UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
09/850,399	05/07/2001	Amit Haller	0909-010

CONFIRMATION NO. 2705

POWER OF ATTORNEY NOTICE

41200
PK PATENT LAW
213 S. Payne Street
Alexandria, VA 22314

OC000000093248352

Date Mailed: 08/07/2017

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 07/27/2017.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/rbell/

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09/850,399	05/07/2001	Amit Haller	0909-010

CONFIRMATION NO. 2705

POA ACCEPTANCE LETTER

22045
BROOKS KUSHMAN P.C.
1000 TOWN CENTER
TWENTY-SECOND FLOOR
SOUTHFIELD, MI 48075

OC000000093248360

Date Mailed: 08/07/2017

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 07/27/2017.

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/rbell/

PTO/AIA/81B (07-13)
Approved for use through 01/31/2018. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995 no persons are required to respond to a collection of information unless it displays a valid OMB control number

REEXAMINATION OR SUPPLEMENTAL EXAMINATION – PATENT OWNER POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY WITH A NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS FOR REEXAMINATION OR SUPPLEMENTAL EXAMINATION AND PATENT

Control Number(s)	90/013,925
Filing Date(s)	March 24, 2017
First Named Inventor	Amit Haller
Title	System, Device and Computer Readable
Patent Number	7,039,033
Examiner Name	Charles R Craver
Attorney Docket No(s)	IXI0101RX

I. Power of Attorney. This form may be used to change the Power of Attorney in a reexamination or supplemental examination proceeding (or multiple proceedings where merged). This form may also be used to change the Power of Attorney in the patent file; in such a case, a copy of this form will be placed in both the patent file and the reexamination or supplemental examination proceeding.

A. Revocation of Previous Power of Attorney. I hereby revoke all previous patent owner powers of attorney, if any, given:

☒ in the above-identified reexamination or supplemental examination proceeding control number(s) (more than one may be changed only if the proceedings are merged).

☐ in the file of the above-identified patent.

(check BOTH boxes if change in BOTH the patent file and the reexamination or supplemental examination proceeding is requested).

B. Designation of Power of Attorney.

☐ A Power of Attorney is submitted herewith.

OR

☒ I hereby appoint Practitioner(s) associated with the Customer Number identified in the box at right as my/our attorney(s) or agent(s) to prosecute the proceeding(s)/patent identified above and selected in section I(A), and to transact all business in the United States Patent and Trademark Office connected therewith: 22045

OR

☐ I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s) to prosecute the proceeding(s) identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

Practitioner(s) Name	Registration Number

Authorization for the Power of Attorney is provided by the signature on page 2 of this form.

This collection of information is required by 37 CFR 1.31, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public, which is to update (and by the USPTO to process) the file of a patent or reexamination proceeding. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 15 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

II. Change of Correspondence Address

Please recognize or change the correspondence address for the above-identified reexamination or supplemental examination proceeding control number(s) (more than one may be changed **only** if they are merged proceedings) **and for the file of the above-identified patent** to be:

☒ The address associated with the above-identified Customer Number.
OR
☐ The address associated with the Customer Number identified in the box at right: ☐
OR

☐ Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

NOTE: THE CORRESPONDENCE ADDRESS FOR THE REEXAMINATION OR SUPPLEMENTAL EXAMINATION PROCEEDING CONTROL NUMBER(S) MUST BE THE SAME AS THAT FOR THE PATENT. SEE 37 CFR 1.33.

III. Authorization for Power of Attorney and (if selected) Change of Correspondence Address

I am the:
☐ Inventor, having ownership of the patent being reexamined.
OR
☒ Patent owner.
Statement under 37 CFR 3.73(c) (Form PTO/AIA/96) submitted herewith or filed on _____.

Signature of Inventor or Patent Owner		Date 7/26/17	
Name	Steven Robert Pedersen	Telephone	212-634-7150
Title and Company	Manager, IXI IP, LLC		

NOTE: Signatures of all the inventors or patent owners of the entire interest or their representative(s) are required. If more than one signature is required, submit multiple forms, check the box below, and identify the total number of forms submitted in the blank below.

☐ A total of _____ forms are submitted. *If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*

Patent Assignment Abstract of Title

Total Assignments: 7

Application #: 09850399 **Filing Dt:** 05/07/2001 **Patent #:** 7039033 **Issue Dt:** 05/02/2006

PCT #: NONE **Intl Reg #:** **Publication #:** US20020163895 **Pub Dt:** 11/07/2002

Inventors: Amit Haller, Peter Fornell, Avraham Itzchak, Amir Glick, Ziv Haparnas

Title: SYSTEM, DEVICE AND COMPUTER READABLE MEDIUM FOR PROVIDING A MANAGED WIRELESS NETWORK USING SHORT-RANGE RADIO SIGNALS

Assignment: 1

Reel/Frame: 032239 / 0078 **Received:** 02/11/2014 **Recorded:** 02/11/2014 **Mailed:** 02/20/2014 **Pages:** 5

Conveyance: CHANGE OF NAME (SEE DOCUMENT FOR DETAILS).

Assignor: IXI MOBILE (ISRAEL) LTD. **Exec Dt:** 11/28/2001

Assignee: IXI MOBILE (R & D) LTD.
11 MOSHE LEVI STREET
RISHON LEZION, ISRAEL

Correspondent: JMB DAVIS BEN-DAVID
8 HARTOM STREET
JERUSALEM, ISRAEL

Assignment: 2

Reel/Frame: 013273 / 0484 **Received:** 09/13/2002 **Recorded:** 09/13/2002 **Mailed:** 12/02/2002 **Pages:** 7

Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

Assignors: HALLER, AMIT **Exec Dt:** 01/07/2002

FORNELL, PETER **Exec Dt:** 01/07/2002

ITZCHAK, AVRAHAM **Exec Dt:** 06/05/2002

GLICK, AMIR **Exec Dt:** 03/06/2002

HAPARNAS, ZIV **Exec Dt:** 01/07/2002

Assignee: IXI MOBILE (ISRAEL) LTD.
HA'TIDHAR STREET, #3
RA'ANANA, ISRAEL 43654

Correspondent: VIERRA MAGEN MARCUS ET AL.
KIRK J. DENIRO
685 MARKET STREET, SUITE 540
SAN FRANCISCO, CA 94105

Assignment: 3

Reel/Frame: 017846 / 0872 **Received:** 06/29/2006 **Recorded:** 06/29/2006 **Mailed:** 06/30/2006 **Pages:** 10

Conveyance: SECURITY AGREEMENT

Assignor: IXI MOBILE (R&D) LTD. **Exec Dt:** 06/19/2006

Assignee: SOUTHPOINT MASTER FUND LP
623 FIFTH AVENUE
SUITE 2503
NEW YORK, NEW YORK 10022

Correspondent: AARON R. ETTELMAN [680454.0003]
ONE COMMERCE SQUARE
2005 MARKET STREET, SUITE 2200
PHILADELPHIA, PA 19103-7013

Assignment: 4

Reel/Frame: 028055 / 0575 **Received:** 04/17/2012 **Recorded:** 04/17/2012 **Mailed:** 04/18/2012 **Pages:** 5

Conveyance: RELEASE BY SECURED PARTY (SEE DOCUMENT FOR DETAILS).

Assignor: SOUTHPOINT MASTER FUND LP **Exec Dt:** 03/21/2012

Assignee: IXI MOBILE (R&D) LTD.
11 MOSHE LEVI STREET
RISHON LEZION, ISRAEL

Correspondent: JMB DAVIS BEN-DAVID
1 HAMARPE STREET
PO BOX 45087
JERUSALEM, ISRAEL

Assignment: 5

Reel/Frame: 033042 / 0985 **Received:** 06/05/2014 **Recorded:** 06/05/2014 **Mailed:** 06/06/2014 **Pages:** 6

Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

Assignor: IXI MOBILE (R&D) LTD. **Exec Dt:** 06/05/2014

Assignee: IXI IP, LLC
THE CHRYSLER BUILDING
405 LEXINGTON AVENUE, SUITE 726
NEW YORK, NEW YORK 10174

Correspondent: PERKINS COIE LLP
1201 THIRD AVENUE, SUITE 4900
SEATTLE, WA 98101

Assignment: 6

Reel/Frame: 033098 / 0056 **Received:** 06/05/2014 **Recorded:** 06/05/2014 **Mailed:** 06/16/2014 **Pages:** 5

Conveyance: SECURITY INTEREST

Assignor: IXI IP, LLC **Exec Dt:** 06/05/2014

Assignee: FORTRESS CREDIT CO LLC
1345 AVENUE OF THE AMERICAS
46TH FLOOR
NEW YORK, NEW YORK 10105

Correspondent: PERKINS COIE LLP
1201 THIRD AVENUE, SUITE 4900
SEATTLE, WA 98101

Assignment: 7

Reel/Frame: 033718 / 0687 **Received:** 09/11/2014 **Recorded:** 09/11/2014 **Mailed:** 09/12/2014 **Pages:** 3

Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

Assignor: FORTRESS CREDIT CO DBDLLC **Exec Dt:** 09/11/2014

Assignee: FCO V CLO TRANSFEROR LLC
1345 AVENUE OF THE AMERICAS
46TH FLOOR
NEW YORK, NEW YORK 10105

Correspondent: PERKINS COIE LLP
1201 THIRD AVENUE, SUITE 4900
SEATTLE, WA 98101

Search Results as of: 07/22/2017 14:25:41 PM

Disclaimer:
Assignment information on the assignment database reflects assignment documents that have been actually recorded.
If the assignment for a patent was not recorded, the name of the assignee on the patent application publication or patent may be different.
If you have any comments or questions concerning the data displayed, contact OPR / Assignments at 571-272-3350

Close Window

PTO/AIA/96 (08-12)
Approved for use through 01/31/2013. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: IXI IP, LLC

Application No./Patent No.: 7,039,033 Filed/Issue Date: May 2, 2006

Titled: System, Device and Computer Readable Medium for Providing a Managed Wireless Network Using Short-Range Radio Signals

IXI IP, LLC, a Corporation

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☑ The assignee of the entire right, title, and interest.

2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):

   ☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.

   ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (*e.g.*, bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

B. ☑ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: HALLER, FORNELL, ITZCHAK, GLICK, HAPARNAS To: IXI MOBILE (ISRAEL) LTD.

   The document was recorded in the United States Patent and Trademark Office at

   Reel 013273, Frame 0484, or for which a copy thereof is attached.

2. From: IXI MOBILE (ISRAEL) LTD. To: IXI MOBILE (R&D) LTD.

   The document was recorded in the United States Patent and Trademark Office at

   Reel 032239, Frame 0078, or for which a copy thereof is attached.

PTO/AIA/96 (08-12)
Approved for use through 01/31/2013. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

STATEMENT UNDER 37 CFR 3.73(c)

3. From: IXI MOBILE (R&D) LTD. To: IXI IP, LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 033042, Frame 0985, or for which a copy thereof is attached.

4. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

5. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

6. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☑ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

Signature	7/26/17 Date
Steven Robert Pedersen Printed or Typed Name	Manager Title or Registration Number

Electronic Acknowledgement Receipt	
EFS ID:	29906860
Application Number:	90013925
International Application Number:	
Confirmation Number:	1027
Title of Invention:	SYSTEM, DEVICE AND COMPUTER READABLE MEDIUM FOR PROVIDING A MANAGED WIRELESS NETWORK USING SHORT-RANGE RADIO SIGNALS
First Named Inventor/Applicant Name:	7039033
Customer Number:	41200
Filer:	Lissi M. Marquis/Nona Durham
Filer Authorized By:	Lissi M. Marquis
Attorney Docket Number:	0909-010
Receipt Date:	27-JUL-2017
Filing Date:	24-MAR-2017
Time Stamp:	12:56:00
Application Type:	Reexam (Patent Owner)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	IXI-POA-Signed.pdf	690252 3438da163818c3e37f8553e568b98100065172d7	no	6

Warnings:

Information:	
Total Files Size (in bytes):	690252

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

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www.uspto.gov

BIB DATA SHEET

CONFIRMATION NO. 2705

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
09/850,399	05/07/2001 RULE	370	2616	0909-010

APPLICANTS

INVENTORS

Amit Haller, Belmont, CA;
Peter Fornell, Lake Oswego, OR;
Avraham Itzchak, Ra'anana, ISRAEL;
Amir Glick, Tel Aviv, ISRAEL;
Ziv Haparnas, Tel Aviv, ISRAEL;

** CONTINUING DATA **********

** FOREIGN APPLICATIONS **********

** IF REQUIRED, FOREIGN FILING LICENSE GRANTED **
07/02/2001

Foreign Priority claimed ☐ Yes ☐ No 35 USC 119(a-d) conditions met ☐ Yes ☐ No Verified and Acknowledged _____ Examiner's Signature	☐ Met after Allowance _____ Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		CA	9	57	5

ADDRESS

BROOKS KUSHMAN P.C.
1000 TOWN CENTER
TWENTY-SECOND FLOOR
SOUTHFIELD, MI 48075
UNITED STATES

TITLE

SYSTEM, DEVICE AND COMPUTER READABLE MEDIUM FOR PROVIDING A MANAGED WIRELESS NETWORK USING SHORT-RANGE RADIO SIGNALS

FILING FEE RECEIVED		
1409	FEES: Authority has been given in Paper No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

BIB (Rev. 05/07).

UNITED STATES PATENT AND TRADEMARK OFFICE

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United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
09/850,399	05/07/2001	Amit Haller	IXIM-01003US1

CONFIRMATION NO. 2705

27730
DILWORTH PAXSON LLP
1500 Market Street
Suite 3500 E
PHILADELPHIA, PA 19102

POWER OF ATTORNEY NOTICE

OC000000090215607

Date Mailed: 03/28/2017

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 03/24/2017.

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/rbell/

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09/850,399	05/07/2001	Amit Haller	IXIM-01003US1

CONFIRMATION NO. 2705

41200
PK PATENT LAW
213 S. Payne Street
Alexandria, VA 22314

POA ACCEPTANCE LETTER

OC000000090215838

Date Mailed: 03/28/2017

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/rbell/

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www.uspto.gov

BIB DATA SHEET

CONFIRMATION NO. 2705

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
09/850,399	05/07/2001 RULE	370	2616	IXIM-01003US1

APPLICANTS

INVENTORS

Amit Haller, Belmont, CA;
Peter Fornell, Lake Oswego, OR;
Avraham Itzchak, Ra'anana, ISRAEL;
Amir Glick, Tel Aviv, ISRAEL;
Ziv Haparnas, Tel Aviv, ISRAEL;

**** CONTINUING DATA ***************************

**** FOREIGN APPLICATIONS ***************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****
07/02/2001

Foreign Priority claimed ☐ Yes ☐ No 35 USC 119(a-d) conditions met ☐ Yes ☐ No Verified and Acknowledged _____ Examiner's Signature	☐ Met after Allowance _____ Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		CA	9	57	5

ADDRESS

PK PATENT LAW
213 S. Payne Street
Alexandria, VA 22314
UNITED STATES

TITLE

SYSTEM, DEVICE AND COMPUTER READABLE MEDIUM FOR PROVIDING A MANAGED WIRELESS NETWORK USING SHORT-RANGE RADIO SIGNALS

FILING FEE RECEIVED	FEES: Authority has been given in Paper	☐ All Fees
1409	No._____ to charge/credit DEPOSIT ACCOUNT	☐ 1.16 Fees (Filing)
	No._____ for following:	☐ 1.17 Fees (Processing Ext. of time)
		☐ 1.18 Fees (Issue)
		☐ Other _____
		☐ Credit

BIB (Rev. 05/07).

Pepper Hamilton LLP
Attorneys at Law

19th Floor, High Street Tower
125 High Street
Boston, MA 02110-2736
617.204.5100
Fax 617.204.5150

Andrew W. Schultz
direct dial: 617.204.5176
direct fax: 877.550.5908
schultza@pepperlaw.com

February 21, 2017

FILED VIA HAND DELIVERY

Michelle K. Lee, Director of the U.S. Patent and Trademark Office
c/o Office of the General Counsel, 10B20
Madison Building East
600 Dulany Street
Alexandria, VA 22314

Re: Copy of Notice of Appeal for IPR2015-01444

Dear Ms. Lee:

Pursuant to 35 U.S.C. 142 and 37 C.F.R. 104.2, enclosed is one copy of IXI IP, LLC's Notice of Appeal for IPR2015-01444.

If you need any additional information, please contact me at the number above.

Sincerely,

Andrew W. Schultz, Reg. No. 66,869

cc: W. Karl Renner (*via email*)
Kevin Greene (*via email*)
Jeremy Monaldo (*via email*)
Indranil Mukerji (*via email*)

By: Andy H. Chan, Reg. No. 56,893
Pepper Hamilton LLP
333 Twin Dolphin Drive
Suite 400
Redwood City, CA 94065
(650) 802-3602 (telephone)
(650) 802-3650 (facsimile)
chana@pepperlaw.com

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD.,
SAMSUNG ELECTRONICS AMERICA, INC., AND APPLE INC.,
Petitioner
v.

IXI IP, LLC
Patent Owner

Case No. IPR2015-01444
Patent 7,039,033

IXI IP, LLC'S NOTICE OF APPEAL
TO THE U.S. COURT OF APPEALS FOR THE FEDERAL CIRCUIT

Pursuant to 35 U.S.C. §§ 141(c), 142, and 319 and 37 C.F.R. §§ 90.2, 90.3, and 104.2, Patent Owner IXI IP, LLC ("IXI") hereby provides notice of its appeal to the United States Court of Appeals for the Federal Circuit of the Final Written Decision (Paper 27) entered by the Patent Trial and Appeal Board ("PTAB") on December 21, 2016 (Attachment A), and from all underlying findings, orders, decisions, rulings and opinions. In particular, Patent Owner states that the issues to be addressed on appeal may include, but are not limited to:

A. Whether the PTAB erred in finding that 1, 4, 7, and 14 are unpatentable under 35 U.S.C. § 103 as being obvious over PCT Publication No. WO 01/76154 of Marchand (Ex. 1005, "Marchand") in view of U.S. Patent No. 6,560,642 of Nurmann (Ex. 1010, "Nurmann") and U.S. Patent No. 6,771,635 of Vilander (Ex. 1011, "Vilander")?

B. Whether the PTAB erred in finding that claim 5 is unpatentable under 35 U.S.C. § 103 as being obvious over Marchand in view of Nurmann, Vilander and Handley et al., *Request for Comments 2543 SIP: Session Initiation Protocol* (Ex. 1007, "RFC 2543")?

C. Whether the PTAB erred in finding that claims 6 and 23 are unpatentable under 35 U.S.C. § 103 as being obvious over Marchand in view of Nurmann, Vilander, and U.S. Patent No. 6,836,474 of Larsson (Ex. 1008, "Larsson")?

D. Whether the PTAB erred in finding that claims 12, 15, 22, 34, 39, 40, 42, and 46 are unpatentable under 35 U.S.C. § 103 as being obvious over Marchand in view of Nurmann, Vilander, and K. Arnold *et al.*, The JINI™ Specification (Ex. 1009, "JINI Spec")?

E. Whether the PTAB erred in finding that claims 25 and 28 are unpatentable under 35 U.S.C. § 103 as being obvious over Marchand, Larsson, and JINI Spec?

F. Whether the PTAB erred in denying Patent Owner's Motion to Exclude Evidence?

Simultaneous with submission of this Notice of Appeal to the Director of the United States Patent and Trademark Office, this Notice of Appeal is being filed with the Patent Trial and Appeal Board. In addition, this Notice of Appeal, along with the required docketing fees, is being filed with the United States Court of Appeals for the Federal Circuit.

Dated: February 21, 2017

Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that on this 21st day of February, 2017, a true and correct copy of the foregoing Patent Owner's Notice of Appeal to the U.S. Court of Appeals for the Federal Circuit was served on the following counsel for Petitioner via email:

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Dated: February 21, 2017

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Paper No. 27
Entered: December 21, 2016

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD.,
SAMSUNG ELECTRONICS AMERICA, INC., and APPLE INC.,
Petitioner,

v.

IXI IP, LLC,
Patent Owner.

Case IPR2015-01444
Patent 7,039,033 B2

Before KRISTINA M. KALAN, ROBERT J. WEINSCHENK, and JOHN A. HUDALLA, *Administrative Patent Judges*.

HUDALLA, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

Samsung Electronics Co., Ltd., Samsung Electronics America, Inc., and Apple Inc. (collectively "Petitioner") filed a Petition ("Pet.") (Paper 2) to institute an *inter partes* review of claims 1, 4–7, 12, 14, 15, 22, 23, 25, 28, 34, 39, 40, 42, and 46 of U.S. Patent No. 7,039,033 B2 ("the '033 patent")

(Ex. 1001) pursuant to 35 U.S.C. §§ 311–319. Patent Owner, IXI IP, LLC ("IXI"), filed a Preliminary Response ("Prelim. Resp.") (Paper 6) to the Petition. Taking into account the arguments presented in IXI's Preliminary Response, we determined that the information presented in the Petition established that there is a reasonable likelihood that Petitioner would prevail in challenging claims 1, 4–7, 12, 14, 15, 22, 23, 25, 28, 34, 39, 40, 42, and 46 of the '033 patent under 35 U.S.C. § 103(a). Pursuant to 35 U.S.C. § 314, we instituted this proceeding on December 30, 2015, as to these claims of the '033 patent. Paper 7 ("Dec. on Inst.").

During the course of trial, IXI filed a Patent Owner Response (Paper 14, "PO Resp."), and Petitioner filed a Reply to the Patent Owner Response (Paper 18, "Pet. Reply"). An oral hearing was held on September 15, 2016, and a transcript of the hearing is included in the record. Paper 26 ("Tr.").

Petitioner proffered a Declaration of Dr. Sayfe Kiaei (Ex. 1003) with its Petition, and IXI proffered a Declaration of Dr. Narayan Mandayam (Ex. 2301) with its Response. The parties also filed transcripts of the depositions of Dr. Kiaei (Exs. 2303–2305) and Dr. Mandayam (Exs. 1018, 1019).

IXI filed a Motion to Exclude (Paper 21) certain exhibits submitted by Petitioner. Petitioner filed an Opposition (Paper 24) and IXI filed a Reply (Paper 25).

We have jurisdiction under 35 U.S.C. § 6. This decision is a Final Written Decision under 35 U.S.C. § 318(a) as to the patentability of claims 1, 4–7, 12, 14, 15, 22, 23, 25, 28, 34, 39, 40, 42, and 46 of the '033 patent. For the reasons discussed below, Petitioner has demonstrated by a preponderance of the evidence that these claims are unpatentable under § 103(a).

I. BACKGROUND

A. Related Proceedings

The parties identify the following proceedings related to the '033 patent: *IXI Mobile (R&D) Ltd. v. Samsung Electronics Co.,* Case No. 3:15-cv-03752-HSG (N.D. Cal.); *IXI Mobile (R&D) Ltd. v. Apple, Inc.*, Case No. 4:15-cv-03755-PJH (N.D. Cal.); and *IXI Mobile (R&D) Ltd. v. Blackberry Ltd.*, Case No. 3:15-cv-03754-RS (N.D. Cal.). Pet. 1–2; Paper 5, 1–2; Paper 7, 1–2.

B. The '033 Patent

The '033 patent issued from an application filed on May 7, 2001. Ex. 1001, at [22]. The '033 patent is directed to "a system that accesses information from a wide area network ('WAN'), such as the Internet, and local wireless devices in response to short-range radio signals." *Id.* at 4:8–11. Figure 1 of the '033 patent is reproduced below:

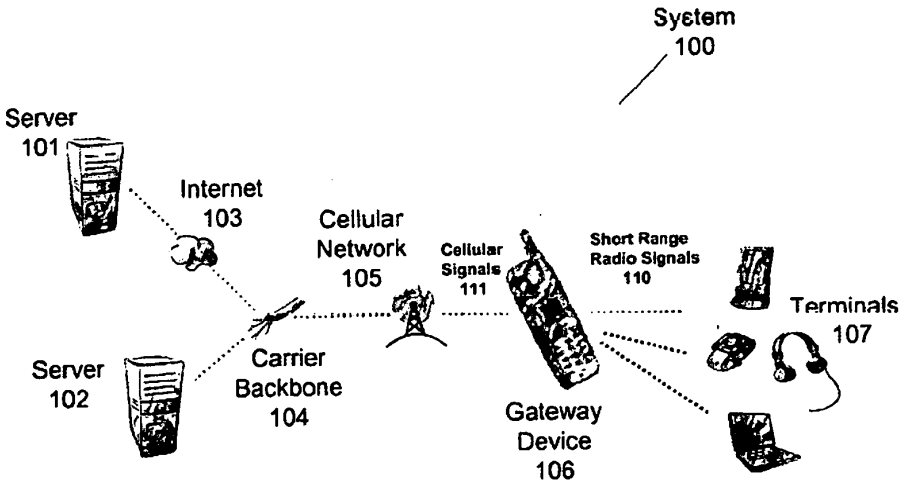

Fig. 1

Figure 1 illustrates an exemplary system 100 having a personal area network (PAN) and a wide area network. *Id.* at 4:8–19. The PAN is made up of gateway device 106 and one or more terminals 107, such as, for example, a laptop computer, a personal digital assistant (PDA), or a printer. *Id.* at 4:17–25. Gateway device 106 is coupled to cellular network 105, which in turn connects to Internet 103 through carrier backbone 104. *Id.* at 4:36–39, 49–55.

Software architecture 400 for gateway device 106 may include network management software 404 including, *inter alia,* PAN application server 404a. *Id.* at 5:61–6:5, 6:36–42; 6:58–63, Figs. 4, 5a. In turn, PAN application server 404a includes service repository software component 704, which "allows applications 406, which run on a gateway device 106 or terminals 107, to discover what services are offered by a PAN, and to determine the characteristics of the available services." *Id.* at 10:1–9, 12:9–14, Fig. 7; *see also id.* at 12:33–67 (enumerating the many functions of service repository software component 704).

C. Illustrative Claim

Claims 1, 25, 34, and 42 of the '033 patent are independent. Claims 4–7, 12, 14, 15, 22, and 23 depend from claim 1; claim 28 depends from claim 25; claims 39 and 40 depend from claim 34; and claim 46 depends from claim 42. Independent claim 1 is illustrative of the challenged claims and is reproduced below:

> 1. A system for providing access to the Internet, comprising:
>
> a first wireless device, in a short distance wireless network, having a software component to access information from the Internet by communicating with a cellular network in response to a first short-range radio signal, wherein the first

wireless device communicates with the cellular network and receives the first short-range radio signal; and,

a second wireless device, in the short distance wireless network, to provide the first short-range radio signal,

wherein the software component includes a network address translator software component to translate between a first Internet Protocol ("IP") address provided to the first wireless device from the cellular network and a second address for the second wireless device provided by the first wireless device,

wherein the software component includes a service repository software component to identify a service provided by the second wireless device.

