD [KR]) 22 March 2006 (2006-03-22) paragraph [0005] - paragraph [0007] paragraph [0012] - paragraph [0014] paragraph [0020] - paragraph [0027] paragraph [0039] - paragraph [0050] paragraph [0067] - paragraph [0072]	1,2, 16-21, 35-40, 52,53
Y	WO 2006/000617 A (NOKIA CORP [FI]; SINIVAARA HASSE [FI]; BLACK SIMON [GB]; EDNEY JONATHA) 5 January 2006 (2006-01-05) page 3, line 14 - line 33 page 7, line 23 - page 11, line 4	10-15, 29-34, 48-51, 61-64
P,X	WO 2007/008857 A (MICROSOFT CORP [US]) 18 January 2007 (2007-01-18) page 6, line 19 - page 8, line 22 page 10, line 10 - page 11, line 28	1,2,7, 16-21, 26, 35-40, 45,52, 53,58

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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2007/020294

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	US 2007/064643 A1 (TAVARES CLIFFORD [US]) 22 March 2007 (2007-03-22) paragraph [0025] - paragraph [0029] paragraph [0039] - paragraph [0046] paragraph [0052]	1,2,7, 16-21, 26, 35-40, 45,52, 53,58
Y	US 2005/135304 A1 (WENTINK MENZO [NL] ET AL) 23 June 2005 (2005-06-23)	3-5, 22-24, 41-43, 54-56, 65-80
A	paragraphs [0005], [0009], [0031] paragraph [0034] - paragraph [0041] paragraph [0044] paragraph [0049] - paragraph [0051] paragraph [0054] - paragraph [0063] paragraph [0076] paragraph [0083] - paragraph [0086] paragraphs [0104], [0105] figures 2,4-7	6,25,44, 57
Y	WO 01/15387 A (NOKIA CORP [FI]; NOKIA INC [US]) 1 March 2001 (2001-03-01) page 2, line 13 - line 34 page 4, line 23 - page 5, line 2 page 8, line 29 - page 10, line 17 page 13, line 6 - page 14, line 7 page 15, line 25 - page 21, line 27 figure 3	65-80
A	US 2006/165035 A1 (CHANDRA ARTY [US] ET AL) 27 July 2006 (2006-07-27) paragraphs [0003], [0004] paragraph [0013] - paragraph [0016] paragraphs [0020], [0022] paragraph [0030] - paragraph [0032] claim 27 figure 1	3-5, 22-24, 41-43, 54-56, 65-80
P,X	WO 2007/095396 A (INTEL CORP [US]; GINZBURG BORIS [IL]) 23 August 2007 (2007-08-23) paragraph [0016] - paragraph [0021] figure 2	65,67, 69,71, 73,75, 77,79

INTERNATIONAL SEARCH REPORT

International application No.
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Box No. 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 No. 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 allsearchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search reportcovers 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 and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☒ 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: 1,2,6-21,25-40,44-53,57-64

The first invention (see independent Claims: 1, 20, 39 and 52) relates to automatic mode selection by:
- (communication means for) establishing an infrastructure mode wireless connection with a wireless client through a wireless access point, and for establishing a direct link setup (DLS) mode wireless connection with the wireless client;
- (control means for) selecting either infrastructure mode or DLS mode for communication with the wireless client based on at least one characteristic of the infrastructure mode and DLS mode wireless connections;
- wherein the communication means exchanges frames of data with the wireless client using the selected mode.

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2. claims: 3-5,22-24,41-43,54-56,65-80

The second invention (see independent Claims 65, 69, 73 and 77) deals with the problem of to inform a wireless client about candidate clients for infrastructure mode communications and direct link setup communications.
This is achieved by a wireless access point comprising:
- communications means for communicating with a plurality of wireless clients; and
- memory means for storing addresses of the wireless clients;
- wherein the communications means comprises transmitter means for transmitting a message to at least one of the wireless clients, wherein the message comprises the addresses of the wireless clients, and identifies the wireless clients that are capable of direct link setup (DLS) mode communications.
Remark: Dependent Claims 3-5, 22-24, 41-43, 54-56 relate to an appliance of the second invention in the first invention.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2007/020294

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