Ex. 1001, 15:40–59.

D. The Prior Art

Petitioner relies on the following prior art:

PCT Publication No. WO 01/76154 A2 to Marchand, published Oct. 11, 2001 (Ex. 1005, "Marchand"), which claims priority to U.S. Application No. 09/541,529, filed Apr. 3, 2000 (Ex. 1006, "Marchand Priority");

Handley et al., *Request For Comments 2543 SIP: Session Initiation Protocol*, THE INTERNET SOCIETY, March 1999 (Ex. 1007, "RFC 2543");

U.S. Patent No. 6,836,474 B1 to Larsson, filed Aug. 31, 2000, issued Dec. 28, 2004 (Ex. 1008, "Larsson");

K. Arnold et al., *The Jini™ Specification*, Addison-Wesley, June 1, 1999 (Ex. 1009, "JINI Spec.");

U.S. Patent No. 6,560,642 B1 to Nurmann, filed Oct. 23, 1999, issued May 6, 2003 (Ex. 1010, "Nurmann"); and

U.S. Patent No. 6,771,635 B1 to Vilander, filed Mar. 27, 2000, issued Aug. 3, 2004 (Ex. 1011, "Vilander").

E. The Asserted Grounds

We instituted this proceeding on the following grounds of unpatentability (Dec. on Inst. 26):

References	Basis	Claim(s) Challenged
Marchand, Nurmann, and Vilander	35 U.S.C. § 103(a)	1, 4, 7, 14
Marchand, Nurmann, Vilander, and RFC 2543	35 U.S.C. § 103(a)	5
Marchand, Nurmann, Vilander, and Larsson	35 U.S.C. § 103(a)	6, 23
Marchand, Nurmann, Vilander, and JINI Spec.	35 U.S.C. § 103(a)	12, 15, 22, 34, 39, 40, 42, 46
Marchand, Larsson, and JINI Spec.	35 U.S.C. § 103(a)	25, 28

F. Claim Interpretation

In an *inter partes* review, we construe claims by applying the broadest reasonable interpretation in light of the specification. 37 C.F.R. § 42.100(b); *see Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016). Under the broadest reasonable interpretation standard, and absent any special definitions, claim terms are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *See In re Translogic Tech. Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Any special definitions for claim terms or phrases must be set forth "with reasonable clarity, deliberateness, and precision." *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). Only those terms which are in controversy need be construed, and only to the extent

necessary to resolve the controversy. *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

In our Decision on Institution, we determined that no claim terms required construction. Dec. on Inst. 6–7. Based on our review of the complete record, we maintain our determination that no constructions are necessary, with the exception of the term "thin terminal" in claims 7 and 46.

The parties' arguments require us to consider whether a printer is commensurate with the broadest reasonable interpretation of "thin terminal." *See* Pet. 30–31; PO Resp. 42–43; Pet. Reply 18–20. The '033 patent describes "thin terminals" as having "a relatively low power central processor and operating system" and as being "mainly used as peripherals to an Application server in a PAN." Ex. 1001, 5:2–5. The main tasks of a thin terminal are described as "user interaction, rendering output for a user and providing an Application server with a user's input." *Id.* at 5:5–7. Examples of thin terminals provided in the '033 patent include a watch and a messaging terminal. *Id.* at 5:5–7. Furthermore, the '033 patent contrasts thin terminals with smart terminals having "a relatively powerful central processor, operating system and applications," such as "a computer notebook and PDA." *Id.* at 4:62–5:2. In describing a messaging terminal in one embodiment, the '033 patent states that the terminal "has no embedded application code or data." *Id.* at 10:18–21.

Petitioner contends a printer is a thin terminal because, at least, a printer "has a low power central processor and operating system relative to a laptop computer or PDA." Pet. 31 (citing Ex. 1003 ¶ 25) (internal quotation omitted). We agree with Petitioner, and we additionally observe that a printer is a peripheral utilized for rendering user output, which is consistent with the Specification's description of a thin terminal. We also agree with

Petitioner that the Specification's reference to "no embedded application code or data" (Ex. 1001, 10:18–21) does not preclude a printer with application code and/or data from being a thin terminal, because the '033 patent also describes the thin terminal locating, downloading, and executing software. Pet. 19 (citing Ex. 1001, 10:13–25). As such, we determine the "thin terminal" recited in claims 7 and 46 encompasses a printer.[1]

II. ANALYSIS

A. Obviousness Ground Based on Marchand, Nurmann, and Vilander

Petitioner contends claims 1, 4, 7, and 14 would have been obvious over the combination of Marchand, Nurmann, and Vilander. Pet. 11–29. IXI disputes Petitioner's contention. PO Resp. 16–43.

1. Principles of Law

A claim is unpatentable under 35 U.S.C. § 103(a)[2] if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter

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[1] Although we acknowledge the different standards for claim interpretation before us and before the district courts, IXI's infringement contentions in the co-pending litigation provide additional extrinsic support for our determination. *See* Pet. 31 (citing Ex. 1012, 20, 45; Ex. 1013, 35, 70). In particular, IXI contends that a printer is a type of "thin terminal" in its infringement case. *See id.*

[2] The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) ("AIA"), amended 35 U.S.C. §§ 102 and 103. Because the '033 patent has an effective filing date before the effective date of the applicable AIA amendments, throughout this Decision we refer to the pre-AIA versions of 35 U.S.C. §§ 102 and 103.

pertains. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) where in evidence, so-called secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). We also recognize that prior art references must be "considered together with the knowledge of one of ordinary skill in the pertinent art." *Paulsen*, 30 F.3d at 1480 (citing *In re Samour*, 571 F.2d 559, 562 (CCPA 1978)). We analyze Petitioner's obviousness grounds with the principles identified above in mind.

2. Level of Ordinary Skill in the Art

In determining the level of ordinary skill in the art, various factors may be considered, including the "type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field." *In re GPAC, Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (citing *Custom Accessories, Inc. v. Jeffrey-Allan Indus., Inc.*, 807 F.2d 955, 962 (Fed. Cir. 1986)). In addition, the prior art of record in this proceeding—namely, Marchand, Nurmann, Vilander, RFC 2543, Larsson, and JINI Spec.—is indicative of the level of ordinary skill in the art. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001); *GPAC*, 57 F.3d at 1579; *In re Oelrich*, 579 F.2d 86, 91 (CCPA 1978).

> Petitioner contends a person of ordinary skill in the art would have had a Master[] of Science Degree (or a similar technical Master's Degree, or higher degree) in an academic

> area emphasizing electrical engineering, computer engineering, or computer science with a concentration in communication and networking systems or, alternatively, a Bachelor's Degree (or higher degree) in an academic area emphasizing electrical or computer engineering and having two or more years of experience in communication and networking systems.

Pet. 7–8. Petitioner's contention is supported by the testimony of Dr. Kiaei, who bases his testimony on his "experience working in industry and academia, with undergraduate and postgraduate students, with colleagues from academia, and with engineers practicing in industry." Ex. 1003 ¶¶ 15–16. IXI does not dispute Petitioner's definition of the level of ordinary skill in the art, and, in fact, IXI applies it in IXI's Patent Owner Response. PO Resp. 8; *see also* Ex. 2301 ¶ 16 (IXI's declarant, Dr. Mandayam, applying same definition). Accordingly, we apply Petitioner's definition of the level of ordinary skill in the art for purposes of this Decision. We further observe that Petitioner's proposed definition comports with the qualifications a person would need to understand and implement the teachings of the '033 patent and the prior art of record.

3. Marchand

Marchand is a published international patent application, and Petitioner asserts Marchand's priority date under 35 U.S.C. § 102(e) is April 3, 2000, the date of filing for a prior national application (i.e., Marchand Priority) in the United States. *See* Pet. 4–5. IXI does not contest Petitioner's priority date assertion. Therefore, for purposes of this decision, we find Marchand qualifies as prior art to the '033 patent under 35 U.S.C. § 102(e) because April 3, 2000, predates the May 7, 2001, filing date of the '033 patent.

Marchand relates to "an ad-hoc network and a gateway that provides an interface between external wireless IP networks and devices in the ad-hoc network." Ex. 1005, 1:5–7. Figure 3 of Marchand is reproduced below:

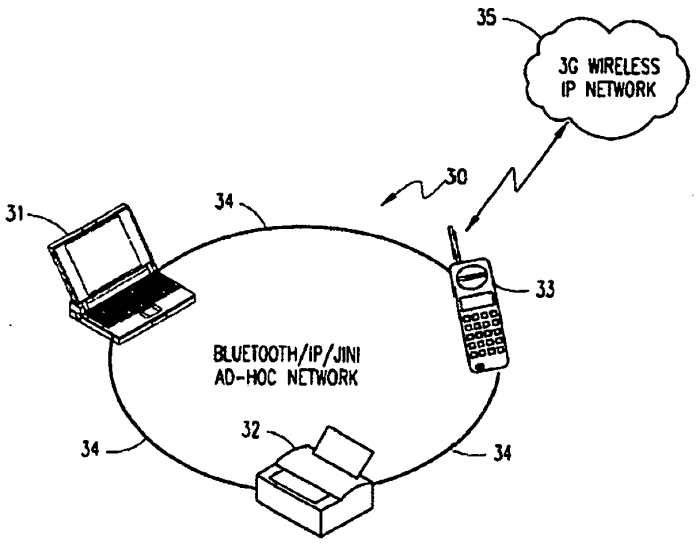


FIG. 3

Figure 3 illustrates "an ad-hoc network 30 utilizing Bluetooth, IP [Internet Protocol], and JINI technologies . . . to enable the use of a gateway mobile phone." *Id.* at 7:7–9. Ad-hoc network 30 (also called "Bluetooth Piconet (30)") includes laptop computer 31, printer 32, and mobile phone 33, which can communicate via Bluetooth radio link 34. *Id.* at Abstract, 7:9–11. Mobile phone 33 acts "as a gateway between the ad-hoc network and a 3G wireless IP network 35 such as the General Packet Radio Service (GPRS) network." *Id.* at 7:12–14. Regarding IP address translation, IP packets from the GPRS are received at mobile phone 33 through its public IP address, and then are forwarded to the private IP address of the device on ad-hoc network 30. *Id.* at 7:14–16. Address translation in the opposite direction is handled similarly. *Id.* at 7:16–17.

"JINI (Java) technology is utilized to publish and share services between the devices" in network 30, and this technology "provid[es] the capability for an application 21 to discover, join, and download services 22 from a JINI LUS [Lookup Service]." *Id.* at 6:3–4, 6:21–22. "The LUS contains a list of available services provided by other devices on the network." *Id.* at 3:11–12. Devices in the network "announce not only value-added services, but also their attributes and capabilities to the network," whereupon these services are published through the LUS. *Id.* at 3:12–15, 10:17–18. The LUS also provides interfaces for services that are available to the devices in the network. *Id.* at 3:13–14, 8:12–15.

Figure 4 of Marchand is reproduced below.

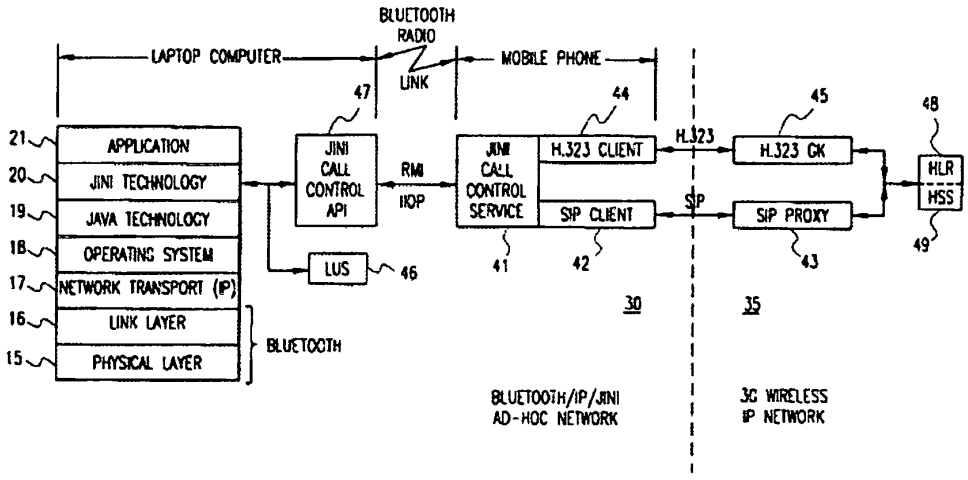


FIG. 4

Figure 4 depicts "a simplified functional block diagram of a connection between two devices such as the laptop computer 31 and the mobile phone 33 utilizing the ad-hoc network 30 of FIG. 3." *Id.* at 7:26–28. Gateway mobile phone 33 publishes in the Bluetooth piconet the call control services that it offers utilizing JINI LUS 46.

4. Nurmann

Nurmann relates to establishing an "Internet Protocol ('IP') network with several IP hosts and with an IP gateway for connecting the IP network to the [I]nternet." Ex. 1010, 1:9–12. Acting as a Dynamic Host Configuration Protocol (DHCP) client, the IP gateway determines whether a DHCP server is present in the IP network. *Id.* at 2:62–67. If a DHCP server is present, "[t]he allocation of the IP addresses to the IP hosts functioning as DHCP clients takes place from the DHCP server." *Id.* at 2:6–27. "If there is no DHCP server[,] the IP gateway is activated automatically as [a] DHCP server," which "allocates IP addresses and IP network masks to the IP hosts in a standard manner." *Id.* at 2:50–57.

5. Vilander

Vilander relates to "the allocation of IP addresses to mobile terminals and in particular to the allocation of a host part of an IP address to a mobile terminal." Ex. 1011, 1:6–8. Vilander teaches that, when a mobile terminal requests Internet access, the request is directed to a Gateway General Packet Radio Service (GPRS) Switching Node (GGSN), which may act as an Internet Access Server. *Id.* at 1:48–52.

6. Claim 1

Petitioner argues Marchand teaches a "first wireless device, in a short distance wireless network, having a software component to access information from the Internet by communicating with a cellular network in response to a first short-range radio signal," as recited in claim 1. Pet. 21–23. Petitioner maps Marchand's mobile phone 33 to the recited "first wireless device," and Marchand's ad-hoc Bluetooth piconet to the recited

"short distance wireless network." *Id.* at 21–22 (citing Ex. 1005, 1:29–31, 6:23–25, 7:12–14). Regarding the recited "second wireless device," Petitioner maps "[t]he devices in the ad-hoc Bluetooth Piconet network 30 [that] send signals to the mobile phone 33 over short-range radio links." *Id.* at 23–24 (citing Ex. 1003 ¶¶ 19, 25–27; Ex. 1005, 7:9–11, 7:18–21). As such, Petitioner maps Marchand's laptop computer 31 and/or printer 32 to the "second wireless device." *Id.*; Ex. 1005, 7:9–11, Fig. 3.

Regarding "access[ing] information from the Internet by communicating with a cellular network in response to a first short-range radio signal," Petitioner contends the IP packets sent among devices in Marchand's Bluetooth piconet over a short-range radio link correspond to the "first short-range radio signal." Pet. 22–23. Petitioner further contends Marchand's disclosure of connecting devices "to an IP-based network such as the Internet" and of "data going out of the Piconet to the GPRS network" teaches the recited Internet access. *Id.* at 22–24 (citing Ex. 1003 ¶ 27; Ex. 1005, 7:14–17, 13:12–14).

According to Petitioner, "Marchand discloses a network address translator to translate between a first IP address and a second IP address" based on Marchand's description of translating and forwarding between public and private IP addresses. *Id.* at 24 (citing Ex. 1003 ¶ 27; Ex. 1005, 7:14–17, 10:31–11:2). Petitioner contends an ordinarily skilled artisan would have modified Marchand in view of Vilander "such that the public IP address of the mobile phone gateway 33 was provided by the cellular network 35." *Id.* at 18 (citing Ex. 1003 ¶ 46). In particular, Petitioner cites Vilander's implementation of a device on the cellular network, such as a GGSN, to allocate the public IP address to the gateway. *Id.* (citing Ex. 1011 at 1:48–52, 1:57–59). Petitioner further contends an ordinarily skilled

artisan would have modified Marchand in view of Nurmann "such that the mobile gateway provides the private IP addresses to the devices on the network 30." *Id.* (citing Ex. 1003 ¶ 47). Specifically, Petitioner proposes implementing Nurmann's DHCP server on Marchand's mobile phone 33 to accomplish IP addressing in Marchand's local network 30. *Id.* (citing Ex. 1010, 4:51–56). Petitioner associates these citations from Vilander and Nurmann with the recited "network address translator software component" of claim 1. *See id.* at 24–25.

Petitioner maps Marchand's JINI Lookup Service (LUS) to the recited "service repository software component [that] identif[ies] a service provided by the second wireless device" of claim 1. Pet. 25–26 (citing Ex. 1003 ¶ 28; Ex. 1005, 3:11–12, 5:13–14). Claim 1 requires this "service repository software component" to be part of the "software component," which is itself part of the "first wireless device." Ex. 1001, 15:42–43, 15:57–59. Dr. Kiaei acknowledges "Marchand does not expressly state that the JINI LUS is located on mobile phone 33." Ex. 1003 ¶ 37. Petitioner nonetheless contends an ordinarily skilled artisan "would appreciate that Marchand implicitly teaches an implementation in which the JINI LUS is located in the mobile phone 33." Pet. 26 (citing Ex. 1003 ¶¶ 37–41). In particular, Petitioner cites Marchand's description of the mobile phone having "an interface/Application Programming Interface (API) . . . [that] is downloaded to the Bluetooth device involved in an external wireless call in order to have the device behave as a slave device toward the mobile phone which is the master." Ex. 1005, 6:27–31; *see also* Pet. 26–27 (citing same). Relying on testimony from Dr. Kiaei, Petitioner contends an ordinarily skilled artisan "would [have] underst[ood] that Marchand's API corresponds to a JINI

proxy object" and that such "proxy objects are downloaded from a LUS" in JINI. Pet. 27 (citing Ex. 1003 ¶ 38).

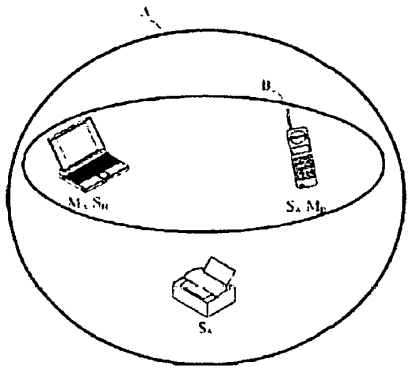
Petitioner also highlights Marchand's description "that all the devices in the ad-hoc Bluetooth Piconet network 30 publish their services when the mobile phone 33 connects to the ad-hoc Bluetooth Piconet network 30 and cellular network 35." *Id.* (citing Ex. 1003 ¶ 39; Ex. 1005, 10:12–18). Because a LUS "identifies services provided by devices on the network 30," Petitioner contends an ordinarily skilled artisan would have concluded from this description that Marchand teaches a JINI LUS located on mobile phone 33. *Id.* at 27–28 (citing Ex. 1003 ¶ 39). Petitioner additionally contends an ordinarily skilled artisan would have recognized that implementing Marchand's LUS in mobile phone 33—the gateway device to the cellular network—would best allow for the other devices in the ad-hoc Bluetooth piconet to join or leave without loss of connectivity between the piconet and the cellular network. Pet. 28 (citing Ex. 1003 ¶ 40).

Thus, Petitioner has established that Marchand, Vilander, and Nurmann teach every limitation of claim 1. Petitioner, as supported by Dr. Kiaei's testimony, also has established that a person of ordinary skill in the art would have had reason to combine the teachings of Marchand, Vilander, and Nurmann to achieve the system recited in claim 1. *See* Pet. 17–20; Ex. 1003 ¶¶ 46–51. We now consider IXI's arguments in opposition to Petitioner's obviousness analysis.

a. How an Ordinarily Skilled Artisan Would Have Interpreted Marchand's Teachings Related to the LUS

IXI disputes that Marchand teaches a LUS located on mobile phone 33, because IXI contends an ordinarily skilled artisan "would not understand

Marchand to disclose that its JINI LUS is on Marchand's cellular-enabled mobile phone 33, and . . . would have no motivation to modify Marchand to place the JINI LUS on the mobile phone in contradistinction to Marchand's explicit teachings to the contrary." PO Resp. 26–27. In particular, IXI contends Petitioner and its declarant wrongly analyzed Marchand's Bluetooth piconet. *See id.* at 12–15, 27–36. IXI's contention is based on Dr. Mandayam's testimony regarding a Bluetooth scatternet, which is formed when a Bluetooth device participates concurrently in two or more piconets. *See* Ex. 2301 ¶¶ 28–30. Figure 4 from Dr. Mandayam's Declaration is reproduced below



Id. ¶ 30. Figure 4 depicts separate piconets A (in blue) and B (in red) applied to the devices in Marchand's ad-hoc network. *Id.* ¶ 31. Dr. Mandayam explains:

> [T]he laptop computer is the master (M_A) of piconet A, with the mobile phone (S_A) and the printer (S_A) as slave devices in piconet A. The mobile phone is the master of piconet B (M_B), with only the laptop (S_B) as its slave device. Both the laptop and the mobile phone simultaneously act as master and slave devices on independent piconets, with piconet B, being a "sub-piconet" within piconet A.

Id.

Applying Dr. Mandayam's explanation to Marchand, IXI contends an ordinarily skilled artisan "would [have] appreciate[d] that the JINI LUS 46 must be located on the master device of the Bluetooth piconet, which Marchand discloses is a laptop as clearly shown on Marchand's Figure 4." PO Resp. 28 (citing Ex. 2301 ¶¶ 54–55). IXI further contends "the gateway mobile phone is the master of a sub-piconet within Marchand's Bluetooth piconet." *Id.* at 27. This purported sub-piconet, in which "the gateway mobile phone acts as the master device with the requesting device as its slave," is formed "[w]hen a device, such as a laptop, seeks to use the call control service offered by Marchand's gateway mobile phone." *Id.* at 30 (citing Ex. 2301 ¶¶ 54–55). In this case, "the gateway mobile phone sends the requesting device an API which allows the gateway mobile phone to establish its own, independent Bluetooth piconet . . . within the main Bluetooth piconet that connects all of the devices in the network." *Id.* (citing Ex. 1005, 10:25–29; Ex. 2301 ¶ 54). As such, IXI seeks to distinguish Marchand's teachings on publishing this call control API from Marchand's other teachings on publishing services to a JINI LUS upon entry of the mobile phone into the piconet. *Id.* at 32 (citing Ex. 2301 ¶ 56).

IXI's arguments rely heavily on Marchand's Figure 4, which appears to dispose a LUS within the laptop computer. *Id.* at 28 (presenting annotated version of Marchand's Fig. 4). Based on this drawing figure, and in consideration of IXI's sub-piconet theory, IXI argues that an ordinarily skilled artisan would not have had a reason to dispose a LUS within Marchand's gateway mobile phone. *See id.* at 26–37. We do not agree Marchand's disclosure should be read so narrowly, however, particularly because obviousness is determined from the perspective of "a person having ordinary skill in the art to which said subject matter pertains." 35 U.S.C.

§ 103(a); *see also Dann v. Johnston*, 425 U.S. 219, 230 (1976) ("[T]he mere existence of differences between the prior art and an invention does not establish the invention's nonobviousness.").

Petitioner presents evidence showing that an ordinarily skilled artisan would have considered Marchand's call control API to be a JINI proxy object. *See* Pet. 26–27 (citing Ex. 1003 ¶ 38; Ex. 1005, 6:27–7:2). In turn, Petitioner and Dr. Kiaei cite the JINI Spec. as teaching that such proxy objects are stored in a LUS for use when a client wants access to a service.[3] *See id.* (citing Ex. 1003 ¶ 38; Ex. 1009, 5–12). Finally, Petitioner cites Marchand's claim 6 as explicitly reciting "a JINI call control API that is downloaded from the gateway to the other devices on the ad-hoc network." *See id.* at 27 (citing Ex. 1005, 15:25–27). Petitioner concludes an ordinarily skilled artisan would have would have understood Marchand "as implicitly describing an implementation in which the JINI LUS, which identifies services provided by devices on the network 30, is located on the mobile phone gateway 33." *Id.* (citing Ex. 1003 ¶ 38). We are persuaded by this rationale, which establishes how an ordinarily skilled artisan would have read Marchand.

In addition, Marchand does not expressly prevent the LUS from being disposed on the gateway mobile phone. We agree with Petitioner's

[3] We may consider record evidence outside of the asserted ground, such as the JINI Spec., that demonstrates the knowledge and perspective of one of ordinary skill in the art, particularly when it explains why an ordinarily skilled artisan would have been motivated to combine or modify the cited references to arrive at the claimed invention. *See Ariosa Diagnostics v. Verinata Health, Inc.*, 805 F.3d 1359, 1365 (Fed. Cir. 2015); *Randall Mfg. v. Rea*, 733 F.3d 1355, 1362 (Fed. Cir. 2013).

assessment that Marchand's Figure 4 is merely exemplary and that nothing in Marchand limits or precludes the inclusion of a LUS in the gateway mobile phone. *See* Pet. Reply 11–12. Furthermore, one of ordinary skill in the art would have known, at least, that it was possible to have multiple LUSs in a network. *See* Ex. 1009, 5 ("Each Jini system is built around *one or more* lookup services." (original emphasis omitted and emphasis added)).[4] If multiple LUSs are possible, and if a LUS must be disposed on a master device, as IXI contends (*see, e.g.*, PO Resp. 28 (citing Ex. 2301 ¶¶ 54–55)), then Marchand's teaching that a gateway mobile phone is a master (*see* Pet. 13–14 (citing Ex. 1005, 8:2–2); Pet. Reply 3 (citing Ex. 1005, 3:22–27, 7:26–31, 8:1–3)) supports Petitioner's contention that Marchand suggests disposing a LUS in the gateway mobile phone. We also are not persuaded by Dr. Mandayam's testimony and IXI's arguments that the LUS must be disposed on a device that is "intrinsic to the Piconet" and that is "not the gateway." Ex. 1019, 16:10–14; Tr. 81:1–86:2. The notion of an "intrinsic" device is not apt in Marchand, which is expressly directed to ad-hoc networks. *See, e.g.*, Ex. 1005, 7:7–11, Fig. 3 (including gateway mobile phone in discussion of described "ad-hoc network").

Accordingly, based on the arguments before us, we determine that an ordinarily skilled artisan's understanding of Marchand would not have been limited by IXI's sub-piconet theory in the way suggested by IXI. Therefore, we determine that Marchand would have informed an ordinarily skilled artisan that the "service repository software component" may be disposed in the "first wireless device."

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[4] Petitioner makes this point citing a reference that is subject to IXI's motion to exclude, *see* Pet. Reply 11–12 (citing Ex. 1016), but the same point is supported by the JINI Spec.

b. Marchand's Teachings on a Network Address Translator

IXI also disputes that Marchand teaches a "network address translator software component" located on mobile phone 33, as required by claim 1. PO Resp. 37. In particular, IXI contends that "Marchand discloses that an API should be used to translate between a public IP address and a private IP address." *Id.* (citing Ex. 1005, 11:17–12:3; 15:29–31). IXI cites Marchand's claim 7, which recites the "JINI call control API includes means for deconflicting public and private IP addresses when devices in the ad-hoc network are utilizing real-time applications over the wireless IP network." *Id.* (quoting Ex. 1005, 15:29–31). Dr. Mandayam testifies that an ordinarily skilled artisan "would have understood that the use of an API to translate between public and private addresses is significantly different than using a NAT [network address translator]."[5] Ex. 2301 ¶ 64. IXI further contends Marchand discourages utilizing a NAT in the gateway mobile phone and encourages using an API translator to avoid the problem of IP address mismatch "for real-time applications such as VoIP [Voice over Internet Protocol]." PO Resp. 39 (quoting Ex. 1005, 11:26–12:2; citing Ex. 2301 ¶ 66).

We do not agree with IXI's characterization of Marchand's teachings on address translation, however. As noted by Petitioner, Marchand describes forwarding IP packets received at the gateway mobile phone through a public IP address to a destination device in the piconet having a

[5] Even though both parties reference a network address translator, Marchand actually uses the acronym "NAT" to refer to a "National Access Translator." *See* Ex. 1005, 11:23. Given an opportunity at the oral hearing to explain if there were any meaningful differences in this terminology, IXI's counsel did not offer any. *See* Tr. 36:11–37:8.

private IP address, and vice versa. Pet. 24 (citing Ex. 1003 ¶ 27; Ex. 1005, 7:14–17, 10:31–11:2). In addition, Dr. Mandayam testifies that address translation is done at the gateway in Marchand. Pet. Reply 13 (citing Ex. 1018, 147:5–7, 152:25–153:1). Accordingly, and regardless of whether this address translation is performed by a NAT or an API translator, Marchand teaches a network address translator software component located on the gateway mobile phone. *See* Pet. Reply 14–15. Furthermore, we agree with Petitioner that the use of an API translator for certain real-time applications would have been viewed as "as a supplement to NAT [and] not a substitute for NAT." Pet. Reply 14 (citing Ex. 1003 ¶ 27). For these reasons, Petitioner has established that Marchand teaches a "network address translator software component."

c. Rationale for Modifying Marchand in View of Vilander and Nurmann

IXI disputes Petitioner's contention that, in view of Vilander, an ordinarily skilled artisan "would have modified Marchand's system such that the public IP address of the mobile phone gateway 33 was provided by the cellular network 35." PO Resp. 40 (quoting Pet. 17–18). IXI argues that Marchand and Vilander do not indicate a need for the cellular network to provide a public IP address for the gateway mobile phone. *Id.* (citing Ex. 2301 ¶ 70). Nevertheless, we agree with Petitioner that "using Vilander's address allocation in Marchand would have amounted to nothing more than the use of a known technique to improve similar devices in the same way or the combination of prior art elements according to known methods to yield predictable results." Pet. Reply 15 (citing, *inter alia*, *KSR v. Teleflex*, 550 U.S. 398, 417 (2007)); *see also* Pet. 19 (citing same).

Although Marchand describes gateway mobile phone as having "a public IP address recognized in the wireless IP network," Marchand does not explicitly describe how the public IP address is assigned. Pet. Reply 16 (quoting Ex. 1005, 4:23–30). In light of this, Petitioner identifies evidence that Vilander's GGSN would have improved Marchand by allocating the public IP address to Marchand's gateway mobile phone 33. Pet. 18 (citing Ex. 1003 ¶ 46; Ex. 1011, 1:48–52, 1:57–59).

IXI likewise disputes Petitioner's contention that, in view of Nurmann, an ordinarily skilled artisan "would have modified [Marchand's] mobile gateway 33 such that the mobile gateway provides the private IP addresses to the devices on the network 30." PO Resp. 40 (quoting Pet. 18). According to IXI, a person of ordinary skill in the art "would have understood that the master device, containing the JINI LUS, . . . provide[s] the private IP addresses," so that person "would not have been motivated to require a slave device [i.e., the mobile gateway] in the network to assign private IP addresses." PO Resp. 40 (citing Ex. 2201 [sic, 2301] ¶ 71). For the same reasons expressed above, however, we determine that an ordinarily skilled artisan would not have read Marchand to preclude the gateway from being a master device with a LUS. *See supra* § II.A.4.a.

d. Secondary Considerations of Nonobviousness

IXI did not put forth any evidence of secondary considerations of nonobviousness.

e. Conclusion Regarding Claim 1

Based on all of the evidence of record, we determine, by a preponderance of the evidence, that the subject matter of claim 1 would have

been obvious over the combination of Marchand, Vilander, and Nurmann under 35 U.S.C. § 103(a).

7. Claims 4, 7, and 14

Claim 4 depends from claim 1 and recites "the service repository software component identifies whether the service is available at a particular time." Ex. 1001, 16:4–6. Building on Petitioner's analysis for claim 1, in which Marchand's LUS corresponds to the recited "service repository software component," Petitioner contends "Marchand teaches that '[t]he LUS contains a list of *available* services provided by other devices on the network.'" Pet. 29 (quoting Ex. 1005, 3:11–12) (emphasis added by Petitioner).

Claim 7 depends from claim 1 and recites "the second wireless device is a thin terminal." Ex. 1001, 16:14–15. Mirroring its unpatentability contentions for claim 1, Petitioner maps Marchand's printer 32 to the recited "second wireless device" that is a "thin terminal." Pet. 30–31 (citing, *inter alia*, Ex. 1005, 7:9–11). As stated above, we determine a printer is a type of "thin terminal." *See supra* § I.F.

Claim 14 depends from claim 1 and recites "the second wireless device includes an application software component that registers an availability of the service with the service repository software component." Ex. 1001, 16:34–36. Petitioner cites Marchand for teaching that "[o]ther devices (e.g., printer 32) on [Marchand's] ad-hoc Bluetooth Piconet network 30 may use their respective Java and JINI layers 19 and 20 to discover, join, and download services 22 from [the] JINI LUS." Pet. 31–32 (citing Ex. 1005, 6:19–22, 7:23–25, 8:11–28) (internal quotation omitted). Petitioner contends an ordinarily skilled artisan "would [have] underst[ood]

that one or more software elements, such as Marchand's Java technology layer 19, JINI technology layer 20, and any other application (e.g., application 21) in a network 30 device . . . help [to] implement registration of an availability of a service with the LUS." *Id.* at 32; Ex. 1003 ¶¶ 28, 32.

Therefore, having considered Petitioner's unpatentability contentions and supporting evidence, we are persuaded that Petitioner presents sufficient evidence to support a finding that these prior art references teach the claimed subject matter recited in claims 4, 7, and 14. For the same reasons as above with respect to claim 1, we also are satisfied that Petitioner has presented sufficient reasons for the combination, as supported by Dr. Kiaei's testimony. *See* Pet. 17–20; Ex. 1003 ¶¶ 46–51. Furthermore, regarding claims 4 and 14, IXI relies on its same arguments from claim 1 (*see* PO Resp. 41), which we do not find persuasive for the reasons mentioned above. For claim 7, IXI's arguments pertain to claim interpretation of the term "thin terminal," (*see id.* at 42–43), and we already have considered those arguments above. *See supra* § I.F. Therefore, based on the entire record before us, we conclude Petitioner has demonstrated by a preponderance of the evidence that the subject matter of claims 4, 7, and 14 would have been obvious over the combination of Marchand, Vilander, and Nurmann.

B. Obviousness Ground Based on Marchand, Nurmann, Vilander, and RFC 2543

Petitioner contends claim 5 would have been obvious over the combination of Marchand, Nurmann, Vilander, and RFC 2543. Pet. 32–35. IXI disputes Petitioner's contention. PO Resp. 43–45.

1. RFC 2543

RFC 2543 is an Internet standards document related to Session Initiation Protocol (SIP), which is "an application-layer control (signaling) protocol for creating, modifying and terminating sessions with one or more participants." Ex. 1007, 1. An SIP-capable "client queries the DNS [Domain Naming Service] server for address records for the host portion of the Request-URI [Uniform Resource Identifier]." *Id.* at 13. Such a client "MAY cache a successful DNS query result." *Id.*

2. Claim 5

Claim 5 depends from claim 1 and recites "the software component includes a domain naming service ('DNS') software component to translate between a human readable name and a second Internet Protocol ('IP') address." Ex. 1001, 16:7–10. Petitioner cites RFC 2543's teachings regarding a client querying a DNS server to obtain and cache an IP address corresponding to a human-readable name, such as "company.com." Pet. 33 (citing Ex. 1003 ¶¶ 54–55; Ex. 1007, 13, 146). Petitioner proposes adding "RFC 2543's disclosure of DNS query and response . . . with Marchand's SIP client in the combination of Marchand, Nurmann, and Vilander to implement full SIP capabilities (e.g., DNS) in Marchand's SIP client and comply with SIP standards." *Id.* at 34 (citing Ex. 1003 ¶ 57). According to Petitioner, this would be useful when a device in Marchand's piconet requests "access to the Internet (e.g., a web page, online call)." *Id.* at 33–34 (citing Ex. 1003 ¶ 56).

Supported by Dr. Mandayam's testimony, IXI argues that devices on Marchand's piconet access the cellular network through a call control client, and Marchand does not teach that the client provides access to a webpage.

Id. at 44–45; Ex. 2301 ¶¶ 74–75.[6] IXI further notes that "Marchand does not teach that the devices in the Bluetooth piconet have human-readable names." *Id.* at 45 (drawing a contrast with Ex. 1001, 8:25–29). IXI also argues an ordinarily skilled artisan would not have been motivated to add such unnecessary functions. *Id.*

As noted by Petitioner, however, Marchand's gateway mobile phone includes a second interface/API, depicted as SIP client 42 in Figure 4, which enables the use of the full SIP client capabilities. Pet. 33; Pet. Reply 20 (both citing Ex. 1003 ¶ 54; Ex. 1005, 8:5–7, 9:20–30). In light of this teaching, we are persuaded that an ordinarily skilled artisan would have known to implement RFC 2543's disclosure of DNS query, response, and caching in Marchand's SIP client 42. *See* Ex. 1003 ¶¶ 54, 57. We further agree with Petitioner that this amounts to using a known technique to improve similar devices in the same way to yield predictable results. *See* Pet. 34; Pet. Reply 21 (both citing *KSR*, 550 U.S. at 417).

For these reasons, we are satisfied that Petitioner has presented sufficient reasons for the combination of Marchand, Nurmann, Vilander, and RFC 2543. We also are persuaded that Petitioner presents sufficient evidence to support a finding that RFC 2543 teaches the additional limitation recited in claim 5. Finally, to the extent IXI again relies on its arguments for claim 1 (*see* PO Resp. 44), we do not find them persuasive for the same reasons mentioned above. Accordingly, based on the complete trial record, we conclude Petitioner has demonstrated by a preponderance of the evidence

[6] Although IXI cites paragraphs 75–76 of Dr. Mandayam's declaration, the context makes clear that IXI intended to cite paragraphs 74–75.

that the subject matter of claim 5 would have been obvious over the combination of Marchand, Vilander, Nurmann, and RFC 2543.

C. *Obviousness Ground Based on Marchand, Nurmann, Vilander, and Larsson*

Petitioner contends claims 6 and 23 would have been obvious over the combination of Marchand, Nurmann, Vilander, and Larsson. Pet. 35–39. IXI disputes Petitioner's contention. PO Resp. 46–48.

1. Larsson

Larsson "relates to WAP [Wireless Application Protocol] sessions between a mobile terminal and a WAP gateway, and more particularly, to the organization of protocol layers in a WAP gateway." Ex. 1008, 1:25–27. Figure 1 of Larsson is reproduced below:

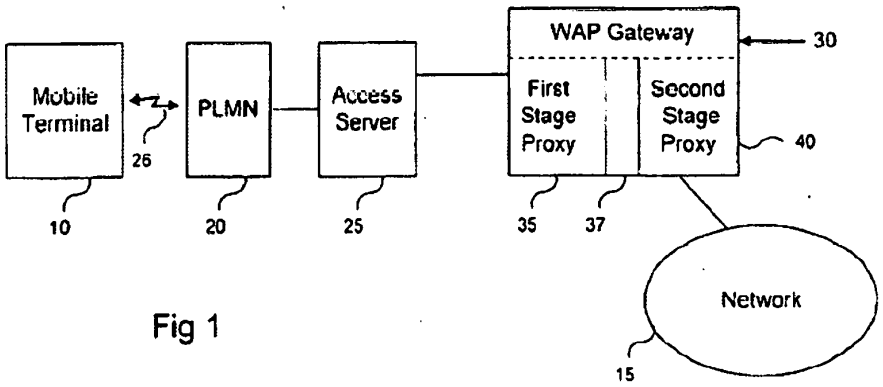

Fig 1

Figure 1 illustrates mobile terminal 10, i.e., "a portable laptop computer, personal digital assistant (PDA), mobile telephone, pager, etc.," accessing private network 15 via WAP gateway 30. *Id.* at 2:31–46. Private network 15 may be a corporate network or a virtual private network (VPN). *Id.* at 2:47–55. The mobile terminal 10 obtains access to access server 25 via wireless link 26 to Public Land Mobile Network (PLMN) 20. *Id.* at 2:40–

44. The WAP gateway 30 includes first stage proxy 35 and second stage proxy 40, which are "functionally separated" by firewall 37. *Id.* at 2:62–64, 3:1–7.

2. Claims 6 and 23

Claim 6 depends from claim 1 and recites "the software component includes a security software component to control access between the cellular network and the first wireless device." Ex. 1001, 16:11–13. Petitioner proposes adding Larsson to the combination of Marchand, Nurmann, and Vilander for teaching the security software component. Pet. 37. Petitioner contends an ordinarily skilled artisan would have "include[d] security software components such as Larsson's firewall 37, first stage proxy 35, and second stage proxy 40 in Marchand's mobile phone gateway 33 which is situated between two networks (e.g., Marchand's cellular network 35 and ad-hoc Bluetooth Piconet network 30)." *Id.* (citing Ex. 1003 ¶ 61). Petitioner also contends an ordinarily skilled artisan would have been motivated to add Larsson's firewall 37, first stage proxy 35, and second stage proxy 40 in Marchand's gateway 33 to provide secure access to Marchand's piconet from the cellular network. *Id.* (citing Ex. 1003 ¶ 62). According to Petitioner, this would result in more efficient authentication because such authentication need only be performed once at the time of the first network access request. *Id.* at 37–38 (citing Ex. 1003 ¶ 62; Ex. 1008, 2:8–15).

IXI contends Larsson does not teach "that the WAP gateway can be incorporated in the mobile terminal 10 or even that the WAP gateway is on a local area network with mobile terminal 10." PO Resp. 48 (citing Ex. 2201 ¶ 78). We agree with Petitioner, however, that Petitioner's proposed

combination seeks to add Larsson's security components to Marchand's gateway mobile phone, not Larsson's own mobile terminal 10. *See* Pet. Reply 22. As such, IXI misapprehends the proposed combination. Furthermore, we are persuaded by Petitioner's showing that Larsson and Marchand both involve a gateway situated between two networks such that an ordinarily skilled artisan would have known to apply Larsson's security features to Marchand's similar topology. *See* Pet. 37 (citing Ex. 1003 ¶ 61); Pet. Reply 23 (citing Ex. 1003 ¶¶ 58–61; Ex. 1008, 1:8, 1:67–2:1, 2:30–54, Fig. 1). We are further persuaded by Petitioner's contention that an ordinarily skilled artisan would have been motivated by the efficiency gained through performing authentication only once at the time of the first request for network access. *See* Pet. 37–38 (citing Ex. 1003 ¶ 62; Ex. 1008, 2:8–15).

Claim 23 depends from claim 1 and recites "the first wireless device further includes a virtual private network ('VPN') software component." Ex. 1001, 16:59–61. Regarding the recited VPN, Petitioner contends the asserted 4-way obviousness combination "discloses a second stage proxy that resides within the VPN side of a firewall in a gateway cellular phone, and authenticates access requests from users." Pet. 39 (citing Ex. 1003 ¶ 59; Ex. 1008, 3:1–7; 4:13–22. This is supported by Larsson's teachings on private network 15 potentially being a VPN; because the second stage proxy interacts with the VPN, the second stage proxy acts as the recited "virtual private network . . . software component." *See* 1003 ¶¶ 58–59; Ex. 1008, 2:47–55, Fig. 1.

Finally, to the extent IXI relies on the same arguments from claim 1 relative to claims 6 and 23 (PO Resp. 46), we find them unpersuasive for the same reasons mentioned above.

Accordingly, we are persuaded that Petitioner presents sufficient evidence to support a finding that the combination of Marchand, Nurmann, Vilander, and Larsson teaches the subject matter recited in claims 6 and 23 (*see* Pet. 38–39), and that there are sufficient reasons for the combination (*see id.* at 37–38). Therefore, based on the entire record before us, we conclude Petitioner has demonstrated by a preponderance of the evidence that the subject matter of claims 6 and 23 would have been obvious over the combination of Marchand, Nurmann, Vilander, and Larsson.

D. Obviousness Ground Based on Marchand, Nurmann, Vilander, and JINI Spec.

Petitioner contends claims 12, 15, 22, 34, 39, 40, 42, and 46 would have been obvious over the combination of Marchand, Nurmann, Vilander, and JINI Spec. Pet. 39–55. IXI disputes Petitioner's contention. PO Resp. 48–56

1. JINI Spec.

The JINI Spec. is a textbook directed to the Jini architecture, which is "designed for deploying and using services in a network." Ex. 1009, xix. The JINI Spec. teaches a process by which a Lookup Service (LUS) is used to register proxy objects associated with available services. *Id.* at 5–12. A client wishing to use a service loads an appropriate proxy object from the LUS and executes the proxy object to access the service. *Id.* at 72–75; *see also* Ex. 1003 ¶¶ 63, 69 (explaining the use of proxy objects in the JINI Spec.).

2. Claim 22, 34, and 39

Independent claims 1 and 34 include some limitations that are similar in scope, so the parties' positions relative to claim 34 are similar to those in claim 1. Therefore, we focus on certain differences in the analyses between claims 1 and 34.

Petitioner maps Marchand's gateway mobile phone 33 to the recited "handheld device" of claim 34, and Petitioner maps Marchand's Bluetooth piconet to the recited "short distance wireless network." Pet. 44 (citing Ex. 1003 ¶¶ 24–26; Ex. 1005, 4:21–23, 6:16–29, 7:18–23, 8:11). For the recited "storage device," Petitioner cites Marchand's description of programming interfaces and protocol stack layers and contends that an ordinarily skilled artisan would have understood that a storage device would have been necessary to store software associated with these features in Marchand's gateway mobile phone. *Id.* at 45 (citing Ex. 1003 ¶¶ 33–36; Ex. 1005, 6:16–29). Petitioner likewise contends an ordinarily skilled artisan would have appreciated that software in the gateway, including software for "implement[ing] routing and communication over the cellular and local wireless networks," would require execution by a processor coupled to the storage device. *Id.* at 45–46 (citing Ex. 1003 ¶¶ 34–36; Ex. 1005, 2:14–16, 2:27–31, 6:18–20, 6:27–30).

Regarding claim 34's recitations on providing an IP data packet to a terminal and translating between first and second IP addresses, Petitioner cites Marchand's description of receiving IP data packets from a public IP network at the gateway and forwarding them to other devices in the Bluetooth piconet. *Id.* at 24–25, 46–48 (citing Ex. 1003 ¶ 27; Ex. 1005, 7:14–17, 10:31–11:2). For "control[ling] access" between the networks, Petitioner cites this same teaching on IP data packets and also cites

Marchand's description of the gateway functioning as "a call-control server for client devices in the ad-hoc network, and . . . as a call-control client for a server in the wireless IP network." *Id.* (citing Ex. 1003 ¶¶ 24, 25, 58–62; Ex. 1005, 4:23–27, 7:12–14). For enumerating and searching a list of services, Petitioner cites Marchand's teachings on listing services in a JINI LUS and on allowing devices to discover, join, and download services from the LUS. *Id.* at 48–49 (citing Ex. 1003 ¶¶ 28, 32; Ex. 1005, 6:19–22, 7:9–25, 8:11–28, 11:12–14). Petitioner also cites the JINI Spec. for teaching that the LUS can provide a proxy object to a requesting device so that the device may access the requested service. *Id.* (citing, *inter alia*, Ex. 1003 ¶¶ 38, 63, 68; Ex. 1009, 4–11, 72–75). Thus, Petitioner has established that Marchand, Vilander, Nurmann, and JINI Spec. teach every limitation of claim 34.

Claim 39 depends from claim 34 and recites "the search includes searching the list of services by class, attribute or instance." Ex. 1001, 18:3–4. Citing the JINI Spec., Petitioner contends "a JINI LUS stores information about a service's ID, its class or type, and its attributes," all of which can be searched. Pet. 50 (citing Ex. 1003 ¶ 64; Ex. 1009, 9–11, 16–20, 73, 77–79, 217–230). Claim 22 depends from claim 1 and contains a similar limitation; Petitioner's analysis is nearly identical to that of claim 39. *See id.* at 43–44. Petitioner, therefore, has established that the combination of Marchand, Nurmann, Vilander, and JINI Spec. teaches the additional limitations in claims 22 and 39.

Building on its reasons for combining Marchand, Nurmann, and Vilander, Petitioner contends an ordinarily skilled artisan would have combined the JINI Spec. with these references "to fully implement and realize JINI technology in Marchand's ad-hoc Bluetooth Piconet network 30." *Id.* at 42 (citing Ex. 1003 ¶ 70). According to Petitioner, this would

allow each device in Marchand's piconet "to register, search for, and execute services in the [piconet] according to the JINI Spec." *Id.* (citing Ex. 1003 ¶ 70). We agree with Petitioner that this amounts to nothing more than the use of a known technique to improve similar devices in the same way or the combination of prior art elements according to known methods to yield predictable results. *Id.* (citing *KSR*, 550 U.S. at 417). As such, Petitioner has established that a person of ordinary skill in the art would have had reason to combine the teachings of Marchand, Vilander, Nurmann, and JINI Spec. to achieve the system recited in claim 34.

With respect to claims 34 and 39, IXI argues Marchand cannot teach the recited enumerated list of services operative in the software component of the handheld device's processor because Marchand's LUS cannot be in gateway mobile phone 33. PO Resp. 53–54. IXI's reasoning behind this argument is the same as for the argument it made for claim 1. *See id.* Therefore, for the same reasons mentioned above with respect to claim 1, we are not persuaded by this argument. We also are unpersuaded by IXI's arguments for claim 22, which recapitulate arguments it made for claim 1. *See id.* at 52.

Accordingly, based on the entire trial record, we conclude Petitioner has demonstrated by a preponderance of the evidence that the subject matter of claims 22, 34, and 39 would have been obvious over the combination of Marchand, Nurmann, Vilander, and JINI Spec.

3. Claims 42 and 46

Claim 42 is an independent claim that shares many similar limitations to those in independent claim 34. *See* Ex. 1001, 18:14–40. Petitioner's mapping of prior art elements to claim 42 is nearly identical to that of claim

34. *See* Pet. 50–55. In contrast, however, claim 42 recites that the processor of a first handheld device provides short-range radio signals to second and third wireless handheld devices. *See* Ex. 1001, 18:14–40. Petitioner maps Marchand's network devices, such as a laptop computer, a printer, or a PDA, to the second and third wireless handheld devices. Pet. 52 (citing Ex. 1003 ¶¶ 25, 26; Ex. 1005, 6:23–27, 7:9–11, 10:18–21). In support of its mapping, Petitioner notes that non-asserted claim 45 from the '033 patent indicates that "a laptop computer [and] a personal digital assistant" are wireless handheld devices. *Id.* (citing Ex. 1001, 18:50-54). Petitioner also references the '033 patent's description of a "hand-held" device 350 in Figure 3b, which, in one embodiment, "is one of the terminals 107"; in turn, Petitioner references that a printer is one of the enumerated terminals 107 in the '033 patent. *Id.* at 52 (citing Ex. 1001, 4:17–25, 5:43–46). In light of this, Petitioner contends an ordinarily skilled artisan "would [have] consider[ed] any of Marchand's network 30 devices, such as the laptop computer, printer, or PDA, as corresponding to the second and third wireless handheld devices." Pet. 52 (citing Ex. 1001, 4:17–25; 5:43–46; Ex. 1003 ¶ 26). Petitioner additionally notes that IXI mapped a printer to the "second wireless handheld device" limitation in its infringement contentions from the related district court litigation. *Id.* at 52–53 (citing Ex. 1012, 45; Ex. 1013, 70).

IXI does not dispute Petitioner's evidence showing that an ordinarily skilled artisan would have understood Marchand's laptop computer, printer, and PDA as corresponding to the recited second and third wireless handheld devices. Nor does IXI dispute that Marchand's laptop computer, printer, and PDA are "handheld device[s]" commensurate with claim 42; indeed, IXI does not propose a construction of "handheld." IXI's only argument against

Petitioner's analysis for claim 42 recapitulates its argument from claim 34, namely, that Marchand cannot teach a wireless handheld device that enumerates a list of services because Marchand's LUS cannot be in the gateway mobile phone. PO Resp. 53–55. As stated above, we do not agree that Marchand's teachings on the LUS are so limited. *See supra* § II.A.6.a. Accordingly, we determine that Marchand teaches the recited second and third "wireless handheld device[s]" of claim 42.

Claim 46 depends from claim 42 and further recites "the second wireless handheld device is a thin terminal." Ex. 1001, 18:55–57. As stated above, we determine a printer is a type of "thin terminal" (*see supra* § I.F.), and Petitioner maps Marchand's printer 32 to the second wireless handheld device. Pet. 55. IXI's arguments disputing Petitioner's analysis relate to claim interpretation (*see* PO Resp. 42–43, 56), which we have addressed above.

Therefore, having reviewed Petitioner's unpatentability contentions for claims 42 and 46 (*see id.* at 50–55), we determine Petitioner has established that Marchand, Vilander, Nurmann, and JINI Spec. teach every limitation of these claims. Petitioner's rationale for combining these references is also sufficient for the reasons stated above. Based on the entire trial record, we conclude Petitioner has demonstrated by a preponderance of the evidence that the subject matter of claims 42 and 46 would have been obvious over the combination of Marchand, Nurmann, Vilander, and JINI Spec.

4. Claims 12, 15, and 40

Claim 12 recites "the software component includes a plug and play software component to load and execute software for the second wireless

device." Ex. 1001, 16:27–29. Claim 40 recites "the software component includes a plug and play software component to identify the terminal in the short distance wireless network and obtain the application software component for the terminal." *Id.* at 18:5–9. Petitioner relies on Marchand and JINI Spec., as supported by Dr. Kiaei's testimony, for teaching these limitations. *See* Pet. 39–43, 50. Specifically, Petitioner contends "a network 30 device (e.g., printer 32) registers a service (e.g., printing service) with the JINI LUS in gateway mobile phone 33 by loading a proxy object corresponding to its service onto the JINI LUS." *Id.* at 39–42 (citing Ex. 1003 ¶¶ 63, 67; Ex. 1009, 4–11, 72–73, 217–230). According to Petitioner, when a request for a service is received, the proxy object is loaded and executed to allow access to the service. *Id.* at 41–43 (citing Ex. 1003 ¶¶ 38, 63, 68–69; Ex. 1009, 4–11, 16–20, 73–74, 77–79, 217–230).

As supported by Dr. Mandayam's testimony, IXI contends an ordinarily skilled artisan would not have understood JINI Spec's proxy object that is published to a LUS upon joining a network as constituting a "plug and play software component." PO Resp. 50 (citing Ex. 2301 ¶ 84). Specifically, IXI contends "there is no disclosure of a software component that functions in a 'plug and play' manner." *Id.* IXI explains "the LUS does not *determine*, *find*, or otherwise *resolve* the software necessary to support the joining terminal, consistent with the plain and ordinary meaning of the term 'plug and play' and the specification of the -033 Patent." *Id.* at 50–51 (citing Ex. 2301 ¶ 84).

Yet the JINI Spec. describes the concept of "[n]etwork plug-and-work" as being a goal of the JINI architecture: "You should be able to plug a service into the network and have it be visible and available to those who want to use it. Plugging something into a network should be all or almost all

you need to do to deploy the service." Ex. 1009, 4. This is commensurate with the recited "plug and play" concept recited in claims 12 and 40. The JINI Spec. also describes downloading of code for a proxy object and "invoking methods on the proxy object" in response to a request for a service. *Id.* at 5–7, 9–10. This is commensurate with the recited "load[ing] and execut[ing]" of software in claim 12 and "obtain[ing] the application software component" in claim 40. We additionally agree with Petitioner (Pet. Reply 23–24) that certain of IXI's arguments turn on features not appearing in the claims, such as "determin[ing], find[ing], or otherwise resolv[ing] the software." *See* PO Resp. 50–51. These arguments are not persuasive.

Petitioner's obviousness analysis for claim 15 is similar to that for claim 12, and it likewise establishes that the asserted obviousness combination teaches the additional limitation in claim 15. *See* Pet. 43 (citing Ex. 1003 ¶¶ 38, 63, 67). Regarding claim 15, IXI again relies on its arguments for claim 1 (*see* PO Resp. 52), which are not persuasive for the same reasons mentioned above.

Based on all of the evidence of record, we determine, by a preponderance of the evidence, that the subject matter of claims 12, 15, and 40 would have been obvious over the combination of Marchand, Vilander, Nurmann, and JINI Spec. under 35 U.S.C. § 103(a).

E. Obviousness Ground Based on Marchand, Larsson, and JINI Spec.

Petitioner contends claims 25 and 28 would have been obvious over the combination of Marchand, Larsson, and JINI Spec. Pet. 55–60. IXI disputes Petitioner's contention. PO Resp. 56–57.

Petitioner's analysis for independent claim 25 incorporates elements of the analysis above for independent claim 34 and for dependent claim 6. In particular, Petitioner cites Marchand for teaching the basic Bluetooth system architecture, the transfer of IP data packets, and the use of a JINI LUS. Pet. 56–59. Petitioner cites Larsson for teaching the recited "security software component." *Id.* at 58–59. Petitioner cites the JINI Spec. for teaching details on registering and listing services with a LUS and using proxy objects to implement services. *Id.* at 59.

For claim 28, which depends from claim 25, Petitioner relies on the same analysis for claim 23, in which Petitioner cites Larsson for teaching staged proxies that are used with a VPN. *See id.* at 39, 60; *supra* § II.C.2.

Thus, for the same reasons discussed above, Petitioner establishes that the combination of Marchand, Larsson, and JINI Spec. teaches the subject matter recited in claims 25 and 28. Petitioner also presents sufficient reasons for combining Marchand, Larsson, and JINI Spec. that mirror those given with respect to other grounds discussed above. Pet. 56; *see supra* §§ II.C.2., II.D.2.

IXI again contends Marchand does not teach or suggest locating the JINI LUS and its service searching capabilities (i.e., the "service repository software component") on mobile phone 33, which corresponds to the recited "second wireless device" in claim 25. PO Resp. 57. For the same reasons discussed above, however, we are not persuaded by this argument.

Accordingly, based on the entire trial record, we conclude Petitioner has demonstrated by a preponderance of the evidence that the subject matter of claims 25 and 28 would have been obvious over the combination of Marchand, Larsson, and JINI Spec.

F. Testimony of Dr. Kiaei

IXI argues that "Dr. Kiaei's opinions are unreliable because they misunderstand and mischaracterize the inner workings of Marchand's network and devices." PO Resp. 12. Dr. Kiaei's "opinions regarding Bluetooth, the proposed modifications of Marchand, and the purported motivations for modifying Marchand should be entitled to little weight, if any," IXI argues, because of "Dr. Kiaei's lack of understanding Bluetooth and failure to consider the implications of Marchand's reliance on Bluetooth with respect to the proposed combinations." *Id.* at 15. IXI's arguments are rooted in IXI's sub-piconet theory discussed above. *See supra* § II.A.6.a.

Petitioner replies that the "portion of Marchand relied upon in the Petition does not rely on a device being connected in more than one piconet." Pet. Reply 25. Thus, IXI's sub-piconet theory is supported by hypothetical drawings and testimony of Dr. Mandayam, not by Marchand, according to Petitioner. *Id.* Moreover, Dr. Kiaei testified that the question of whether a device could be connected in more than one piconet was a hypothetical question that he could not answer without more information because it was outside of the scope of what he considered. *See id.* at 24–25 (quoting Ex. 2302, 98:2–3, 98:22–99:9). In sum, Petitioner argues that IXI's "attack on Dr. Kiaei's credibility is misguided and [is] not germane to any substantive issues involved in this proceeding." *Id.* at 25.

We have the discretion to determine the appropriate weight to be accorded to the evidence presented, including opinion testimony, based on the disclosure of the underlying facts or data upon which the opinion is based. *See, e.g., Yorkey v. Diab*, 601 F.3d 1279, 1284 (Fed. Cir. 2010) (holding the Board has discretion to credit one witness's testimony over another "unless no reasonable trier of fact could have done so"). In this

instance, we are not persuaded by IXI's arguments that Dr. Kiaei's testimony as a whole should be given "little weight, if any." Specifically, we have considered IXI's and Dr. Mandayam's sub-piconet theory in detail, and we determine that it would not have limited an ordinarily skilled artisan's understanding of Marchand. *See supra* § II.A.6.a. Thus, we accord an appropriate weight to Dr. Kiaei's testimony as indicated in this Decision.

G. Motion to Exclude

IXI moves to exclude Exhibits 1002, 1014, and 1015 on the basis of relevance "because they are not referenced or explained at all in the Petition or the Reply." Paper 21, 10–11. In its Opposition, Petitioner contends Dr. Kiaei referenced these exhibits in his declaration. Paper 24, 2–3 (citing Ex. 1003 ¶¶ 35, 36, 42, 60). Because Dr. Kiaei relies on these exhibits in support of his testimony in this case, IXI has not shown that they are irrelevant under FRE 401 and 402. Accordingly, we deny IXI's motion to exclude Exhibits 1002, 1014, and 1015.

IXI also moves to exclude Exhibits 1016 and 1017 on the basis of relevance, hearsay, and authenticity. Paper 21, 5–9. IXI further contends Exhibits 1016 and 1017 constitute improper supplemental information that was submitted without authorization pursuant to 37 C.F.R. § 42.123. *Id.* at 2–5. Because we do not rely upon Exhibits 1016 and 1017 in rendering this Decision, we dismiss as moot IXI's motion to exclude these exhibits.

III. CONCLUSION

Petitioner has demonstrated, by a preponderance of the evidence, that

(a) claims 1, 4, 7, and 14 are unpatentable over Marchand, Nurmann, and Vilander under 35 U.S.C. § 103(a);

(b) claim 5 is unpatentable over Marchand, Nurmann, Vilander, and RFC 2543 under 35 U.S.C. § 103(a);

(c) claims 6 and 23 are unpatentable over Marchand, Nurmann, Vilander, and Larsson under 35 U.S.C. § 103(a);

(d) claims 12, 15, 22, 34, 39, 40, 42, and 46 are unpatentable over Marchand, Nurmann, Vilander, and JINI Spec. under 35 U.S.C. § 103(a); and

(e) claims 25 and 28 are unpatentable over Marchand, Larsson, and JINI Spec. under 35 U.S.C. § 103(a).

IV. ORDER

In consideration of the foregoing, it is

ORDERED that claims 1, 4–7, 12, 14, 15, 22, 23, 25, 28, 34, 39, 40, 42, and 46 of the '033 patent are held unpatentable;

FURTHER ORDERED that IXI's motion to exclude Exhibits 1002, 1014, and 1015 is *denied*;

FURTHER ORDERED that IXI's motion to exclude Exhibits 1016 and 1017 is *dismissed as moot*; and

FURTHER ORDERED that because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

IPR2015-01444
Patent 7,039,033 B2

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CERTIFICATE OF SERVICE

I, Katherine R. Lundie, hereby certify that on February 21, 2017 true and correct copies of the foregoing document were served upon the following parties as indicated below:

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Paper No. 27
Entered: December 21, 2016

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD.,
SAMSUNG ELECTRONICS AMERICA, INC., and APPLE INC.,
Petitioner,

v.

IXI IP, LLC,
Patent Owner.

Case IPR2015-01444
Patent 7,039,033 B2

Before KRISTINA M. KALAN, ROBERT J. WEINSCHENK, and JOHN A. HUDALLA, *Administrative Patent Judges*.

HUDALLA, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

Samsung Electronics Co., Ltd., Samsung Electronics America, Inc., and Apple Inc. (collectively "Petitioner") filed a Petition ("Pet.") (Paper 2) to institute an *inter partes* review of claims 1, 4–7, 12, 14, 15, 22, 23, 25, 28, 34, 39, 40, 42, and 46 of U.S. Patent No. 7,039,033 B2 ("the '033 patent")

(Ex. 1001) pursuant to 35 U.S.C. §§ 311–319. Patent Owner, IXI IP, LLC ("IXI"), filed a Preliminary Response ("Prelim. Resp.") (Paper 6) to the Petition. Taking into account the arguments presented in IXI's Preliminary Response, we determined that the information presented in the Petition established that there is a reasonable likelihood that Petitioner would prevail in challenging claims 1, 4–7, 12, 14, 15, 22, 23, 25, 28, 34, 39, 40, 42, and 46 of the '033 patent under 35 U.S.C. § 103(a). Pursuant to 35 U.S.C. § 314, we instituted this proceeding on December 30, 2015, as to these claims of the '033 patent. Paper 7 ("Dec. on Inst.").

During the course of trial, IXI filed a Patent Owner Response (Paper 14, "PO Resp."), and Petitioner filed a Reply to the Patent Owner Response (Paper 18, "Pet. Reply"). An oral hearing was held on September 15, 2016, and a transcript of the hearing is included in the record. Paper 26 ("Tr.").

Petitioner proffered a Declaration of Dr. Sayfe Kiaei (Ex. 1003) with its Petition, and IXI proffered a Declaration of Dr. Narayan Mandayam (Ex. 2301) with its Response. The parties also filed transcripts of the depositions of Dr. Kiaei (Exs. 2303–2305) and Dr. Mandayam (Exs. 1018, 1019)

IXI filed a Motion to Exclude (Paper 21) certain exhibits submitted by Petitioner. Petitioner filed an Opposition (Paper 24) and IXI filed a Reply (Paper 25).

We have jurisdiction under 35 U.S.C. § 6. This decision is a Final Written Decision under 35 U.S.C. § 318(a) as to the patentability of claims 1, 4–7, 12, 14, 15, 22, 23, 25, 28, 34, 39, 40, 42, and 46 of the '033 patent. For the reasons discussed below, Petitioner has demonstrated by a preponderance of the evidence that these claims are unpatentable under § 103(a).

I. BACKGROUND

A. Related Proceedings

The parties identify the following proceedings related to the '033 patent: *IXI Mobile (R&D) Ltd. v. Samsung Electronics Co.*, Case No. 3:15-cv-03752-HSG (N.D. Cal.); *IXI Mobile (R&D) Ltd. v. Apple, Inc.*, Case No. 4:15-cv-03755-PJH (N.D. Cal.); and *IXI Mobile (R&D) Ltd. v. Blackberry Ltd.*, Case No. 3:15-cv-03754-RS (N.D. Cal.). Pet. 1–2; Paper 5, 1–2; Paper 7, 1–2.

B. The '033 Patent

The '033 patent issued from an application filed on May 7, 2001. Ex. 1001, at [22]. The '033 patent is directed to "a system that accesses information from a wide area network ('WAN'), such as the Internet, and local wireless devices in response to short-range radio signals." *Id.* at 4:8–11. Figure 1 of the '033 patent is reproduced below:

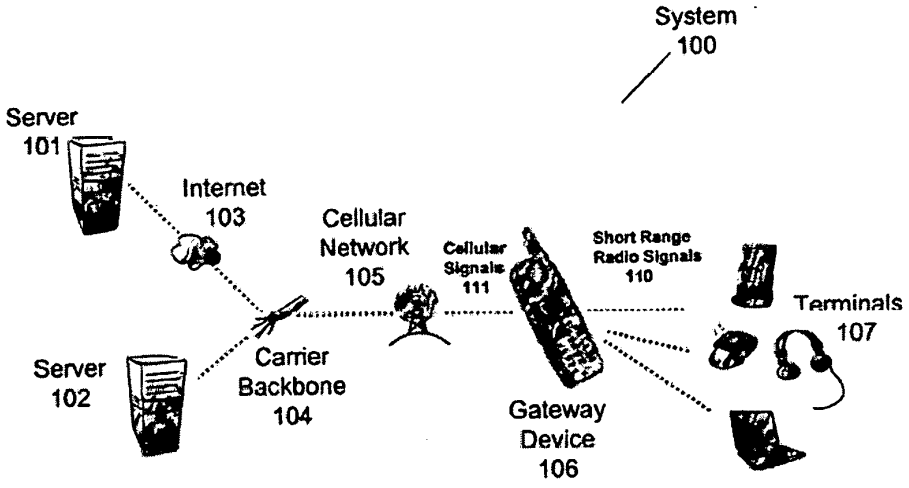

Fig. 1

Figure 1 illustrates an exemplary system 100 having a personal area network (PAN) and a wide area network. *Id.* at 4:8–19. The PAN is made up of gateway device 106 and one or more terminals 107, such as, for example, a laptop computer, a personal digital assistant (PDA), or a printer. *Id.* at 4:17–25. Gateway device 106 is coupled to cellular network 105, which in turn connects to Internet 103 through carrier backbone 104. *Id.* at 4:36–39, 49–55.

Software architecture 400 for gateway device 106 may include network management software 404 including, *inter alia,* PAN application server 404a. *Id.* at 5:61–6:5, 6:36–42; 6:58–63, Figs. 4, 5a. In turn, PAN application server 404a includes service repository software component 704, which "allows applications 406, which run on a gateway device 106 or terminals 107, to discover what services are offered by a PAN, and to determine the characteristics of the available services." *Id.* at 10:1–9, 12:9–14, Fig. 7; *see also id.* at 12:33–67 (enumerating the many functions of service repository software component 704).

C. Illustrative Claim

Claims 1, 25, 34, and 42 of the '033 patent are independent. Claims 4–7, 12, 14, 15, 22, and 23 depend from claim 1; claim 28 depends from claim 25; claims 39 and 40 depend from claim 34; and claim 46 depends from claim 42. Independent claim 1 is illustrative of the challenged claims and is reproduced below:

> 1. A system for providing access to the Internet, comprising:
>
> a first wireless device, in a short distance wireless network, having a software component to access information from the Internet by communicating with a cellular network in response to a first short-range radio signal, wherein the first

wireless device communicates with the cellular network and receives the first short-range radio signal; and,

a second wireless device, in the short distance wireless network, to provide the first short-range radio signal,

wherein the software component includes a network address translator software component to translate between a first Internet Protocol ("IP") address provided to the first wireless device from the cellular network and a second address for the second wireless device provided by the first wireless device,

wherein the software component includes a service repository software component to identify a service provided by the second wireless device.

Ex. 1001, 15:40–59.

D. The Prior Art

Petitioner relies on the following prior art:

PCT Publication No. WO 01/76154 A2 to Marchand, published Oct. 11, 2001 (Ex. 1005, "Marchand"), which claims priority to U.S. Application No. 09/541,529, filed Apr. 3, 2000 (Ex. 1006, "Marchand Priority");

Handley et al., *Request For Comments 2543 SIP: Session Initiation Protocol*, THE INTERNET SOCIETY, March 1999 (Ex. 1007, "RFC 2543");

U.S. Patent No. 6,836,474 B1 to Larsson, filed Aug. 31, 2000, issued Dec. 28, 2004 (Ex. 1008, "Larsson");

K. Arnold et al., *The Jini™ Specification*, Addison-Wesley, June 1, 1999 (Ex. 1009, "JINI Spec.");

U.S. Patent No. 6,560,642 B1 to Nurmann, filed Oct. 23, 1999, issued May 6, 2003 (Ex. 1010, "Nurmann"); and

U.S. Patent No. 6,771,635 B1 to Vilander, filed Mar. 27, 2000, issued Aug. 3, 2004 (Ex. 1011, "Vilander").

E. The Asserted Grounds

We instituted this proceeding on the following grounds of unpatentability (Dec. on Inst. 26):

References	Basis	Claim(s) Challenged
Marchand, Nurmann, and Vilander	35 U.S.C. § 103(a)	1, 4, 7, 14
Marchand, Nurmann, Vilander, and RFC 2543	35 U.S.C. § 103(a)	5
Marchand, Nurmann, Vilander, and Larsson	35 U.S.C. § 103(a)	6, 23
Marchand, Nurmann, Vilander, and JINI Spec.	35 U.S.C. § 103(a)	12, 15, 22, 34, 39, 40, 42, 46
Marchand, Larsson, and JINI Spec.	35 U.S.C. § 103(a)	25, 28

F. Claim Interpretation

In an *inter partes* review, we construe claims by applying the broadest reasonable interpretation in light of the specification. 37 C.F.R. § 42.100(b); *see Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016). Under the broadest reasonable interpretation standard, and absent any special definitions, claim terms are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *See In re Translogic Tech. Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Any special definitions for claim terms or phrases must be set forth "with reasonable clarity, deliberateness, and precision." *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). Only those terms which are in controversy need be construed, and only to the extent

necessary to resolve the controversy. *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

In our Decision on Institution, we determined that no claim terms required construction. Dec. on Inst. 6–7. Based on our review of the complete record, we maintain our determination that no constructions are necessary, with the exception of the term "thin terminal" in claims 7 and 46.

The parties' arguments require us to consider whether a printer is commensurate with the broadest reasonable interpretation of "thin terminal." *See* Pet. 30–31; PO Resp. 42–43; Pet. Reply 18–20. The '033 patent describes "thin terminals" as having "a relatively low power central processor and operating system" and as being "mainly used as peripherals to an Application server in a PAN." Ex. 1001, 5:2–5. The main tasks of a thin terminal are described as "user interaction, rendering output for a user and providing an Application server with a user's input." *Id.* at 5:5–7. Examples of thin terminals provided in the '033 patent include a watch and a messaging terminal. *Id.* at 5:5–7. Furthermore, the '033 patent contrasts thin terminals with smart terminals having "a relatively powerful central processor, operating system and applications," such as "a computer notebook and PDA." *Id.* at 4:62–5:2. In describing a messaging terminal in one embodiment, the '033 patent states that the terminal "has no embedded application code or data." *Id.* at 10:18–21.

Petitioner contends a printer is a thin terminal because, at least, a printer "has a low power central processor and operating system relative to a laptop computer or PDA." Pet. 31 (citing Ex. 1003 ¶ 25) (internal quotation omitted). We agree with Petitioner, and we additionally observe that a printer is a peripheral utilized for rendering user output, which is consistent with the Specification's description of a thin terminal. We also agree with

Petitioner that the Specification's reference to "no embedded application code or data" (Ex. 1001, 10:18–21) does not preclude a printer with application code and/or data from being a thin terminal, because the '033 patent also describes the thin terminal locating, downloading, and executing software. Pet. 19 (citing Ex. 1001, 10:13–25). As such, we determine the "thin terminal" recited in claims 7 and 46 encompasses a printer.[1]

II. ANALYSIS

A. Obviousness Ground Based on Marchand, Nurmann, and Vilander

Petitioner contends claims 1, 4, 7, and 14 would have been obvious over the combination of Marchand, Nurmann, and Vilander. Pet. 11–29. IXI disputes Petitioner's contention. PO Resp. 16–43.

1. Principles of Law

A claim is unpatentable under 35 U.S.C. § 103(a)[2] if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter

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[1] Although we acknowledge the different standards for claim interpretation before us and before the district courts, IXI's infringement contentions in the co-pending litigation provide additional extrinsic support for our determination. *See* Pet. 31 (citing Ex. 1012, 20, 45; Ex. 1013, 35, 70). In particular, IXI contends that a printer is a type of "thin terminal" in its infringement case. *See id.*

[2] The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) ("AIA"), amended 35 U.S.C. §§ 102 and 103. Because the '033 patent has an effective filing date before the effective date of the applicable AIA amendments, throughout this Decision we refer to the pre-AIA versions of 35 U.S.C. §§ 102 and 103.

pertains. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) where in evidence, so-called secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). We also recognize that prior art references must be "considered together with the knowledge of one of ordinary skill in the pertinent art." *Paulsen*, 30 F.3d at 1480 (citing *In re Samour*, 571 F.2d 559, 562 (CCPA 1978)). We analyze Petitioner's obviousness grounds with the principles identified above in mind.

2. Level of Ordinary Skill in the Art

In determining the level of ordinary skill in the art, various factors may be considered, including the "type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field." *In re GPAC, Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (citing *Custom Accessories, Inc. v. Jeffrey-Allan Indus., Inc.*, 807 F.2d 955, 962 (Fed. Cir. 1986)). In addition, the prior art of record in this proceeding—namely, Marchand, Nurmann, Vilander, RFC 2543, Larsson, and JINI Spec.—is indicative of the level of ordinary skill in the art. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001); *GPAC*, 57 F.3d at 1579; *In re Oelrich*, 579 F.2d 86, 91 (CCPA 1978).

> Petitioner contends a person of ordinary skill in the art would have had a Master[] of Science Degree (or a similar technical Master's Degree, or higher degree) in an academic

> area emphasizing electrical engineering, computer engineering, or computer science with a concentration in communication and networking systems or, alternatively, a Bachelor's Degree (or higher degree) in an academic area emphasizing electrical or computer engineering and having two or more years of experience in communication and networking systems.

Pet. 7–8. Petitioner's contention is supported by the testimony of Dr. Kiaei, who bases his testimony on his "experience working in industry and academia, with undergraduate and postgraduate students, with colleagues from academia, and with engineers practicing in industry." Ex. 1003 ¶¶ 15–16. IXI does not dispute Petitioner's definition of the level of ordinary skill in the art, and, in fact, IXI applies it in IXI's Patent Owner Response. PO Resp. 8; *see also* Ex. 2301 ¶ 16 (IXI's declarant, Dr. Mandayam, applying same definition). Accordingly, we apply Petitioner's definition of the level of ordinary skill in the art for purposes of this Decision. We further observe that Petitioner's proposed definition comports with the qualifications a person would need to understand and implement the teachings of the '033 patent and the prior art of record.

3. Marchand

Marchand is a published international patent application, and Petitioner asserts Marchand's priority date under 35 U.S.C. § 102(e) is April 3, 2000, the date of filing for a prior national application (i.e., Marchand Priority) in the United States. *See* Pet. 4–5. IXI does not contest Petitioner's priority date assertion. Therefore, for purposes of this decision, we find Marchand qualifies as prior art to the '033 patent under 35 U.S.C. § 102(e) because April 3, 2000, predates the May 7, 2001, filing date of the '033 patent.

Marchand relates to "an ad-hoc network and a gateway that provides an interface between external wireless IP networks and devices in the ad-hoc network." Ex. 1005, 1:5–7. Figure 3 of Marchand is reproduced below:

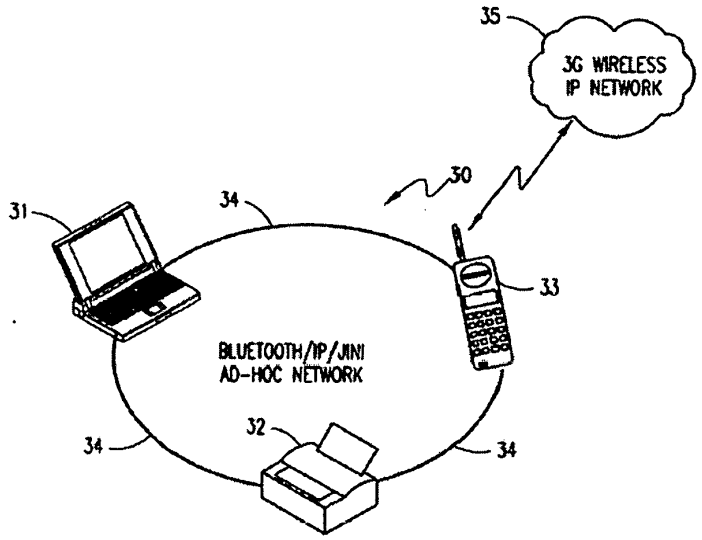


FIG. 3

Figure 3 illustrates "an ad-hoc network 30 utilizing Bluetooth, IP [Internet Protocol], and JINI technologies . . . to enable the use of a gateway mobile phone." *Id.* at 7:7–9. Ad-hoc network 30 (also called "Bluetooth Piconet (30)") includes laptop computer 31, printer 32, and mobile phone 33, which can communicate via Bluetooth radio link 34. *Id.* at Abstract, 7:9–11. Mobile phone 33 acts "as a gateway between the ad-hoc network and a 3G wireless IP network 35 such as the General Packet Radio Service (GPRS) network." *Id.* at 7:12–14. Regarding IP address translation, IP packets from the GPRS are received at mobile phone 33 through its public IP address, and then are forwarded to the private IP address of the device on ad-hoc network 30. *Id.* at 7:14–16. Address translation in the opposite direction is handled similarly. *Id.* at 7:16–17.

"JINI (Java) technology is utilized to publish and share services between the devices" in network 30, and this technology "provid[es] the capability for an application 21 to discover, join, and download services 22 from a JINI LUS [Lookup Service]." *Id.* at 6:3–4, 6:21–22. "The LUS contains a list of available services provided by other devices on the network." *Id.* at 3:11–12. Devices in the network "announce not only value-added services, but also their attributes and capabilities to the network," whereupon these services are published through the LUS. *Id.* at 3:12–15, 10:17–18. The LUS also provides interfaces for services that are available to the devices in the network. *Id.* at 3:13–14, 8:12–15.

Figure 4 of Marchand is reproduced below.

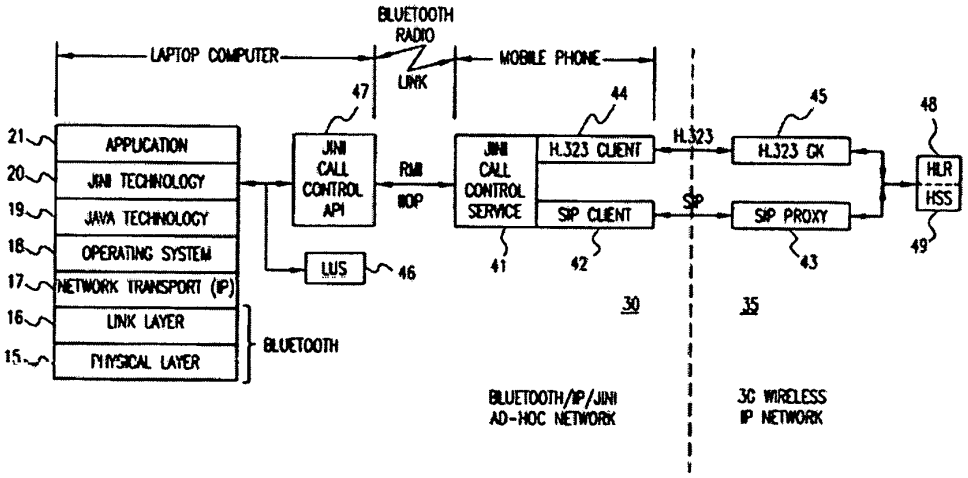


FIG. 4

Figure 4 depicts "a simplified functional block diagram of a connection between two devices such as the laptop computer 31 and the mobile phone 33 utilizing the ad-hoc network 30 of FIG. 3." *Id.* at 7:26–28. Gateway mobile phone 33 publishes in the Bluetooth piconet the call control services that it offers utilizing JINI LUS 46.

4. Nurmann

Nurmann relates to establishing an "Internet Protocol ('IP') network with several IP hosts and with an IP gateway for connecting the IP network to the [I]nternet." Ex. 1010, 1:9–12. Acting as a Dynamic Host Configuration Protocol (DHCP) client, the IP gateway determines whether a DHCP server is present in the IP network. *Id.* at 2:62–67. If a DHCP server is present, "[t]he allocation of the IP addresses to the IP hosts functioning as DHCP clients takes place from the DHCP server." *Id.* at 2:6–27. "If there is no DHCP server[,] the IP gateway is activated automatically as [a] DHCP server," which "allocates IP addresses and IP network masks to the IP hosts in a standard manner." *Id.* at 2:50–57.

5. Vilander

Vilander relates to "the allocation of IP addresses to mobile terminals and in particular to the allocation of a host part of an IP address to a mobile terminal." Ex. 1011, 1:6–8. Vilander teaches that, when a mobile terminal requests Internet access, the request is directed to a Gateway General Packet Radio Service (GPRS) Switching Node (GGSN), which may act as an Internet Access Server. *Id.* at 1:48–52.

6. Claim 1

Petitioner argues Marchand teaches a "first wireless device, in a short distance wireless network, having a software component to access information from the Internet by communicating with a cellular network in response to a first short-range radio signal," as recited in claim 1. Pet. 21–23. Petitioner maps Marchand's mobile phone 33 to the recited "first wireless device," and Marchand's ad-hoc Bluetooth piconet to the recited

"short distance wireless network." *Id.* at 21–22 (citing Ex. 1005, 1:29–31, 6:23–25, 7:12–14). Regarding the recited "second wireless device," Petitioner maps "[t]he devices in the ad-hoc Bluetooth Piconet network 30 [that] send signals to the mobile phone 33 over short-range radio links." *Id.* at 23–24 (citing Ex. 1003 ¶¶ 19, 25–27; Ex. 1005, 7:9–11, 7:18–21). As such, Petitioner maps Marchand's laptop computer 31 and/or printer 32 to the "second wireless device." *Id.*; Ex. 1005, 7:9–11, Fig. 3.

Regarding "access[ing] information from the Internet by communicating with a cellular network in response to a first short-range radio signal," Petitioner contends the IP packets sent among devices in Marchand's Bluetooth piconet over a short-range radio link correspond to the "first short-range radio signal." Pet. 22–23. Petitioner further contends Marchand's disclosure of connecting devices "to an IP-based network such as the Internet" and of "data going out of the Piconet to the GPRS network" teaches the recited Internet access. *Id.* at 22–24 (citing Ex. 1003 ¶ 27; Ex. 1005, 7:14–17, 13:12–14).

According to Petitioner, "Marchand discloses a network address translator to translate between a first IP address and a second IP address" based on Marchand's description of translating and forwarding between public and private IP addresses. *Id.* at 24 (citing Ex. 1003 ¶ 27; Ex. 1005, 7:14–17, 10:31–11:2). Petitioner contends an ordinarily skilled artisan would have modified Marchand in view of Vilander "such that the public IP address of the mobile phone gateway 33 was provided by the cellular network 35." *Id.* at 18 (citing Ex. 1003 ¶ 46). In particular, Petitioner cites Vilander's implementation of a device on the cellular network, such as a GGSN, to allocate the public IP address to the gateway. *Id.* (citing Ex. 1011 at 1:48–52, 1:57–59). Petitioner further contends an ordinarily skilled

artisan would have modified Marchand in view of Nurmann "such that the mobile gateway provides the private IP addresses to the devices on the network 30." *Id.* (citing Ex. 1003 ¶ 47). Specifically, Petitioner proposes implementing Nurmann's DHCP server on Marchand's mobile phone 33 to accomplish IP addressing in Marchand's local network 30. *Id.* (citing Ex. 1010, 4:51–56). Petitioner associates these citations from Vilander and Nurmann with the recited "network address translator software component" of claim 1. *See id.* at 24–25.

Petitioner maps Marchand's JINI Lookup Service (LUS) to the recited "service repository software component [that] identif[ies] a service provided by the second wireless device" of claim 1. Pet. 25–26 (citing Ex. 1003 ¶ 28; Ex. 1005, 3:11–12, 5:13–14). Claim 1 requires this "service repository software component" to be part of the "software component," which is itself part of the "first wireless device." Ex. 1001, 15:42–43, 15:57–59. Dr. Kiaei acknowledges "Marchand does not expressly state that the JINI LUS is located on mobile phone 33." Ex. 1003 ¶ 37. Petitioner nonetheless contends an ordinarily skilled artisan "would appreciate that Marchand implicitly teaches an implementation in which the JINI LUS is located in the mobile phone 33." Pet. 26 (citing Ex. 1003 ¶¶ 37–41). In particular, Petitioner cites Marchand's description of the mobile phone having "an interface/Application Programming Interface (API) . . . [that] is downloaded to the Bluetooth device involved in an external wireless call in order to have the device behave as a slave device toward the mobile phone which is the master." Ex. 1005, 6:27–31; *see also* Pet. 26–27 (citing same). Relying on testimony from Dr. Kiaei, Petitioner contends an ordinarily skilled artisan "would [have] underst[ood] that Marchand's API corresponds to a JINI

proxy object" and that such "proxy objects are downloaded from a LUS" in JINI. Pet. 27 (citing Ex. 1003 ¶ 38).

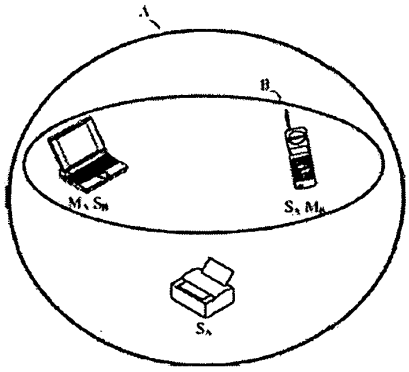
Petitioner also highlights Marchand's description "that all the devices in the ad-hoc Bluetooth Piconet network 30 publish their services when the mobile phone 33 connects to the ad-hoc Bluetooth Piconet network 30 and cellular network 35." *Id.* (citing Ex. 1003 ¶ 39; Ex. 1005, 10:12–18). Because a LUS "identifies services provided by devices on the network 30," Petitioner contends an ordinarily skilled artisan would have concluded from this description that Marchand teaches a JINI LUS located on mobile phone 33. *Id.* at 27–28 (citing Ex. 1003 ¶ 39). Petitioner additionally contends an ordinarily skilled artisan would have recognized that implementing Marchand's LUS in mobile phone 33—the gateway device to the cellular network—would best allow for the other devices in the ad-hoc Bluetooth piconet to join or leave without loss of connectivity between the piconet and the cellular network. Pet. 28 (citing Ex. 1003 ¶ 40).

Thus, Petitioner has established that Marchand, Vilander, and Nurmann teach every limitation of claim 1. Petitioner, as supported by Dr. Kiaei's testimony, also has established that a person of ordinary skill in the art would have had reason to combine the teachings of Marchand, Vilander, and Nurmann to achieve the system recited in claim 1. *See* Pet. 17–20; Ex. 1003 ¶¶ 46–51. We now consider IXI's arguments in opposition to Petitioner's obviousness analysis.

a. How an Ordinarily Skilled Artisan Would Have Interpreted Marchand's Teachings Related to the LUS

IXI disputes that Marchand teaches a LUS located on mobile phone 33, because IXI contends an ordinarily skilled artisan "would not understand

Marchand to disclose that its JINI LUS is on Marchand's cellular-enabled mobile phone 33, and . . . would have no motivation to modify Marchand to place the JINI LUS on the mobile phone in contradistinction to Marchand's explicit teachings to the contrary." PO Resp. 26–27. In particular, IXI contends Petitioner and its declarant wrongly analyzed Marchand's Bluetooth piconet. *See id.* at 12–15, 27–36. IXI's contention is based on Dr. Mandayam's testimony regarding a Bluetooth scatternet, which is formed when a Bluetooth device participates concurrently in two or more piconets. *See* Ex. 2301 ¶¶ 28–30. Figure 4 from Dr. Mandayam's Declaration is reproduced below



Id. ¶ 30. Figure 4 depicts separate piconets A (in blue) and B (in red) applied to the devices in Marchand's ad-hoc network. *Id.* ¶ 31. Dr. Mandayam explains:

> [T]he laptop computer is the master (M_A) of piconet A, with the mobile phone (S_A) and the printer (S_A) as slave devices in piconet A. The mobile phone is the master of piconet B (M_B), with only the laptop (S_B) as its slave device. Both the laptop and the mobile phone simultaneously act as master and slave devices on independent piconets, with piconet B, being a "sub-piconet" within piconet A.

Id.

Applying Dr. Mandayam's explanation to Marchand, IXI contends an ordinarily skilled artisan "would [have] appreciate[d] that the JINI LUS 46 must be located on the master device of the Bluetooth piconet, which Marchand discloses is a laptop as clearly shown on Marchand's Figure 4." PO Resp. 28 (citing Ex. 2301 ¶¶ 54–55). IXI further contends "the gateway mobile phone is the master of a sub-piconet within Marchand's Bluetooth piconet." *Id.* at 27. This purported sub-piconet, in which "the gateway mobile phone acts as the master device with the requesting device as its slave," is formed "[w]hen a device, such as a laptop, seeks to use the call control service offered by Marchand's gateway mobile phone." *Id.* at 30 (citing Ex. 2301 ¶¶ 54–55). In this case, "the gateway mobile phone sends the requesting device an API which allows the gateway mobile phone to establish its own, independent Bluetooth piconet . . . within the main Bluetooth piconet that connects all of the devices in the network." *Id.* (citing Ex. 1005, 10:25–29; Ex. 2301 ¶ 54). As such, IXI seeks to distinguish Marchand's teachings on publishing this call control API from Marchand's other teachings on publishing services to a JINI LUS upon entry of the mobile phone into the piconet. *Id.* at 32 (citing Ex. 2301 ¶ 56).

IXI's arguments rely heavily on Marchand's Figure 4, which appears to dispose a LUS within the laptop computer. *Id.* at 28 (presenting annotated version of Marchand's Fig. 4). Based on this drawing figure, and in consideration of IXI's sub-piconet theory, IXI argues that an ordinarily skilled artisan would not have had a reason to dispose a LUS within Marchand's gateway mobile phone. *See id.* at 26–37. We do not agree Marchand's disclosure should be read so narrowly, however, particularly because obviousness is determined from the perspective of "a person having ordinary skill in the art to which said subject matter pertains." 35 U.S.C.

§ 103(a); *see also Dann v. Johnston*, 425 U.S. 219, 230 (1976) ("[T]he mere existence of differences between the prior art and an invention does not establish the invention's nonobviousness.").

Petitioner presents evidence showing that an ordinarily skilled artisan would have considered Marchand's call control API to be a JINI proxy object. *See* Pet. 26–27 (citing Ex. 1003 ¶ 38; Ex. 1005, 6:27–7:2). In turn, Petitioner and Dr. Kiaei cite the JINI Spec. as teaching that such proxy objects are stored in a LUS for use when a client wants access to a service.[3] *See id.* (citing Ex. 1003 ¶ 38; Ex. 1009, 5–12). Finally, Petitioner cites Marchand's claim 6 as explicitly reciting "a JINI call control API that is downloaded from the gateway to the other devices on the ad-hoc network." *See id.* at 27 (citing Ex. 1005, 15:25–27). Petitioner concludes an ordinarily skilled artisan would have would have understood Marchand "as implicitly describing an implementation in which the JINI LUS, which identifies services provided by devices on the network 30, is located on the mobile phone gateway 33." *Id.* (citing Ex. 1003 ¶ 38). We are persuaded by this rationale, which establishes how an ordinarily skilled artisan would have read Marchand.

In addition, Marchand does not expressly prevent the LUS from being disposed on the gateway mobile phone. We agree with Petitioner's

[3] We may consider record evidence outside of the asserted ground, such as the JINI Spec., that demonstrates the knowledge and perspective of one of ordinary skill in the art, particularly when it explains why an ordinarily skilled artisan would have been motivated to combine or modify the cited references to arrive at the claimed invention. *See Ariosa Diagnostics v. Verinata Health, Inc.*, 805 F.3d 1359, 1365 (Fed. Cir. 2015); *Randall Mfg. v. Rea*, 733 F.3d 1355, 1362 (Fed. Cir. 2013).

assessment that Marchand's Figure 4 is merely exemplary and that nothing in Marchand limits or precludes the inclusion of a LUS in the gateway mobile phone. *See* Pet. Reply 11–12. Furthermore, one of ordinary skill in the art would have known, at least, that it was possible to have multiple LUSs in a network. *See* Ex. 1009, 5 ("Each Jini system is built around *one or more* lookup services." (original emphasis omitted and emphasis added)).[4] If multiple LUSs are possible, and if a LUS must be disposed on a master device, as IXI contends (*see, e.g.*, PO Resp. 28 (citing Ex. 2301 ¶¶ 54–55)), then Marchand's teaching that a gateway mobile phone is a master (*see* Pet. 13–14 (citing Ex. 1005, 8:2–2); Pet. Reply 3 (citing Ex. 1005, 3:22–27, 7:26–31, 8:1–3)) supports Petitioner's contention that Marchand suggests disposing a LUS in the gateway mobile phone. We also are not persuaded by Dr. Mandayam's testimony and IXI's arguments that the LUS must be disposed on a device that is "intrinsic to the Piconet" and that is "not the gateway." Ex. 1019, 16:10–14; Tr. 81:1–86:2. The notion of an "intrinsic" device is not apt in Marchand, which is expressly directed to ad-hoc networks. *See, e.g.*, Ex. 1005, 7:7–11, Fig. 3 (including gateway mobile phone in discussion of described "ad-hoc network").

Accordingly, based on the arguments before us, we determine that an ordinarily skilled artisan's understanding of Marchand would not have been limited by IXI's sub-piconet theory in the way suggested by IXI. Therefore, we determine that Marchand would have informed an ordinarily skilled artisan that the "service repository software component" may be disposed in the "first wireless device."

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[4] Petitioner makes this point citing a reference that is subject to IXI's motion to exclude, *see* Pet. Reply 11–12 (citing Ex. 1016), but the same point is supported by the JINI Spec.

b. Marchand's Teachings on a Network Address Translator

IXI also disputes that Marchand teaches a "network address translator software component" located on mobile phone 33, as required by claim 1. PO Resp. 37. In particular, IXI contends that "Marchand discloses that an API should be used to translate between a public IP address and a private IP address." *Id.* (citing Ex. 1005, 11:17–12:3; 15:29–31). IXI cites Marchand's claim 7, which recites the "JINI call control API includes means for deconflicting public and private IP addresses when devices in the ad-hoc network are utilizing real-time applications over the wireless IP network." *Id.* (quoting Ex. 1005, 15:29–31). Dr. Mandayam testifies that an ordinarily skilled artisan "would have understood that the use of an API to translate between public and private addresses is significantly different than using a NAT [network address translator]."[5] Ex. 2301 ¶ 64. IXI further contends Marchand discourages utilizing a NAT in the gateway mobile phone and encourages using an API translator to avoid the problem of IP address mismatch "for real-time applications such as VoIP [Voice over Internet Protocol]." PO Resp. 39 (quoting Ex. 1005, 11:26–12:2; citing Ex. 2301 ¶ 66).

We do not agree with IXI's characterization of Marchand's teachings on address translation, however. As noted by Petitioner, Marchand describes forwarding IP packets received at the gateway mobile phone through a public IP address to a destination device in the piconet having a

[5] Even though both parties reference a network address translator, Marchand actually uses the acronym "NAT" to refer to a "National Access Translator." *See* Ex. 1005, 11:23. Given an opportunity at the oral hearing to explain if there were any meaningful differences in this terminology, IXI's counsel did not offer any. *See* Tr. 36:11–37:8.

private IP address, and vice versa. Pet. 24 (citing Ex. 1003 ¶ 27; Ex. 1005, 7:14–17, 10:31–11:2). In addition, Dr. Mandayam testifies that address translation is done at the gateway in Marchand. Pet. Reply 13 (citing Ex. 1018, 147:5–7, 152:25–153:1). Accordingly, and regardless of whether this address translation is performed by a NAT or an API translator, Marchand teaches a network address translator software component located on the gateway mobile phone. *See* Pet. Reply 14–15. Furthermore, we agree with Petitioner that the use of an API translator for certain real-time applications would have been viewed as "as a supplement to NAT [and] not a substitute for NAT." Pet. Reply 14 (citing Ex. 1003 ¶ 27). For these reasons, Petitioner has established that Marchand teaches a "network address translator software component."

c. Rationale for Modifying Marchand in View of Vilander and Nurmann

IXI disputes Petitioner's contention that, in view of Vilander, an ordinarily skilled artisan "would have modified Marchand's system such that the public IP address of the mobile phone gateway 33 was provided by the cellular network 35." PO Resp. 40 (quoting Pet. 17–18). IXI argues that Marchand and Vilander do not indicate a need for the cellular network to provide a public IP address for the gateway mobile phone. *Id.* (citing Ex. 2301 ¶ 70). Nevertheless, we agree with Petitioner that "using Vilander's address allocation in Marchand would have amounted to nothing more than the use of a known technique to improve similar devices in the same way or the combination of prior art elements according to known methods to yield predictable results." Pet. Reply 15 (citing, *inter alia*, *KSR v. Teleflex*, 550 U.S. 398, 417 (2007)); *see also* Pet. 19 (citing same).

Although Marchand describes gateway mobile phone as having "a public IP address recognized in the wireless IP network," Marchand does not explicitly describe how the public IP address is assigned. Pet. Reply 16 (quoting Ex. 1005, 4:23–30). In light of this, Petitioner identifies evidence that Vilander's GGSN would have improved Marchand by allocating the public IP address to Marchand's gateway mobile phone 33. Pet. 18 (citing Ex. 1003 ¶ 46; Ex. 1011, 1:48–52, 1:57–59).

IXI likewise disputes Petitioner's contention that, in view of Nurmann, an ordinarily skilled artisan "would have modified [Marchand's] mobile gateway 33 such that the mobile gateway provides the private IP addresses to the devices on the network 30." PO Resp. 40 (quoting Pet. 18). According to IXI, a person of ordinary skill in the art "would have understood that the master device, containing the JINI LUS, . . . provide[s] the private IP addresses," so that person "would not have been motivated to require a slave device [i.e., the mobile gateway] in the network to assign private IP addresses." PO Resp. 40 (citing Ex. 2201 [sic, 2301] ¶ 71). For the same reasons expressed above, however, we determine that an ordinarily skilled artisan would not have read Marchand to preclude the gateway from being a master device with a LUS. *See supra* § II.A.4.a.

d. Secondary Considerations of Nonobviousness

IXI did not put forth any evidence of secondary considerations of nonobviousness.

e. Conclusion Regarding Claim 1

Based on all of the evidence of record, we determine, by a preponderance of the evidence, that the subject matter of claim 1 would have

been obvious over the combination of Marchand, Vilander, and Nurmann under 35 U.S.C. § 103(a).

7. Claims 4, 7, and 14

Claim 4 depends from claim 1 and recites "the service repository software component identifies whether the service is available at a particular time." Ex. 1001, 16:4–6. Building on Petitioner's analysis for claim 1, in which Marchand's LUS corresponds to the recited "service repository software component," Petitioner contends "Marchand teaches that '[t]he LUS contains a list of *available* services provided by other devices on the network.'" Pet. 29 (quoting Ex. 1005, 3:11–12) (emphasis added by Petitioner).

Claim 7 depends from claim 1 and recites "the second wireless device is a thin terminal." Ex. 1001, 16:14–15. Mirroring its unpatentability contentions for claim 1, Petitioner maps Marchand's printer 32 to the recited "second wireless device" that is a "thin terminal." Pet. 30–31 (citing, *inter alia*, Ex. 1005, 7:9–11). As stated above, we determine a printer is a type of "thin terminal." *See supra* § I.F.

Claim 14 depends from claim 1 and recites "the second wireless device includes an application software component that registers an availability of the service with the service repository software component." Ex. 1001, 16:34–36. Petitioner cites Marchand for teaching that "[o]ther devices (e.g., printer 32) on [Marchand's] ad-hoc Bluetooth Piconet network 30 may use their respective Java and JINI layers 19 and 20 to discover, join, and download services 22 from [the] JINI LUS." Pet. 31–32 (citing Ex. 1005, 6:19–22, 7:23–25, 8:11–28) (internal quotation omitted). Petitioner contends an ordinarily skilled artisan "would [have] underst[ood]

that one or more software elements, such as Marchand's Java technology layer 19, JINI technology layer 20, and any other application (e.g., application 21) in a network 30 device . . . help [to] implement registration of an availability of a service with the LUS." *Id.* at 32; Ex. 1003 ¶¶ 28, 32.

Therefore, having considered Petitioner's unpatentability contentions and supporting evidence, we are persuaded that Petitioner presents sufficient evidence to support a finding that these prior art references teach the claimed subject matter recited in claims 4, 7, and 14. For the same reasons as above with respect to claim 1, we also are satisfied that Petitioner has presented sufficient reasons for the combination, as supported by Dr. Kiaei's testimony. *See* Pet. 17–20; Ex. 1003 ¶¶ 46–51. Furthermore, regarding claims 4 and 14, IXI relies on its same arguments from claim 1 (*see* PO Resp. 41), which we do not find persuasive for the reasons mentioned above. For claim 7, IXI's arguments pertain to claim interpretation of the term "thin terminal," (*see id.* at 42–43), and we already have considered those arguments above. *See supra* § I.F. Therefore, based on the entire record before us, we conclude Petitioner has demonstrated by a preponderance of the evidence that the subject matter of claims 4, 7, and 14 would have been obvious over the combination of Marchand, Vilander, and Nurmann.

B. Obviousness Ground Based on Marchand, Nurmann, Vilander, and RFC 2543

Petitioner contends claim 5 would have been obvious over the combination of Marchand, Nurmann, Vilander, and RFC 2543. Pet. 32–35. IXI disputes Petitioner's contention. PO Resp. 43–45.

1. RFC 2543

RFC 2543 is an Internet standards document related to Session Initiation Protocol (SIP), which is "an application-layer control (signaling) protocol for creating, modifying and terminating sessions with one or more participants." Ex. 1007, 1. An SIP-capable "client queries the DNS [Domain Naming Service] server for address records for the host portion of the Request-URI [Uniform Resource Identifier]." *Id.* at 13. Such a client "MAY cache a successful DNS query result." *Id.*

2. Claim 5

Claim 5 depends from claim 1 and recites "the software component includes a domain naming service ('DNS') software component to translate between a human readable name and a second Internet Protocol ('IP') address." Ex. 1001, 16:7–10. Petitioner cites RFC 2543's teachings regarding a client querying a DNS server to obtain and cache an IP address corresponding to a human-readable name, such as "company.com." Pet. 33 (citing Ex. 1003 ¶¶ 54–55; Ex. 1007, 13, 146). Petitioner proposes adding "RFC 2543's disclosure of DNS query and response . . . with Marchand's SIP client in the combination of Marchand, Nurmann, and Vilander to implement full SIP capabilities (e.g., DNS) in Marchand's SIP client and comply with SIP standards." *Id.* at 34 (citing Ex. 1003 ¶ 57). According to Petitioner, this would be useful when a device in Marchand's piconet requests "access to the Internet (e.g., a web page, online call)." *Id.* at 33–34 (citing Ex. 1003 ¶ 56).

Supported by Dr. Mandayam's testimony, IXI argues that devices on Marchand's piconet access the cellular network through a call control client, and Marchand does not teach that the client provides access to a webpage.

Id. at 44–45; Ex. 2301 ¶¶ 74–75.[6] IXI further notes that "Marchand does not teach that the devices in the Bluetooth piconet have human-readable names." *Id.* at 45 (drawing a contrast with Ex. 1001, 8:25–29). IXI also argues an ordinarily skilled artisan would not have been motivated to add such unnecessary functions. *Id.*

As noted by Petitioner, however, Marchand's gateway mobile phone includes a second interface/API, depicted as SIP client 42 in Figure 4, which enables the use of the full SIP client capabilities. Pet. 33; Pet. Reply 20 (both citing Ex. 1003 ¶ 54; Ex. 1005, 8:5–7, 9:20–30). In light of this teaching, we are persuaded that an ordinarily skilled artisan would have known to implement RFC 2543's disclosure of DNS query, response, and caching in Marchand's SIP client 42. *See* Ex. 1003 ¶¶ 54, 57. We further agree with Petitioner that this amounts to using a known technique to improve similar devices in the same way to yield predictable results. *See* Pet. 34; Pet. Reply 21 (both citing *KSR*, 550 U.S. at 417).

For these reasons, we are satisfied that Petitioner has presented sufficient reasons for the combination of Marchand, Nurmann, Vilander, and RFC 2543. We also are persuaded that Petitioner presents sufficient evidence to support a finding that RFC 2543 teaches the additional limitation recited in claim 5. Finally, to the extent IXI again relies on its arguments for claim 1 (*see* PO Resp. 44), we do not find them persuasive for the same reasons mentioned above. Accordingly, based on the complete trial record, we conclude Petitioner has demonstrated by a preponderance of the evidence

[6] Although IXI cites paragraphs 75–76 of Dr. Mandayam's declaration, the context makes clear that IXI intended to cite paragraphs 74–75.

that the subject matter of claim 5 would have been obvious over the combination of Marchand, Vilander, Nurmann, and RFC 2543.

C. *Obviousness Ground Based on Marchand, Nurmann, Vilander, and Larsson*

Petitioner contends claims 6 and 23 would have been obvious over the combination of Marchand, Nurmann, Vilander, and Larsson. Pet. 35–39. IXI disputes Petitioner's contention. PO Resp. 46–48.

1. Larsson

Larsson "relates to WAP [Wireless Application Protocol] sessions between a mobile terminal and a WAP gateway, and more particularly, to the organization of protocol layers in a WAP gateway." Ex. 1008, 1:25–27. Figure 1 of Larsson is reproduced below:

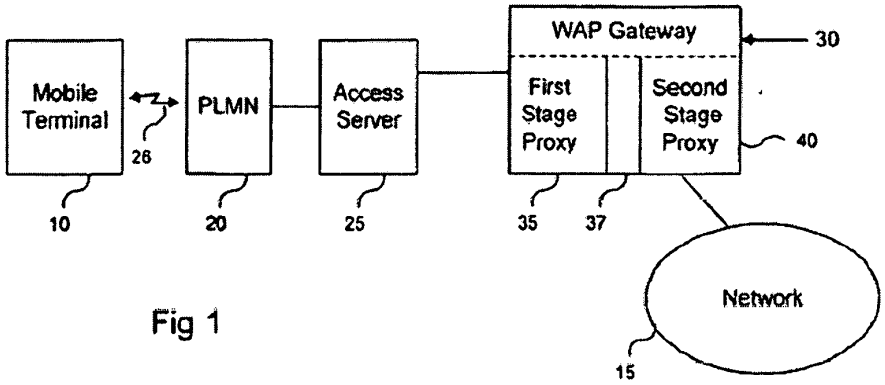

Fig 1

Figure 1 illustrates mobile terminal 10, i.e., "a portable laptop computer, personal digital assistant (PDA), mobile telephone, pager, etc.," accessing private network 15 via WAP gateway 30. *Id.* at 2:31–46. Private network 15 may be a corporate network or a virtual private network (VPN). *Id.* at 2:47–55. The mobile terminal 10 obtains access to access server 25 via wireless link 26 to Public Land Mobile Network (PLMN) 20. *Id.* at 2:40–

44. The WAP gateway 30 includes first stage proxy 35 and second stage proxy 40, which are "functionally separated" by firewall 37. *Id.* at 2:62–64, 3:1–7.

2. Claims 6 and 23

Claim 6 depends from claim 1 and recites "the software component includes a security software component to control access between the cellular network and the first wireless device." Ex. 1001, 16:11–13. Petitioner proposes adding Larsson to the combination of Marchand, Nurmann, and Vilander for teaching the security software component. Pet. 37. Petitioner contends an ordinarily skilled artisan would have "include[d] security software components such as Larsson's firewall 37, first stage proxy 35, and second stage proxy 40 in Marchand's mobile phone gateway 33 which is situated between two networks (e.g., Marchand's cellular network 35 and ad-hoc Bluetooth Piconet network 30)." *Id.* (citing Ex. 1003 ¶ 61). Petitioner also contends an ordinarily skilled artisan would have been motivated to add Larsson's firewall 37, first stage proxy 35, and second stage proxy 40 in Marchand's gateway 33 to provide secure access to Marchand's piconet from the cellular network. *Id.* (citing Ex. 1003 ¶ 62). According to Petitioner, this would result in more efficient authentication because such authentication need only be performed once at the time of the first network access request. *Id.* at 37–38 (citing Ex. 1003 ¶ 62; Ex. 1008, 2:8–15).

IXI contends Larsson does not teach "that the WAP gateway can be incorporated in the mobile terminal 10 or even that the WAP gateway is on a local area network with mobile terminal 10." PO Resp. 48 (citing Ex. 2201 ¶ 78). We agree with Petitioner, however, that Petitioner's proposed

combination seeks to add Larsson's security components to Marchand's gateway mobile phone, not Larsson's own mobile terminal 10. *See* Pet. Reply 22. As such, IXI misapprehends the proposed combination. Furthermore, we are persuaded by Petitioner's showing that Larsson and Marchand both involve a gateway situated between two networks such that an ordinarily skilled artisan would have known to apply Larsson's security features to Marchand's similar topology. *See* Pet. 37 (citing Ex. 1003 ¶ 61); Pet. Reply 23 (citing Ex. 1003 ¶¶ 58–61; Ex. 1008, 1:8, 1:67–2:1, 2:30–54, Fig. 1). We are further persuaded by Petitioner's contention that an ordinarily skilled artisan would have been motivated by the efficiency gained through performing authentication only once at the time of the first request for network access. *See* Pet. 37–38 (citing Ex. 1003 ¶ 62; Ex. 1008, 2:8–15).

Claim 23 depends from claim 1 and recites "the first wireless device further includes a virtual private network ('VPN') software component." Ex. 1001, 16:59–61. Regarding the recited VPN, Petitioner contends the asserted 4-way obviousness combination "discloses a second stage proxy that resides within the VPN side of a firewall in a gateway cellular phone, and authenticates access requests from users." Pet. 39 (citing Ex. 1003 ¶ 59; Ex. 1008, 3:1–7; 4:13–22. This is supported by Larsson's teachings on private network 15 potentially being a VPN; because the second stage proxy interacts with the VPN, the second stage proxy acts as the recited "virtual private network . . . software component." *See* 1003 ¶¶ 58–59; Ex. 1008, 2:47–55, Fig. 1.

Finally, to the extent IXI relies on the same arguments from claim 1 relative to claims 6 and 23 (PO Resp. 46), we find them unpersuasive for the same reasons mentioned above.

Accordingly, we are persuaded that Petitioner presents sufficient evidence to support a finding that the combination of Marchand, Nurmann, Vilander, and Larsson teaches the subject matter recited in claims 6 and 23 (*see* Pet. 38–39), and that there are sufficient reasons for the combination (*see id.* at 37–38). Therefore, based on the entire record before us, we conclude Petitioner has demonstrated by a preponderance of the evidence that the subject matter of claims 6 and 23 would have been obvious over the combination of Marchand, Nurmann, Vilander, and Larsson.

D. Obviousness Ground Based on Marchand, Nurmann, Vilander, and JINI Spec.

Petitioner contends claims 12, 15, 22, 34, 39, 40, 42, and 46 would have been obvious over the combination of Marchand, Nurmann, Vilander, and JINI Spec. Pet. 39–55. IXI disputes Petitioner's contention. PO Resp. 48–56

1. JINI Spec.

The JINI Spec. is a textbook directed to the Jini architecture, which is "designed for deploying and using services in a network." Ex. 1009, xix. The JINI Spec. teaches a process by which a Lookup Service (LUS) is used to register proxy objects associated with available services. *Id.* at 5–12. A client wishing to use a service loads an appropriate proxy object from the LUS and executes the proxy object to access the service. *Id.* at 72–75; *see also* Ex. 1003 ¶¶ 63, 69 (explaining the use of proxy objects in the JINI Spec.).

2. Claim 22, 34, and 39

Independent claims 1 and 34 include some limitations that are similar in scope, so the parties' positions relative to claim 34 are similar to those in claim 1. Therefore, we focus on certain differences in the analyses between claims 1 and 34.

Petitioner maps Marchand's gateway mobile phone 33 to the recited "handheld device" of claim 34, and Petitioner maps Marchand's Bluetooth piconet to the recited "short distance wireless network." Pet. 44 (citing Ex. 1003 ¶¶ 24–26; Ex. 1005, 4:21–23, 6:16–29, 7:18–23, 8:11). For the recited "storage device," Petitioner cites Marchand's description of programming interfaces and protocol stack layers and contends that an ordinarily skilled artisan would have understood that a storage device would have been necessary to store software associated with these features in Marchand's gateway mobile phone. *Id.* at 45 (citing Ex. 1003 ¶¶ 33–36; Ex. 1005, 6:16–29). Petitioner likewise contends an ordinarily skilled artisan would have appreciated that software in the gateway, including software for "implement[ing] routing and communication over the cellular and local wireless networks," would require execution by a processor coupled to the storage device. *Id.* at 45–46 (citing Ex. 1003 ¶¶ 34–36; Ex. 1005, 2:14–16, 2:27–31, 6:18–20, 6:27–30).

Regarding claim 34's recitations on providing an IP data packet to a terminal and translating between first and second IP addresses, Petitioner cites Marchand's description of receiving IP data packets from a public IP network at the gateway and forwarding them to other devices in the Bluetooth piconet. *Id.* at 24–25, 46–48 (citing Ex. 1003 ¶ 27; Ex. 1005, 7:14–17, 10:31–11:2). For "control[ling] access" between the networks, Petitioner cites this same teaching on IP data packets and also cites

Marchand's description of the gateway functioning as "a call-control server for client devices in the ad-hoc network, and . . . as a call-control client for a server in the wireless IP network." *Id.* (citing Ex. 1003 ¶¶ 24, 25, 58–62; Ex. 1005, 4:23–27, 7:12–14). For enumerating and searching a list of services, Petitioner cites Marchand's teachings on listing services in a JINI LUS and on allowing devices to discover, join, and download services from the LUS. *Id.* at 48–49 (citing Ex. 1003 ¶¶ 28, 32; Ex. 1005, 6:19–22, 7:9–25, 8:11–28, 11:12–14). Petitioner also cites the JINI Spec. for teaching that the LUS can provide a proxy object to a requesting device so that the device may access the requested service. *Id.* (citing, *inter alia*, Ex. 1003 ¶¶ 38, 63, 68; Ex. 1009, 4–11, 72–75). Thus, Petitioner has established that Marchand, Vilander, Nurmann, and JINI Spec. teach every limitation of claim 34.

Claim 39 depends from claim 34 and recites "the search includes searching the list of services by class, attribute or instance." Ex. 1001, 18:3–4. Citing the JINI Spec., Petitioner contends "a JINI LUS stores information about a service's ID, its class or type, and its attributes," all of which can be searched. Pet. 50 (citing Ex. 1003 ¶ 64; Ex. 1009, 9–11, 16–20, 73, 77–79, 217–230). Claim 22 depends from claim 1 and contains a similar limitation; Petitioner's analysis is nearly identical to that of claim 39. *See id.* at 43–44. Petitioner, therefore, has established that the combination of Marchand, Nurmann, Vilander, and JINI Spec. teaches the additional limitations in claims 22 and 39.

Building on its reasons for combining Marchand, Nurmann, and Vilander, Petitioner contends an ordinarily skilled artisan would have combined the JINI Spec. with these references "to fully implement and realize JINI technology in Marchand's ad-hoc Bluetooth Piconet network 30." *Id.* at 42 (citing Ex. 1003 ¶ 70). According to Petitioner, this would

allow each device in Marchand's piconet "to register, search for, and execute services in the [piconet] according to the JINI Spec." *Id.* (citing Ex. 1003 ¶ 70). We agree with Petitioner that this amounts to nothing more than the use of a known technique to improve similar devices in the same way or the combination of prior art elements according to known methods to yield predictable results. *Id.* (citing *KSR*, 550 U.S. at 417). As such, Petitioner has established that a person of ordinary skill in the art would have had reason to combine the teachings of Marchand, Vilander, Nurmann, and JINI Spec. to achieve the system recited in claim 34.

With respect to claims 34 and 39, IXI argues Marchand cannot teach the recited enumerated list of services operative in the software component of the handheld device's processor because Marchand's LUS cannot be in gateway mobile phone 33. PO Resp. 53–54. IXI's reasoning behind this argument is the same as for the argument it made for claim 1. *See id.* Therefore, for the same reasons mentioned above with respect to claim 1, we are not persuaded by this argument. We also are unpersuaded by IXI's arguments for claim 22, which recapitulate arguments it made for claim 1. *See id.* at 52.

Accordingly, based on the entire trial record, we conclude Petitioner has demonstrated by a preponderance of the evidence that the subject matter of claims 22, 34, and 39 would have been obvious over the combination of Marchand, Nurmann, Vilander, and JINI Spec.

3. Claims 42 and 46

Claim 42 is an independent claim that shares many similar limitations to those in independent claim 34. *See* Ex. 1001, 18:14–40. Petitioner's mapping of prior art elements to claim 42 is nearly identical to that of claim

34. *See* Pet. 50–55. In contrast, however, claim 42 recites that the processor of a first handheld device provides short-range radio signals to second and third wireless handheld devices. *See* Ex. 1001, 18:14–40. Petitioner maps Marchand's network devices, such as a laptop computer, a printer, or a PDA, to the second and third wireless handheld devices. Pet. 52 (citing Ex. 1003 ¶¶ 25, 26; Ex. 1005, 6:23–27, 7:9–11, 10:18–21). In support of its mapping, Petitioner notes that non-asserted claim 45 from the '033 patent indicates that "a laptop computer [and] a personal digital assistant" are wireless handheld devices. *Id.* (citing Ex. 1001, 18:50-54). Petitioner also references the '033 patent's description of a "hand-held" device 350 in Figure 3b, which, in one embodiment, "is one of the terminals 107"; in turn, Petitioner references that a printer is one of the enumerated terminals 107 in the '033 patent. *Id.* at 52 (citing Ex. 1001, 4:17–25, 5:43–46). In light of this, Petitioner contends an ordinarily skilled artisan "would [have] consider[ed] any of Marchand's network 30 devices, such as the laptop computer, printer, or PDA, as corresponding to the second and third wireless handheld devices." Pet. 52 (citing Ex. 1001, 4:17–25; 5:43–46; Ex. 1003 ¶ 26). Petitioner additionally notes that IXI mapped a printer to the "second wireless handheld device" limitation in its infringement contentions from the related district court litigation. *Id.* at 52–53 (citing Ex. 1012, 45; Ex. 1013, 70).

IXI does not dispute Petitioner's evidence showing that an ordinarily skilled artisan would have understood Marchand's laptop computer, printer, and PDA as corresponding to the recited second and third wireless handheld devices. Nor does IXI dispute that Marchand's laptop computer, printer, and PDA are "handheld device[s]" commensurate with claim 42; indeed, IXI does not propose a construction of "handheld." IXI's only argument against

Petitioner's analysis for claim 42 recapitulates its argument from claim 34, namely, that Marchand cannot teach a wireless handheld device that enumerates a list of services because Marchand's LUS cannot be in the gateway mobile phone. PO Resp. 53–55. As stated above, we do not agree that Marchand's teachings on the LUS are so limited. *See supra* § II.A.6.a. Accordingly, we determine that Marchand teaches the recited second and third "wireless handheld device[s]" of claim 42.

Claim 46 depends from claim 42 and further recites "the second wireless handheld device is a thin terminal." Ex. 1001, 18:55–57. As stated above, we determine a printer is a type of "thin terminal" (*see supra* § I.F.), and Petitioner maps Marchand's printer 32 to the second wireless handheld device. Pet. 55. IXI's arguments disputing Petitioner's analysis relate to claim interpretation (*see* PO Resp. 42–43, 56), which we have addressed above.

Therefore, having reviewed Petitioner's unpatentability contentions for claims 42 and 46 (*see id.* at 50–55), we determine Petitioner has established that Marchand, Vilander, Nurmann, and JINI Spec. teach every limitation of these claims. Petitioner's rationale for combining these references is also sufficient for the reasons stated above. Based on the entire trial record, we conclude Petitioner has demonstrated by a preponderance of the evidence that the subject matter of claims 42 and 46 would have been obvious over the combination of Marchand, Nurmann, Vilander, and JINI Spec.

4. Claims 12, 15, and 40

Claim 12 recites "the software component includes a plug and play software component to load and execute software for the second wireless

device." Ex. 1001, 16:27–29. Claim 40 recites "the software component includes a plug and play software component to identify the terminal in the short distance wireless network and obtain the application software component for the terminal." *Id.* at 18:5–9. Petitioner relies on Marchand and JINI Spec., as supported by Dr. Kiaei's testimony, for teaching these limitations. *See* Pet. 39–43, 50. Specifically, Petitioner contends "a network 30 device (e.g., printer 32) registers a service (e.g., printing service) with the JINI LUS in gateway mobile phone 33 by loading a proxy object corresponding to its service onto the JINI LUS." *Id.* at 39–42 (citing Ex. 1003 ¶¶ 63, 67; Ex. 1009, 4–11, 72–73, 217–230). According to Petitioner, when a request for a service is received, the proxy object is loaded and executed to allow access to the service. *Id.* at 41–43 (citing Ex. 1003 ¶¶ 38, 63, 68–69; Ex. 1009, 4–11, 16–20, 73–74, 77–79, 217–230).

As supported by Dr. Mandayam's testimony, IXI contends an ordinarily skilled artisan would not have understood JINI Spec's proxy object that is published to a LUS upon joining a network as constituting a "plug and play software component." PO Resp. 50 (citing Ex. 2301 ¶ 84). Specifically, IXI contends "there is no disclosure of a software component that functions in a 'plug and play' manner." *Id.* IXI explains "the LUS does not *determine*, *find*, or otherwise *resolve* the software necessary to support the joining terminal, consistent with the plain and ordinary meaning of the term 'plug and play' and the specification of the -033 Patent." *Id.* at 50–51 (citing Ex. 2301 ¶ 84).

Yet the JINI Spec. describes the concept of "[n]etwork plug-and-work" as being a goal of the JINI architecture: "You should be able to plug a service into the network and have it be visible and available to those who want to use it. Plugging something into a network should be all or almost all

you need to do to deploy the service." Ex. 1009, 4. This is commensurate with the recited "plug and play" concept recited in claims 12 and 40. The JINI Spec. also describes downloading of code for a proxy object and "invoking methods on the proxy object" in response to a request for a service. *Id.* at 5–7, 9–10. This is commensurate with the recited "load[ing] and execut[ing]" of software in claim 12 and "obtain[ing] the application software component" in claim 40. We additionally agree with Petitioner (Pet. Reply 23–24) that certain of IXI's arguments turn on features not appearing in the claims, such as "determin[ing], find[ing], or otherwise resolv[ing] the software." *See* PO Resp. 50–51. These arguments are not persuasive.

Petitioner's obviousness analysis for claim 15 is similar to that for claim 12, and it likewise establishes that the asserted obviousness combination teaches the additional limitation in claim 15. *See* Pet. 43 (citing Ex. 1003 ¶¶ 38, 63, 67). Regarding claim 15, IXI again relies on its arguments for claim 1 (*see* PO Resp. 52), which are not persuasive for the same reasons mentioned above.

Based on all of the evidence of record, we determine, by a preponderance of the evidence, that the subject matter of claims 12, 15, and 40 would have been obvious over the combination of Marchand, Vilander, Nurmann, and JINI Spec. under 35 U.S.C. § 103(a).

E. Obviousness Ground Based on Marchand, Larsson, and JINI Spec.

Petitioner contends claims 25 and 28 would have been obvious over the combination of Marchand, Larsson, and JINI Spec. Pet. 55–60. IXI disputes Petitioner's contention. PO Resp. 56–57.

Petitioner's analysis for independent claim 25 incorporates elements of the analysis above for independent claim 34 and for dependent claim 6. In particular, Petitioner cites Marchand for teaching the basic Bluetooth system architecture, the transfer of IP data packets, and the use of a JINI LUS. Pet. 56–59. Petitioner cites Larsson for teaching the recited "security software component." *Id.* at 58–59. Petitioner cites the JINI Spec. for teaching details on registering and listing services with a LUS and using proxy objects to implement services. *Id.* at 59.

For claim 28, which depends from claim 25, Petitioner relies on the same analysis for claim 23, in which Petitioner cites Larsson for teaching staged proxies that are used with a VPN. *See id.* at 39, 60; *supra* § II.C.2.

Thus, for the same reasons discussed above, Petitioner establishes that the combination of Marchand, Larsson, and JINI Spec. teaches the subject matter recited in claims 25 and 28. Petitioner also presents sufficient reasons for combining Marchand, Larsson, and JINI Spec. that mirror those given with respect to other grounds discussed above. Pet. 56; *see supra* §§ II.C.2., II.D.2.

IXI again contends Marchand does not teach or suggest locating the JINI LUS and its service searching capabilities (i.e., the "service repository software component") on mobile phone 33, which corresponds to the recited "second wireless device" in claim 25. PO Resp. 57. For the same reasons discussed above, however, we are not persuaded by this argument.

Accordingly, based on the entire trial record, we conclude Petitioner has demonstrated by a preponderance of the evidence that the subject matter of claims 25 and 28 would have been obvious over the combination of Marchand, Larsson, and JINI Spec.

F. Testimony of Dr. Kiaei

IXI argues that "Dr. Kiaei's opinions are unreliable because they misunderstand and mischaracterize the inner workings of Marchand's network and devices." PO Resp. 12. Dr. Kiaei's "opinions regarding Bluetooth, the proposed modifications of Marchand, and the purported motivations for modifying Marchand should be entitled to little weight, if any," IXI argues, because of "Dr. Kiaei's lack of understanding Bluetooth and failure to consider the implications of Marchand's reliance on Bluetooth with respect to the proposed combinations." *Id.* at 15. IXI's arguments are rooted in IXI's sub-piconet theory discussed above. *See supra* § II.A.6.a.

Petitioner replies that the "portion of Marchand relied upon in the Petition does not rely on a device being connected in more than one piconet." Pet. Reply 25. Thus, IXI's sub-piconet theory is supported by hypothetical drawings and testimony of Dr. Mandayam, not by Marchand, according to Petitioner. *Id.* Moreover, Dr. Kiaei testified that the question of whether a device could be connected in more than one piconet was a hypothetical question that he could not answer without more information because it was outside of the scope of what he considered. *See id.* at 24–25 (quoting Ex. 2302, 98:2–3, 98:22–99:9). In sum, Petitioner argues that IXI's "attack on Dr. Kiaei's credibility is misguided and [is] not germane to any substantive issues involved in this proceeding." *Id.* at 25.

We have the discretion to determine the appropriate weight to be accorded to the evidence presented, including opinion testimony, based on the disclosure of the underlying facts or data upon which the opinion is based. *See, e.g., Yorkey v. Diab*, 601 F.3d 1279, 1284 (Fed. Cir. 2010) (holding the Board has discretion to credit one witness's testimony over another "unless no reasonable trier of fact could have done so"). In this

instance, we are not persuaded by IXI's arguments that Dr. Kiaei's testimony as a whole should be given "little weight, if any." Specifically, we have considered IXI's and Dr. Mandayam's sub-piconet theory in detail, and we determine that it would not have limited an ordinarily skilled artisan's understanding of Marchand. *See supra* § II.A.6.a. Thus, we accord an appropriate weight to Dr. Kiaei's testimony as indicated in this Decision.

G. Motion to Exclude

IXI moves to exclude Exhibits 1002, 1014, and 1015 on the basis of relevance "because they are not referenced or explained at all in the Petition or the Reply." Paper 21, 10–11. In its Opposition, Petitioner contends Dr. Kiaei referenced these exhibits in his declaration. Paper 24, 2–3 (citing Ex. 1003 ¶¶ 35, 36, 42, 60). Because Dr. Kiaei relies on these exhibits in support of his testimony in this case, IXI has not shown that they are irrelevant under FRE 401 and 402. Accordingly, we deny IXI's motion to exclude Exhibits 1002, 1014, and 1015.

IXI also moves to exclude Exhibits 1016 and 1017 on the basis of relevance, hearsay, and authenticity. Paper 21, 5–9. IXI further contends Exhibits 1016 and 1017 constitute improper supplemental information that was submitted without authorization pursuant to 37 C.F.R. § 42.123. *Id.* at 2–5. Because we do not rely upon Exhibits 1016 and 1017 in rendering this Decision, we dismiss as moot IXI's motion to exclude these exhibits.

III. CONCLUSION

Petitioner has demonstrated, by a preponderance of the evidence, that

(a) claims 1, 4, 7, and 14 are unpatentable over Marchand, Nurmann, and Vilander under 35 U.S.C. § 103(a);

(b) claim 5 is unpatentable over Marchand, Nurmann, Vilander, and RFC 2543 under 35 U.S.C. § 103(a);

(c) claims 6 and 23 are unpatentable over Marchand, Nurmann, Vilander, and Larsson under 35 U.S.C. § 103(a);

(d) claims 12, 15, 22, 34, 39, 40, 42, and 46 are unpatentable over Marchand, Nurmann, Vilander, and JINI Spec. under 35 U.S.C. § 103(a); and

(e) claims 25 and 28 are unpatentable over Marchand, Larsson, and JINI Spec. under 35 U.S.C. § 103(a).

IV. ORDER

In consideration of the foregoing, it is

ORDERED that claims 1, 4–7, 12, 14, 15, 22, 23, 25, 28, 34, 39, 40, 42, and 46 of the '033 patent are held unpatentable;

FURTHER ORDERED that IXI's motion to exclude Exhibits 1002, 1014, and 1015 is *denied*;

FURTHER ORDERED that IXI's motion to exclude Exhibits 1016 and 1017 is *dismissed as moot*; and

FURTHER ORDERED that because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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Attorney Docket No. IXI-002US (15-1084)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of:	Amit HALLER et al. §	Group Art Unit:	2616
Patent No:	7,039,033 §	Confirmation No.	2705
Issue Date:	May 2, 2006 §		
Serial No.:	09/850,399 §		
Filed:	May 7, 2001 §		

Title: SYSTEMS, DEVICE AND COMPUTER READABLE MEDIUM FOR PROVIDING A MANAGED WIRELESS NETWORK USING SHORT-RANGE RADIO SIGNALS

NOTIFICATION OF LOSS OF ENTITLEMENT TO SMALL ENTITY STATUS

Pursuant to 37 CFR 1.27(g)(2), the Applicants notify the Office of loss of entitlement to small entity status for the patent referenced above.

Respectfully submitted,

Respectfully submitted,

Amit HALLER et al.

15 July 2016 (Date)

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Electronic Acknowledgement Receipt

EFS ID:	26362651
Application Number:	09850399
International Application Number:	
Confirmation Number:	2705
Title of Invention:	SYSTEM, DEVICE AND COMPUTER READABLE MEDIUM FOR PROVIDING A MANAGED WIRELESS NETWORK USING SHORT-RANGE RADIO SIGNALS
First Named Inventor/Applicant Name:	Amit Haller
Customer Number:	27730
Filer:	Gary David Colby
Filer Authorized By:	
Attorney Docket Number:	IXIM-01003US1
Receipt Date:	18-JUL-2016
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Application Type:	Utility under 35 USC 111(a)

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Notification of loss of entitlement to small entity status	15-1084_001.pdf	46271 71f4f7a823fb9f954bfd65cfee44226949168407	no	1

Warnings:

Information:	
Total Files Size (in bytes):	46271

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Southern District of New York on the following

☐ Trademarks or ☒ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
14CV 2396	4/4/2014	500 Pearl Street New York, NY 10007

PLAINTIFF	DEFENDANT
Network-1 Technologies, Inc.	Google, Inc. et al

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8010988	8/30/2011	Cox
2	8205237	6/19/2012	Cox
3	8640179	1/28/2014	Cox
4	8656044	2/18/2014	Cox
5			

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT
N/A.

CLERK	(BY) DEPUTY CLERK	DATE
Ruby J. Krajick.		4/4/2014

Copy 1—Upon initiation of action, mail this copy to Director **Copy 3—Upon termination of action, mail this copy to Director**
Copy 2—Upon filing document adding patent(s), mail this copy to Director **Copy 4—Case file copy**

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court SOUTHERN DISTRICT of NEW YORK on the following

☐ Trademarks or ☐ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
14CV4355	6/17/2014	500 Pearl Street New York, NY 10007

PLAINTIFF	DEFENDANT
IXI Mobile (R&D) Ltd. et al	Samsung Electronics Co. Ltd. et al.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	7995532	11/13/2007	Haller et al.
2	7426398	9/16/2008	Reisgies
3	7039033	5/2/2006	Haller et al.
4	7016648	3/21/2006	Haller et al.
5			

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading		
	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1			
2			
3			
4			
5			

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT
N/A.

CLERK	(BY) DEPUTY CLERK	DATE
Ruby J. Krajick		6/17/2014

Copy 1—Upon initiation of action, mail this copy to Director **Copy 3—Upon termination of action, mail this copy to Director**
Copy 2—Upon filing document adding patent(s), mail this copy to Director **Copy 4—Case file copy**

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Southern District of New York on the following

☐ Trademarks or ☒ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
14CV4428	6/18/2014	500 Pearl Street New York, NY 10007

PLAINTIFF	DEFENDANT
1X1 Mobile (R&D) Ltd. et al.	Blackberry Limited et al.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	7295532	11/13/2007	Haller et al
2	7426398	9/16/2008	Reisgies
3	7039033	5/2/2006	Haller et al
4	7016648	3/21/2006	Haller et al
5			

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT
N/A.

CLERK	(BY) DEPUTY CLERK	DATE
Ruby J. Krajick		6/18/2014

Copy 1—Upon initiation of action, mail this copy to Director **Copy 3—Upon termination of action, mail this copy to Director**
Copy 2—Upon filing document adding patent(s), mail this copy to Director **Copy 4—Case file copy**

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Southern District of New York on the following

☐ Trademarks or ☒ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
14 CV 4981	7/2/2014	500 Pearl Street New York, NY 10007

PLAINTIFF	DEFENDANT
Teva Women's Health, Inc. et al	Famy Care Ltd. et al

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8415332	4/9/2013	Diliberti et al.
2	8450299	5/28/2013	Diliberti et al
3			
4			
5			

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT
N/A.

CLERK	(BY) DEPUTY CLERK	DATE
Ruby J. Krajick		7/2/2014

Copy 1—Upon initiation of action, mail this copy to Director **Copy 3—Upon termination of action, mail this copy to Director**
Copy 2—Upon filing document adding patent(s), mail this copy to Director **Copy 4—Case file copy**

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
09/850,399	05/07/2001	Amit Haller	IXIM-01003US1

CONFIRMATION NO. 2705

27730
DILWORTH PAXSON LLP
1500 Market Street
Suite 3500 E
PHILADELPHIA, PA 19102

POA ACCEPTANCE LETTER

OC000000075483181

Date Mailed: 06/01/2015

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 05/29/2015.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/dtvernon/

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
09/850,399	05/07/2001	Amit Haller	

CONFIRMATION NO. 2705

74917
ROBERT G. LEV
4766 MICHIGAN BLVD.
YOUNGSTOWN, OH 44505

POWER OF ATTORNEY NOTICE

OC000000075483154

Date Mailed: 06/01/2015

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 05/29/2015.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/dtvernon/

PTO/SB/81A (12-08)
Approved for use through 11/30/2011. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT - POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY WITH A NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS

Patent Number	7,039,033
Issue Date	05-02-2006
First Named Inventor	Amit Haller
Title	System, Device and Computer Readable Medium for Providing a Managed Wireless Network Using
Attorney Docket Number	IXIM-01003US1

I hereby revoke all previous powers of attorney given in the above-identified patent.

☐ A Power of Attorney is submitted herewith.

OR

☒ I hereby appoint Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s) with respect to the patent identified above, and to transact all business in the United States Patent and Trademark Office connected therewith: 27730

OR

☐ I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s) with respect to the patent identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

Practitioner(s) Name	Registration Number

Please recognize or change the correspondence address for the above-identified patent to:

☒ The address associated with the above-mentioned Customer Number.

OR

☐ The address associated with Customer Number:

OR

☐ Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

I am the:

☐ Inventor, having ownership of the patent.

OR

☒ Patent owner.

Statement under 37 CFR 3.73(b) (Form PTO/SB/96) submitted herewith or filed on _____.

SIGNATURE of Inventor or Patent Owner

Signature	/Steven Robert Pedersen/	Date	05/13/2015
Name	Steven Robert Pedersen	Telephone	212-634-7150
Title and Company	Manager, IXI IP, LLC		

NOTE: Signatures of all the inventors or patent owners of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

☒ *Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PTO/SB/47 (03-09)
Approved for use through 03/31/2012. OMB 0651-0016
U.S. Patent and Trademark Office; U. S. DEPARTMENT OF COMMERCE

"FEE ADDRESS" INDICATION FORM

Address to:
Mail Stop M Correspondence
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

- OR -

Fax to:
571-273-6500

INSTRUCTIONS: The issue fee must have been paid for application(s) listed on this form. In addition, only an address represented by a Customer Number can be established as the fee address for maintenance fee purposes (hereafter, fee address). A fee address should be established when correspondence related to maintenance fees should be mailed to a different address than the correspondence address for the application. **When to check the first box below**: If you have a Customer Number to represent the fee address. **When to check the second box below**: If you have no Customer Number representing the desired fee address, in which case a completed Request for Customer Number (PTO/SB/125) must be attached to this form. For more information on Customer Numbers, see the Manual of Patent Examining Procedure (MPEP) § 403.

For the following listed application(s), please recognize as the "Fee Address" under the provisions of 37 CFR 1.363 the address associated with:

☑ Customer Number: 27730

OR

☐ The attached Request for Customer Number (PTO/SB/125) form.

PATENT NUMBER (if known)	APPLICATION NUMBER
7,039,033	09/850,399

Completed by (check one):

☐ Applicant/Inventor — /Gary D. Colby/ (Signature)

☑ Attorney or Agent of record 40,961 (Reg. No.) — Gary D. Colby (Typed or printed name)

☐ Assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96) — 215-575-7075 (Requester's telephone number)

☐ Assignee recorded at Reel _____ Frame_____ — 05/14/2015 (Date)

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more that one signature is required, see below*.

☑ * Total of 1 forms are submitted.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt

EFS ID:	22442515
Application Number:	09850399
International Application Number:	
Confirmation Number:	2705
Title of Invention:	SYSTEM, DEVICE AND COMPUTER READABLE MEDIUM FOR PROVIDING A MANAGED WIRELESS NETWORK USING SHORT-RANGE RADIO SIGNALS
First Named Inventor/Applicant Name:	Amit Haller
Customer Number:	74917
Filer:	Gary David Colby
Filer Authorized By:	
Attorney Docket Number:	
Receipt Date:	29-MAY-2015
Filing Date:	07-MAY-2001
Time Stamp:	09:26:28
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Assignee showing of ownership per 37 CFR 3.73	sb0096_7039033.pdf	462983 2a976a2fe7c9b6952495c2e9c50ec1d3f093f51b	no	2

Warnings:	
Information:	

2	Power of Attorney	sb0081a_7039033.pdf	817133 6b899125381665803f665b33b3d2588e7a505ba6	no	2
Warnings:					
Information:					
3	Maintenance Fee Address Change	sb0047_7039033.pdf	318985 b8707a116398fc890d8e405e94643df0bf421527	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	1599101	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/96 (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: IXI IP, LLC

Application No./Patent No.: 7,039,033 Filed/Issue Date: May 2, 2006

Titled:

IXI IP, LLC , a Corporation

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.

states that it is:

1. [x] the assignee of the entire right, title, and interest in;

2. [ ] an assignee of less than the entire right, title, and interest in (The extent (by percentage) of its ownership interest is _____ %); or

3. [ ] the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above, by virtue of either:

A. [ ] An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy therefore is attached.

OR

B. [x] A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: Haller, Fornell, Itzchak, Glick and Haparnas To: IXI Mobile (ISRAEL) LTD.

The document was recorded in the United States Patent and Trademark Office at
Reel 13273 , Frame 00484 , or for which a copy thereof is attached.

2. From: IXI Mobile (ISRAEL) LTD. To: IXI Mobile (R&D) LTD.

The document was recorded in the United States Patent and Trademark Office at
Reel 32239 , Frame 0078 , or for which a copy thereof is attached.

3. From: IXI Mobile (R&D) LTD. To: IXI IP, LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 33042 , Frame 00985 , or for which a copy thereof is attached.

[ ] Additional documents in the chain of title are listed on a supplemental sheet(s).

[x] As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (*i.e.*, a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Steven Robert Pedersen/ 05/13/2015

Signature Date

Steven Robert Pedersen Manager

Printed or Typed Name Title

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

✎ AO 120 (Rev. 3/04)

TO:	**Commissioner of Trademarks** **P.O. Box 1451** **Alexandria, VA 22313-1451** ATTN: TTAB	**REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK**

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court **Southern District of New York** on the following ☐ Patents or ☒ Trademarks:

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
14cv7954	10/02/2014	500 Pearl Street New York, NY 10007

PLAINTIFF	DEFENDANT
IXI Mobile (R&D) Ltd. Et al	Apple, Inc.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	7295532	11/13/2007	IXI IP
2	7426398	09/16/2008	IXI IP
3	7016648	3/21/2006	IXI IP
4	7039033	5/2/2006	IXI IP
5			

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE
Ruby Krajick		10/2/14

Copy 1—Upon initiation of action, mail this copy to Director **Copy 3—Upon termination of action, mail this copy**
Copy 2—Upon filing document adding patent(s), mail this copy to Director **Copy 4—Case file copy**

✎ AO 120 (Rev. 3/04)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Commissioner of Trademarks P.O. Box 1451 Alexandria, VA 22313-1451 ATTN: TTAB	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court **Southern District of New York** on the following ☐ Patents or ☒ Trademarks:

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
14cv7954	10/02/2014	500 Pearl Street New York, NY 10007

PLAINTIFF	DEFENDANT
IXI Mobile (R&D) Ltd. Et al	Apple, Inc.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	7295532	11/13/2007	IXI IP
2	7426398	09/16/2008	IXI IP
3	7016648	3/21/2006	IXI IP
4	7039033	5/2/2006	IXI IP
5			

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE
Ruby Krajick		10/2/2014

Copy 1—Upon initiation of action, mail this copy to Director **Copy 3—Upon termination of action, mail this copy**
Copy 2—Upon filing document adding patent(s), mail this copy to Director **Copy 4—Case file copy**

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
09/850,399	05/07/2001	Amit Haller	

CONFIRMATION NO. 2705

74917
ROBERT G. LEV
4766 MICHIGAN BLVD.
YOUNGSTOWN, OH 44505

POA ACCEPTANCE LETTER

OC000000048408859

Date Mailed: 06/24/2011

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 06/15/2011.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/deelliott/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
09/850,399	05/07/2001	Amit Haller	IXIM-01000US0

CONFIRMATION NO. 2705

28554
Vierra Magen Marcus & DeNiro LLP
575 Market Street, Suite 2500
San Francisco, CA 94105

POWER OF ATTORNEY NOTICE

OC000000048408813

Date Mailed: 06/24/2011

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 06/15/2011.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

/deelliott/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

Transmittal Letter to Commissioner (Patent Issued)

Docket Number
0276-100

Address To
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Title of Invention

SYSTEM, DEVICE AND COMPUTER READABLE MEDIUM FOR PROVIDING A MANAGED WIRELESS NETWORK USING SHORT-RANAGE RADIO SIGNALS

First Named Inventor	Amit Haller
Application No.	09/840,399
Filing Date	05-07-2001
Patent No.	7,039,033
Examiner	Duong, Frank
Art Unit	2616

Transmitted herewith is:

1. REVOCATION OF POA WITH NEW POA, CHANGE OF CORRESPONDENCE ADDRESS and STATEMENT UNDER 37 CFR 3.73(b) -- signed by Zion Hadad who is the Director of the Assignee.

in the above identified application.

- [X] No additional fee is required.
- [ ] A check in the amount of _____ is attached.
- [ ] The Director is hereby authorized to charge and credit Deposit Account No. _____ as described below.
  - [ ] Charge the amount of _____
  - [ ] Credit any overpayment.
  - [ ] Charge any additional fee required.
- [ ] Payment by credit card. Form PTO-2038 is attached.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

Transmittal Letter to Commissioner (Patent Issued)

Docket Number
0276-100

Correspondence Address			
Customer Number	74917		
-OR-			
Name			
Address			
City		State	
Country		Postal Code	
Phone Number			
E-mail Address			

Certificate of Mailing by Express Mail

I hereby certify that this Transmittal Letter, accompanying documents and fee (if appropriate) are being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450 on the date indicated below:

(Date of Mailing)

(Typed or Printed Name of Person Mailing Correspondence)

(Signature of Person Mailing Correspondence)

("Express Mail" Mailing Label Number)

Certificate of Mailing by First Class Mail

I hereby certify that this Transmittal Letter, accompanying documents and fee (if appropriate) are being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450 on the date indicated below:

(Date of Mailing) *(Name of Person Mailing Correspondence)*

(Signature of Person Mailing Correspondence)

Certificate of Transmission

I hereby certify that this Transmittal Letter, accompanying documents and fee authorization (if appropriate) is being facsimile transmitted to the United States Patent and Trademark Office on the date indicated below:

(Date of Transmission) *(Name of Person Transmitting Correspondence)*

(Signature of Person Transmitting Correspondence)

Signature Instructions

Select the name of the person who will electronically sign the Transmittal Letter from the drop-down box below.

If a practitioner is not present in the drop-down list, you must close this form and select 'Add Practitioner...' in the Form Manager's Utility menu.

Verify that the signatory information is correct and press the 'eSign' button to electronically sign the submission. If you prefer to sign the form manually, simply do not click the 'eSign' button; just print and manually sign.

Signatory Drop-Down Box Robert G. Lev

Name	/Robert G. Lev/		Registration Number	30,280
Signatory Capacity	Attorney for Applicant(s)	E-mail Address	patdoc@lev-ip.com	
eSign	//Robert G. Lev//		Date Signed	06/22/2011

REVOCATION OF POWER OF ATTORNEY WITH A NEW POWER OF ATTORNEY CHANGE OF CORRESPONDENCE ADDRESS AND STATEMENT UNDER 37 CFR 3.73 (b)		PTO/SB/83
	Patent Number	7,039,033
	Issue Date	05-02-2006
	First Named Inventor	Amit HALLER
	Title	System, Device and ...
	Examiner Name	DUONG, Frank
	Attorney Docket Number	0276-100

Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Sir:

I hereby revoke all previous powers of attorney given in the above-identified application, and appoint the following agent to prosecute this application and to transact all business in the United States Patent and Trademark Office connected therewith.

Robert G. LEV Registration No. 30,280

☒ Please change the correspondence address for the above-identified application to the address associated with Customer Number:

74917

Tel: (330) 759-1423
Fax: (330) 759-4865

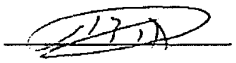
I am the:
☐ Applicant/Inventor
☒ Assignee of record of the entire interest.

Statement under 37 CFR 3.73 (b):

IXI Mobile (Israel) Ltd., a corporation, is the owner of the entire right, title, and interest in the above-identified application by virtue of an assignment from the inventor(s), the assignment being recorded in the USPTO at Reel **013273**, Frame **0484**. The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

I, the undersigned, am empowered to act on behalf of the Assignee. Acting on behalf of the Assignee, I have reviewed all the documents in the chain of title of the patent application identified above, and, to the best of my knowledge and belief, title is in the Assignee identified above.

IXI Mobile (Israel) Ltd.

Signature: 

Name: Zion HADAD

Capacity: Director

Date: November 14th, 2010

Electronic Acknowledgement Receipt

EFS ID:	10360766
Application Number:	09850399
International Application Number:	
Confirmation Number:	2705
Title of Invention:	SYSTEM, DEVICE AND COMPUTER READABLE MEDIUM FOR PROVIDING A MANAGED WIRELESS NETWORK USING SHORT-RANGE RADIO SIGNALS
First Named Inventor/Applicant Name:	Amit Haller
Customer Number:	28554
Filer:	Robert G. Lev
Filer Authorized By:	
Attorney Docket Number:	IXIM-01000US0
Receipt Date:	22-JUN-2011
Filing Date:	07-MAY-2001
Time Stamp:	13:24:38
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	06-22-11Transmittal.pdf	122677 abe59a11ac6ff7d9e446e06a91e2cf8ac6120878	no	2

Warnings:	
Information:	

2	CRF Statement Paper and CRF are the same	06-22-11POA-37CFR.pdf	93118 3a73187805c75db5a3421a6c49cc546fff601305	no	1
Warnings:					
Information:					
			Total Files Size (in bytes):	215795	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
09/850,399	05/07/2001	Amit Haller	IXIM-01000US0

CONFIRMATION NO. 2705

28554
Vierra Magen Marcus & DeNiro LLP
575 Market Street, Suite 2500
San Francisco, CA 94105

MISCELLANEOUS NOTICE

OC000000044186083

Date Mailed: 11/08/2010

A communication which cannot be delivered in electronic form has been mailed to the applicant.

Doc Code: N572

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
09/850,399	05/07/2001	Amit Haller	IXIM-01000US0

CONFIRMATION NO. 2705

OC000000044186083

28554
Vierra Magen Marcus & DeNiro LLP
575 Market Street, Suite 2500
San Francisco, CA 94105

Cc: ROBERT G. LEV
4766 MICHIGAN BLVD.
YOUNGSTOWN, OH 44505

Date Mailed: 11/08/2010

DENIAL OF REQUEST FOR POWER OF ATTORNEY

The request for Power of Attorney filed 10/19/2010 is acknowledged. However, the request cannot be granted at this time for the reason stated below.

- ☐ The Power of Attorney you provided did not comply with the new Power of Attorney rules that became effective on June 25, 2004. See 37 CFR 1.32.
- ☐ The revocation is not signed by the applicant, the assignee of the entire interest, or one particular principal attorney having the authority to revoke.
- ☒ The Power of Attorney is from an assignee and the Certificate required by 37 CFR 3.73(b) has not been received.
- ☐ The person signing for the assignee has omitted their empowerment to sign on behalf of the assignee.
- ☐ The inventor(s) is without authority to appoint attorneys since the assignee has intervened as provided by 37 CFR 3.71.
- ☐ The signature(s) of _____ , a co-inventor in this application, has been omitted. The Power of Attorney will be entered upon receipt of confirmation signed by said co-inventor(s).
- ☐ The person(s) appointed in the Power of Attorney is not registered to practice before the U.S. Patent and Trademark Office.

Questions relating to this Notice should be directed to the Application Assistance Unit.

GT

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

PTO/SB/81A (12-08)
Approved for use through 11/30/2011. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT - POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY WITH A NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS

Patent Number	7039033
Issue Date	05/02/2006
First Named Inventor	Amit HALLER
Title	System, Device And Computer Readable Medium For Providing A
Attorney Docket Number	

I hereby revoke all previous powers of attorney given in the above-identified patent.

☐ A Power of Attorney is submitted herewith.

OR

☒ I hereby appoint Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s) with respect to the patent identified above, and to transact all business in the United States Patent and Trademark Office connected therewith: 74917

OR

☐ I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s) with respect to the patent identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

Practitioner(s) Name	Registration Number

Please recognize or change the correspondence address for the above-identified patent to:

☒ The address associated with the above-mentioned Customer Number.

OR

☐ The address associated with Customer Number:

OR

☐ Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

I am the:

☐ Inventor, having ownership of the patent.

OR

☒ Patent owner.

Statement under 37 CFR 3.73(b) (Form PTO/SB/96) submitted herewith or filed on _____.

SIGNATURE of Inventor or Patent Owner

Signature		Date	June 29 ,2010
Name	Zion HADAD	Telephone	
Title and Company	Director, IXI Mobile (Israel) Ltd		

NOTE: Signatures of all the inventors or patent owners of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

☐ *Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Electronic Acknowledgement Receipt

EFS ID:	8650878
Application Number:	09850399
International Application Number:	
Confirmation Number:	2705
Title of Invention:	SYSTEM, DEVICE AND COMPUTER READABLE MEDIUM FOR PROVIDING A MANAGED WIRELESS NETWORK USING SHORT-RANGE RADIO SIGNALS
First Named Inventor/Applicant Name:	Amit Haller
Customer Number:	28554
Filer:	Robert G. Lev
Filer Authorized By:	
Attorney Docket Number:	IXIM-01000US0
Receipt Date:	19-OCT-2010
Filing Date:	07-MAY-2001
Time Stamp:	10:19:25
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	10-19-10Transmittal.pdf	40039 751ff5e134e42dcb14fbe58f0ca1a59d35773ac1	no	2

Warnings:	
Information:	

2	Change of Address	07-20-10POA.pdf	91120 4b3f7da48290770b561c528625fef3d274db1ab9	no	1

Warnings:	
Information:	
Total Files Size (in bytes):	131159

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Transmittal Letter to Commissioner (Patent Issued)

Docket Number
0276-100

Address To
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Title of Invention

SYSTEM, DEVICE AND COMPUTER READABLE MEDIUM FOR PROVIDING A MANAGED WIRELESS NETWORK USING SHORT-RANGE RADIO SIGNALS

First Named Inventor	Amit Haller
Application No.	09/850,399
Filing Date	May 07, 2001
Patent No.	7,039,033
Examiner	Duong, Frank
Art Unit	2616

Transmitted herewith is:

1. POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY WITH A NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS

in the above identified application.

- [X] No additional fee is required.
- [ ] A check in the amount of _____ is attached.
- [ ] The Director is hereby authorized to charge and credit Deposit Account No. _____ as described below.
  - [ ] Charge the amount of _____
  - [ ] Credit any overpayment.
  - [ ] Charge any additional fee required.
- [ ] Payment by credit card. Form PTO-2038 is attached.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

Transmittal Letter to Commissioner (Patent Issued)

Docket Number
0276-100

Correspondence Address			
Customer Number	74917		
-OR-			
Name			
Address			
City		State	
Country		Postal Code	
Phone Number			
E-mail Address			

Certificate of Mailing by Express Mail

I hereby certify that this Transmittal Letter, accompanying documents and fee (if appropriate) are being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450 on the date indicated below:

(Date of Mailing)

(Typed or Printed Name of Person Mailing Correspondence)

(Signature of Person Mailing Correspondence)

("Express Mail" Mailing Label Number)

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(Date of Mailing) *(Name of Person Mailing Correspondence)*

(Signature of Person Mailing Correspondence)

Certificate of Transmission

I hereby certify that this Transmittal Letter, accompanying documents and fee authorization (if appropriate) is being facsimile transmitted to the United States Patent and Trademark Office on the date indicated below:

(Date of Transmission) *(Name of Person Transmitting Correspondence)*

(Signature of Person Transmitting Correspondence)

Signature Instructions

Select the name of the person who will electronically sign the Transmittal Letter from the drop-down box below.

If a practitioner is not present in the drop-down list, you must close this form and select 'Add Practitioner...' in the Form Manager's Utility menu.

Verify that the signatory information is correct and press the 'eSign' button to electronically sign the submission. If you prefer to sign the form manually, simply do not click the 'eSign' button; just print and manually sign.

Signatory Drop-Down Box Robert G. Lev

Name	Robert G. Lev		Registration Number	30,280
Signatory Capacity	Attorney for Applicant(s)	E-mail Address	patdoc@lev-ip.com	
eSign	/Robert G. Lev/		Date Signed	10/19/2010

07/26/10

2010 JUL 28 PM 4:16 RECEIVED

MS

PTO/SB/66 (03-09)
Approved for use through 03/31/2012. OMB 0851-0016
U.S. Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE

PETITION TO ACCEPT UNINTENTIONALLY DELAYED PAYMENT OF MAINTENANCE FEE IN AN EXPIRED PATENT (37 CFR 1.378(c))

Docket Number (Optional): 0276-100

Mail to: Mail Stop Petition
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
Fax: (571) 273-8300

07/30/2010 DALLEN 00000062 7039033
01 FC:1599 2130.00 OP

NOTE: If information or assistance is needed in completing this form, please contact Petitions Information at (571) 272-3282.

Patent No. 7,039,033 Application Number 09/850,399

Issue Date May 02, 2006 Filing Date May 07, 2001

CAUTION: Maintenance fee (and surcharge, if any) payment must correctly identify: (1) the patent number (or reissue patent number, if a reissue) and (2) the application number of the actual U.S. application (or reissue application) leading to issuance of that patent to ensure the fee(s) is/are associated with the correct patent. 37 CFR 1.366(c) and (d).

Also complete the following information, if applicable

Refund Ref:
07/30/2010 DALLEN 0000171548

CHECK Refund Total: $65.00

The above-identified patent:

☐ is a reissue of original Patent No. _____, original issue date _____; original application number _____, original filing date _____.

☐ resulted from the entry into the U.S. under 35 U.S.C. 371 of international application _____ filed on _____.

CERTIFICATE OF MAILING (37 CFR 1.8(a))

I hereby certify that this paper (*along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to Mail Stop Petition, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, or facsimile transmitted to the U.S. Patent and trademark Office on the date shown below.

July 23, 2010
Date

Kim Woods
Signature

10/06/2010 CKHLOK 00000007 7039033

01 FC:2551 490.00 OP
02 FC:1558 1640.00 OP

Kim Woods - Express Mail: EH797541527US
Typed or printed name of person signing Certificate

Adjustment date: 10/06/2010 CKHLOK
07/30/2010 DALLEN 00000062 7039033
-2130.00 OP
01 FC:1599

PTO/SB/66 (03-09)
Approved for use through 03/31/2012. OMB 0651-0016
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

1. SMALL ENTITY

☒ Patentee claims, or has previously claimed, small entity status. See 37 CFR 1.27.

2. LOSS OF ENTITLEMENT TO SMALL ENTITY STATUS

☐ Patentee is no longer entitled to small entity status. See 37 CFR 1.27(g).

3. MAINTENANCE FEE (37 CFR 1.20(e)-(g))

The appropriate maintenance fee must be submitted with this petition, unless it was paid earlier.

NOT Small Entity			Small Entity		
Amount	Fee	(Code)	Amount	Fee	(Code)
☐ $ _____	3 1/2 yr fee	(1551)	☑ $ 490	3 1/2 yr fee	(2551)
☐ $ _____	7 1/2 yr fee	(1552)	☐ $ _____	7 1/2 yr fee	(2552)
☐ $ _____	11 1/2 yr fee	(1553)	☐ $ _____	11 1/2 yr fee	(2553)

MAINTENANCE FEE BEING SUBMITTED $ 555.00

4. SURCHARGE

The surcharge required by 37 CFR 1.20(i)(2) of $ 1640. (Fee Code 1558) must be paid as a condition of accepting unintentionally delayed payment of the maintenance fee.

SURCHARGE BEING SUBMITTED $ 1640.

5. MANNER OF PAYMENT

☒ Enclosed is a check for the sum of $ 2,195.00 .

☐ Please charge Deposit Account No. _____ the sum of $ _____.

☐ Payment by credit card. Form PTO-2038 is attached.

6. AUTHORIZATION TO CHARGE ANY FEE DEFICIENCY

☐ The Director is hereby authorized to charge any maintenance fee, surcharge or petition deficiency to Deposit Account No. _____.

7. OVERPAYMENT

As to any overpayment made please

☐ Credit to Deposit Account No. _____.

OR

☒ Send refund check.

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

8. STATEMENT

The delay in payment of the maintenance fee to this patent was unintentional.

9. PETITIONER(S) REQUEST THAT THE DELAYED PAYMENT OF THE MAINTENANCE FEE BE ACCEPTED AND THE PATENT REINSTATED.

Signature(s) of Petitioner(s)	July 23, 2010 Date
Robert G. Lev Typed or printed name(s)	30,280 Registration Number, if applicable
330-759-1423 Telephone Number	
4766 Michigan Blvd. Address	
Youngstown, OH 44505 Address	

37 CFR 1.378(d) states: "Any petition under this section must be signed by an attorney or agent registered to practice before the Patent and Trademark Office, or by the patentee, the assignee, or other party in interest."

ENCLOSURES:

☒ Maintenance Fee payment

☒ Surcharge under 37 CFR 1.20(i)(2) (fee for filing the maintenance fee petition)

☒ Power of Attorney - Signed

[Page 3 of 3]

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

MAILED

OCT 06 2010

OFFICE OF PETITIONS

VIERRA MAGEN MARCUS & DENIRO LLP
575 MARKET STREET, SUITE 2500
SAN FRANCISCO CA 94105

In re Patent No. 7,039,033 :
Issued: May 2, 2006 :
Application No. 09/850,399 : ON PETITION
Filed: May 7, 2001 :
Attorney Docket No. IXIM-01000US0 :

This is a decision on the petition under 37 CFR 1.378(c), filed July 23, 2010, to accept the delayed payment of a maintenance fee for the above-identified patent.

The petition is **GRANTED**.

This patent expired on May 3, 2010 for failure to pay the three and one-half year maintenance fee. Since this petition was submitted within twenty-four months after the six-month grace period provided in 37 CFR 1.362(e), the petition was timely filed under the provisions of 37 CFR 1.378(c).

The maintenance fee is hereby accepted and the above-identified patent is reinstated as of the mail date of this decision.

It is not apparent whether the statement of unintentional delay was signed by a person who would have been in a position of knowing that the delay in filing a timely response was unintentional. Nevertheless, in accordance with 37 CFR 10.18, the statement is accepted as constituting a certification of unintentional delay. However, in the event that petitioner has no knowledge that the delay in paying the maintenance fee was in fact unintentional, petitioner must make such an inquiry to ascertain that, in fact the delay was unintentional. If petitioner discovers that the delay in paying the maintenance fee was intentional, petitioner must so notify the Office.

Further, the Power of Attorney and Change of Correspondence Address submitted with the instant petition is hereby not accepted.

ESTABLISHING OWNERSHIP

When an assignee first seeks to take action in a matter before the Office with respect to a patent application, patent, or reexamination proceeding, the assignee must establish its ownership of the property to the satisfaction of the Director. **37 CFR 3.73(b)**. The assignee's ownership may be established under **37 CFR 3.73(b)** by submitting to the Office, in the Office file related to the matter in which action is sought to be taken: (A) documentary evidence of a chain of title from the original owner to the assignee (e.g., copy of an executed assignment submitted for recording) and a statement affirming that

the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is, submitted for recordation pursuant to 37 CFR **3.11**; or
(B) a statement specifying, by reel and frame number, where such evidence is recorded in the Office.
Documents submitted to establish ownership are required to be recorded, or submitted for recordation pursuant to 37 CFR **3.11**, as a condition to permitting the assignee to take action in a matter pending before the Office.
The action taken by the assignee, and the 37 CFR **3.73(b)** submission establishing that the assignee is the appropriate assignee to take such action, can be combined in one paper.
The establishment of ownership by the assignee must be submitted prior to, or at the same time as, the paper requesting or taking action is submitted. 37 CFR 3.73(c). **If the submission establishing ownership is not present, the action sought to be taken will not be given effect.** If the submission establishing ownership is submitted at a later date, that date will be the date of the request for action or the date of the assignee's action taken.
The submission establishing ownership by the assignee must be signed by a party who is authorized to act on behalf of the assignee. See discussion below. Once **37 CFR 3.73(b)** is complied with by an assignee, that assignee may continue to take action in that application, patent, or reexamination proceeding without filing a **37 CFR 3.73(b)** submission each time, provided that ownership has not changed.
The submission establishing ownership by the assignee pursuant to 37 CFR **3.73(b)** is generally referred to as the "statement under 37 CFR **3.73(b)**" or the "37 CFR **3.73(b)** statement." A duplicate copy of the **37 CFR 3.73(b)** statement is not required and should not be submitted. See **37 CFR 1.4(b)** and **MPEP § 502.04**.

Currently, there is no Statement under 37 CFR 3.73(b) filed in the above-identified patent and therefore the request for Power of Attorney and Change of Correspondence Address cannot be accepted at this time.

A courtesy copy of this decision is being mailed to the address given on the petition; however, the Office will mail all future correspondence solely to the address of record.

Telephone inquiries concerning this decision should be directed to the undersigned at (571) 272-7751.

Joan Olszewski
Petitions Examiner
Office of Petitions

cc: Robert G. Lev
4766 Michigan Blvd.
Youngstown, OH 44505

07-26-10

2010 JUL 28 PM 4:16 RECEIVED

M $

PTO/SB/66 (03-09)
Approved for use through 03/31/2012. OMB 0651-0016
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PETITION TO ACCEPT UNINTENTIONALLY DELAYED PAYMENT OF MAINTENANCE FEE IN AN EXPIRED PATENT (37 CFR 1.378(c))

Docket Number (Optional): 0276-100

Mail to: Mail Stop Petition
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
Fax: (571) 273-8300

07/30/2010 DALLEN 00000062 7039033
01 FC:1599 2130.00 OP

NOTE: If information or assistance is needed in completing this form, please contact Petitions Information at (571) 272-3282.

Patent No. 7,039,033 Application Number 09/850,399

Issue Date May 02, 2006 Filing Date May 07, 2001

CAUTION: Maintenance fee (and surcharge, if any) payment must correctly identify: (1) the patent number (or reissue patent number, if a reissue) and (2) the application number of the actual U.S. application (or reissue application) leading to issuance of that patent to ensure the fee(s) is/are associated with the correct patent. 37 CFR 1.366(c) and (d).

Also complete the following information, if applicable

Refund Ref:
07/30/2010 DALLEN 0000171548

CHECK Refund Total: $65.00

The above-identified patent:

☐ is a reissue of original Patent No. _____, original issue date _____;
original application number _____,
original filing date _____.

☐ resulted from the entry into the U.S. under 35 U.S.C. 371 of international application _____ filed on _____.

CERTIFICATE OF MAILING (37 CFR 1.8(a))

I hereby certify that this paper (*along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to Mail Stop Petition, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, or facsimile transmitted to the U.S. Patent and trademark Office on the date shown below.

July 23, 2010
Date

Kim Woods
Signature

Kim Woods - Express Mail: EH797541527US
Typed or printed name of person signing Certificate

PTO/SB/66 (03-09)
Approved for use through 03/31/2012. OMB 0651-0016
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

1. SMALL ENTITY

☒ Patentee claims, or has previously claimed, small entity status. See 37 CFR 1.27.

2. LOSS OF ENTITLEMENT TO SMALL ENTITY STATUS

☐ Patentee is no longer entitled to small entity status. See 37 CFR 1.27(g).

3. MAINTENANCE FEE (37 CFR 1.20(e)-(g))

The appropriate maintenance fee must be submitted with this petition, unless it was paid earlier.

NOT Small Entity			Small Entity		
Amount	Fee	(Code)	Amount	Fee	(Code)
☐ $ _____	3 1/2 yr fee	(1551)	☑ $ 490	3 1/2 yr fee	(2551)
☐ $ _____	7 1/2 yr fee	(1552)	☐ $ _____	7 1/2 yr fee	(2552)
☐ $ _____	11 1/2 yr fee	(1553)	☐ $ _____	11 1/2 yr fee	(2553)

MAINTENANCE FEE BEING SUBMITTED $ 555.00

4. SURCHARGE

The surcharge required by 37 CFR 1.20(i)(2) of $ 1640. (Fee Code 1558) must be paid as a condition of accepting unintentionally delayed payment of the maintenance fee.

SURCHARGE BEING SUBMITTED $ 1640.

5. MANNER OF PAYMENT

☒ Enclosed is a check for the sum of $ 2,195.00 .

☐ Please charge Deposit Account No. _____ the sum of $ _____.

☐ Payment by credit card. Form PTO-2038 is attached.

6. AUTHORIZATION TO CHARGE ANY FEE DEFICIENCY

☐ The Director is hereby authorized to charge any maintenance fee, surcharge or petition deficiency to Deposit Account No. _____.

7. OVERPAYMENT

As to any overpayment made please

OR

☐ Credit to Deposit Account No. _____.

☒ Send refund check.

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

8. STATEMENT

The delay in payment of the maintenance fee to this patent was unintentional.

9. PETITIONER(S) REQUEST THAT THE DELAYED PAYMENT OF THE MAINTENANCE FEE BE ACCEPTED AND THE PATENT REINSTATED.

Signature(s) of Petitioner(s)	**July 23, 2010** Date
Robert G. Lev Typed or printed name(s)	**30,280** Registration Number, if applicable
330-759-1423 Telephone Number	
4766 Michigan Blvd. Address	
Youngstown, OH 44505 Address	

37 CFR 1.378(d) states: "Any petition under this section must be signed by an attorney or agent registered to practice before the Patent and Trademark Office, or by the patentee, the assignee, or other party in interest."

ENCLOSURES:

☒ Maintenance Fee payment

☒ Surcharge under 37 CFR 1.20(i)(2) (fee for filing the maintenance fee petition)

☒ **Power of Attorney - Signed**

PTO/SB/81A (12-08)
Approved for use through 11/30/2011. OMB 0851-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT - POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY WITH A NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS

Patent Number	7039033
Issue Date	05/02/2006
First Named Inventor	Amit HALLER
Title	System, Device And Computer Readable Medium For Providing A [redacted]
Attorney Docket Number	

I hereby revoke all previous powers of attorney given in the above-identified patent.

☐ A Power of Attorney is submitted herewith.

OR

☒ I hereby appoint Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s) with respect to the patent identified above, and to transact all business in the United States Patent and Trademark Office connected therewith: 74917

OR

☐ I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s) with respect to the patent identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

Practitioner(s) Name	Registration Number

Please recognize or change the correspondence address for the above-identified patent to:

☒ The address associated with the above-mentioned Customer Number.

OR

☐ The address associated with Customer Number:

OR

☐ Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

I am the:

☐ Inventor, having ownership of the patent.

OR

☒ Patent owner.

Statement under 37 CFR 3.73(b) (Form PTO/SB/96) submitted herewith or filed on _____.

SIGNATURE of Inventor or Patent Owner

Signature	[signature]	Date	June 29 ,2010
Name	Zion HADAD	Telephone	
Title and Company	Director, iXI Mobile (Israel) Ltd		

NOTE: Signatures of all the inventors or patent owners of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

☐ *Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: **Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PTO/SB/66 (03-09)
Approved for use through 03/31/2012. OMB 0651-0016
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

1. SMALL ENTITY

☒ Patentee claims, or has previously claimed, small entity status. See 37 CFR 1.27.

2. LOSS OF ENTITLEMENT TO SMALL ENTITY STATUS

☐ Patentee is no longer entitled to small entity status. See 37 CFR 1.27(g).

3. MAINTENANCE FEE (37 CFR 1.20(e)-(g))

The appropriate maintenance fee must be submitted with this petition, unless it was paid earlier.

NOT Small Entity			Small Entity		
Amount	Fee	(Code)	Amount	Fee	(Code)
☐ $ _____	3 1/2 yr fee	(1551)	☑ $ 490	3 1/2 yr fee	(2551)
☐ $ _____	7 1/2 yr fee	(1552)	☐ $ _____	7 1/2 yr fee	(2552)
☐ $ _____	11 1/2 yr fee	(1553)	☐ $ _____	11 1/2 yr fee	(2553)

MAINTENANCE FEE BEING SUBMITTED $ 555.00

4. SURCHARGE

The surcharge required by 37 CFR 1.20(i)(2) of $ 1640. (Fee Code 1558) must be paid as a condition of accepting unintentionally delayed payment of the maintenance fee.

SURCHARGE BEING SUBMITTED $ 1640.

5. MANNER OF PAYMENT

☒ Enclosed is a check for the sum of $ 2,195.00 .

☐ Please charge Deposit Account No. _____ the sum of $ _____

☐ Payment by credit card. Form PTO-2038 is attached.

Payment Copy

6. AUTHORIZATION TO CHARGE ANY FEE DEFICIENCY

☐ The Director is hereby authorized to charge any maintenance fee, surcharge or petition deficiency to Deposit Account No. _____.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571) 273-2885

JAN 23 2006 (stamp)

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

28554 7590 10/24/2005

VIERRA MAGEN MARCUS HARMON & DENIRO LLP
685 MARKET STREET, SUITE 540
SAN FRANCISCO, CA 94105

01/24/2006 MBIZUNEE2 00000023 09850399

01 FC:1501 1400.00 OP
02 FC:1504 300.00 OP

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

Kirk J. DeNiro	(Depositor's name)
[signature]	(Signature)
January 20, 2006	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/850,399	05/07/2001	Amit Haller	IXIM-01000US0	2705

TITLE OF INVENTION: SYSTEM, DEVICE AND COMPUTER READABLE MEDIUM FOR PROVIDING A MANAGED WIRELESS NETWORK USING SHORT-RANGE RADIO SIGNALS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1400	$300	$1700	01/24/2006

EXAMINER	ART UNIT	CLASS-SUBCLASS
DUONG, FRANK	2666	370-335000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Vierra Magen Marcus Harmon & DeNiro LLP
2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: IXI Mobile (israel) Ltd.

(B) RESIDENCE: (CITY and STATE OR COUNTRY): Ra'Anana, Israel

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are enclosed:

☒ Issue Fee
☒ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies ______

4b. Payment of Fee(s):

☐ A check in the amount of the fee(s) is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☐ The Director is hereby authorized by charge the required fee(s), or credit any overpayment, to Deposit Account Number 501826 (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

The Director of the USPTO is requested to apply the Issue Fee and Publication Fee (if any) or to re-apply any previously paid issue fee to the application identified above.
NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature [signature] Date January 20, 2006

Typed or printed name Kirk J. DeNiro Registration No. 35,854

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PTOL-85 (Rev. 07/05) Approved for use through 04/30/2007. OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/850,399	05/07/2001	Amit Haller	IXIM-01000US0	2705

28554 7590 12/23/2005

VIERRA MAGEN MARCUS HARMON & DENIRO LLP
685 MARKET STREET, SUITE 540
SAN FRANCISCO, CA 94105

EXAMINER	
DUONG, FRANK	

ART UNIT	PAPER NUMBER
2666	

DATE MAILED: 12/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Supplemental Notice of Allowability	Application No.	Applicant(s)	
	09/850,399	HALLER ET AL.	
	Examiner	Art Unit	
	Frank Duong	2666	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *08/29/05*.

2. ☒ The allowed claim(s) is/are *1-3, 5-31, 33-58 (now 1-56 accordingly)*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☐ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

FRANK DUONG
PRIMARY EXAMINER

Please type a plus sign (+) inside this box → [+]

PTO/SB/08A (08-00)
Approved for use through 10/31/2002. OMB 0651-0031
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet 1 of 2

Complete if Known	
Application Number	09/850,399
Filing Date	May 7, 2001
First Named Inventor	Amit Haller
Group Art Unit	~~2661~~ 2666
Examiner Name	DONY, J
Attorney Docket Number	IXIM-01000US0

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	U.S. Patent Document Number	Kind Code[2] (if known)	Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
FD		6,326,926		Shoobridge et al.	12/4/2001	—

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Office[3]	Number[4]	Kind Code[5] (if known)	Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
FD			WO 99/48315		Nokia Mobile Phones Ltd.	09-23-1999	—	
FD			JP 3153213		Takayama, Inc.	04-03-2001	—	✓

Examiner Signature		Date Considered	3/27/03

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Unique citation designation number. [2] See attached Kinds of U.S. Patent Documents. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U. S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

Please type a plus sign (+) inside this box → [+]

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Substitute for form 1449B/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet 2 of 2

Complete if Known	
Application Number	09/850,399
Filing Date	May 7, 2001
First Named Inventor	Amit Haller
Group Art Unit	2661
Examiner Name	DUONG, T
Attorney Docket Number	IXIM-01000US0

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
TD		White Paper, Handheld Devices: Comparing the Major Platforms, www.dell.com/r&d, December 2000	
TD		Miyatsu, Bluetooth Design Background and Its Technological Features, IEICE Trans, Fundamentals, Vol. E83-A, No. 11, November 2000	
TD		Parekh, Operating Systems on Wireless Handheld Devices, A Strategic Market Analysis, Massachusettes Institute of Technology, September 28, 2000	
TD		Johansson, et al., Short Range Radio Based Ad-hoc Netowrking: Performance and Properties, IEEE, 1999	

Examiner Signature		Date Considered	3/27/03

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Unique citation designation number. [2] Applicant is to place a check mark here if English language Translation is attached.

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● PRINTER RUSH ●
(PTO ASSISTANCE)

Application :	09/850,399	**Examiner :**	Duong	**GAU :**	2666
From:	KEM	**Location:**	(IDC) FMF FDC	**Date:**	11/22/05

Tracking #: epm 09/850,399 Week Date: 10/31/05

DOC CODE	DOC DATE	MISCELLANEOUS
☑ 1449	4-9-03	☐ Continuing Data
☐ IDS		☐ Foreign Priority
☐ CLM		☐ Document Legibility
☐ IIFW		☐ Fees
☐ SRFW		☐ Other
☐ DRW		
☐ OATH		
☐ 312		
☐ SPEC		

[RUSH] **MESSAGE:** (1) Please initial/line through citations.

thank you

KEM

[XRUSH] **RESPONSE:** Fixed 12/20/05

INITIALS: RD

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REV 10/04

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
www.uspto.gov

Bib Data Sheet

CONFIRMATION NO. 2705

SERIAL NUMBER	FILING DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
09/850,399	05/07/2001 RULE	370	2666	IXIM-01000US0

APPLICANTS

Amit Haller, Belmont, CA;

Peter Fornell, Lake Oswego, OR;
Avraham Itzchak, Ra'anana, ISRAEL;Amir Glick, Tel Aviv, ISRAEL;
Ziv Haparnas, Tel Aviv, ISRAEL;

** CONTINUING DATA **********

** FOREIGN APPLICATIONS **********

IF REQUIRED, FOREIGN FILING LICENSE GRANTED
** 07/02/2001

Foreign Priority claimed ☐ yes ☑ no 35 USC 119 (a-d) conditions met ☐ yes ☐ no ☐ Met after Allowance Verified and Acknowledged Examiner's Signature Initials	STATE OR COUNTRY CA	SHEETS DRAWING 9	TOTAL CLAIMS 57	INDEPENDENT CLAIMS 5

ADDRESS
28554
VIERRA MAGEN MARCUS HARMON & DENIRO LLP
685 MARKET STREET, SUITE 540
SAN FRANCISCO , CA
94105

TITLE
SYSTEM, DEVICE AND COMPUTER READABLE MEDIUM FOR PROVIDING A MANAGED WIRELESS NETWORK USING SHORT-RANGE RADIO SIGNALS

FILING FEE	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time)

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/850,399	05/07/2001	Amit Haller	IXIM-01000US0	2705

28554 7590 12/16/2005

VIERRA MAGEN MARCUS HARMON & DENIRO LLP
685 MARKET STREET, SUITE 540
SAN FRANCISCO, CA 94105

EXAMINER	
DUONG, FRANK	

ART UNIT	PAPER NUMBER
2666	

DATE MAILED: 12/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Supplemental Notice of Allowability	Application No. 09/850,399	Applicant(s) HALLER ET AL.	
	Examiner Frank Duong	Art Unit 2666	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *08/29/05*.

2. ☒ The allowed claim(s) is/are *1-3, 5-31, 33-58 (now 1-56 accordingly)*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☐ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

FRANK DUONG
PRIMARY EXAMINER

Please type a plus sign (+) inside this box → [+]

PTO/SB/08A (08-00)
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U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
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Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet 1 of 2

Complete if Known	
Application Number	09/850,399
Filing Date	May 7, 2001
First Named Inventor	Amit Haller
Group Art Unit	~~2661~~ 2666
Examiner Name	
Attorney Docket Number	IXIM-01000US0

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	U.S. Patent Document Number	Kind Code[2] (if known)	Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
FD		6,326,926		Shoobridge et al.	12/4/2001	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Office[3]	Number[4]	Kind Code[5] (if known)	Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
FD			WO 99/48315		Nokia Mobile Phones Ltd.	09-23-1999		
FD			JP 3153213		Takayama, Inc.	04-03-2001		✓

Examiner Signature		Date Considered	3/27/03

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Unique citation designation number. [2] See attached Kinds of U.S. Patent Documents. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U. S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

Please type a plus sign (+) inside this box → [+]

PTO/SB/08B (08-00)
Approved for use through 10/31/2002. OMB 0651-0031
U. S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Substitute for form 1449B/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet 2 of 2

Complete if Known	
Application Number	09/850,399
Filing Date	May 7, 2001
First Named Inventor	Amit Haller
Group Art Unit	2664
Examiner Name	DUONG, F
Attorney Docket Number	IXIM-01000US0

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
FD		White Paper, Handheld Devices: Comparing the Major Platforms, www.dell.com/r&d, December 2000	
FD		Miyatsu, Bluetooth Design Background and Its Technological Features, IEICE Trans, Fundamentals, Vol. E83-A, No. 11, November 2000	
FD		Parekh, Operating Systems on Wireless Handheld Devices, A Strategic Market Analysis, Massachusettes Institute of Technology, September 28, 2000	
FD		Johansson, et al., Short Range Radio Based Ad-hoc Netowrking: Performance and Properties, IEEE, 1999	

Examiner Signature		Date Considered	12/13/05

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Unique citation designation number. [2] Applicant is to place a check mark here if English language Translation is attached.

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Bib Data Sheet

CONFIRMATION NO. 2705

SERIAL NUMBER	FILING DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
09/850,399	05/07/2001 RULE	370	2666	IXIM-01000US0

APPLICANTS

Amit Haller, Belmont, CA;

Peter Fornell, Lake Oswego, OR;
Avraham Itzchak, Ra'anana, ISRAEL;Amir Glick, Tel Aviv, ISRAEL;
Ziv Haparnas, Tel Aviv, ISRAEL;

** CONTINUING DATA **********

FD none

** FOREIGN APPLICATIONS **********

FD none

IF REQUIRED, FOREIGN FILING LICENSE GRANTED
** 07/02/2001

		STATE OR	SHEETS	TOTAL	INDEPENDENT
Foreign Priority claimed	☐ yes ☑ no				
35 USC 119 (a-d) conditions met	☐ yes ☑ no ☐ Met after Allowance	COUNTRY	DRAWING	CLAIMS	CLAIMS
Verified and Acknowledged	Examiner's Signature / Initials	CA	9	57	5

ADDRESS
28554
VIERRA MAGEN MARCUS HARMON & DENIRO LLP
685 MARKET STREET, SUITE 540
SAN FRANCISCO , CA
94105

TITLE
SYSTEM, DEVICE AND COMPUTER READABLE MEDIUM FOR PROVIDING A MANAGED WIRELESS NETWORK USING SHORT-RANGE RADIO SIGNALS

FILING FEE	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time)

● PRINTER RUSH ●
(PTO ASSISTANCE)

Application :	09/850,399	**Examiner :**	Duong	**GAU :**	2666
From:	KEM	**Location:**	(IDC) FMF FDC	**Date:**	11/22/05

Tracking #: epm 09/850,399 Week Date: 10/31/05

DOC CODE	DOC DATE	MISCELLANEOUS
☑ 1449	4-9-03	☐ Continuing Data
☐ IDS		☐ Foreign Priority
☐ CLM		☐ Document Legibility
☐ IIFW		☐ Fees
☐ SRFW		☐ Other
☐ DRW		
☐ OATH		
☐ 312		
☐ SPEC		

[RUSH] **MESSAGE:** ① Please initial/line through citations.

thank you

KEM

[XRUSH] **RESPONSE:** fixed! 12/13/05

INITIALS: FD

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REV 10/04

● PRINTER RUSH ●
(PTO ASSISTANCE)

Application :	09/850,399	**Examiner :**	Duong	**GAU :**	2666
From:	KEM	**Location:**	(IDC) FMF FDC	**Date:**	11/22/05

Tracking #: epm 09/850,399 Week Date: 10/31/05

DOC CODE	DOC DATE	MISCELLANEOUS
☑ 1449	4-9-03	☐ Continuing Data
☐ IDS		☐ Foreign Priority
☐ CLM		☐ Document Legibility
☐ IIFW		☐ Fees
☐ SRFW		☐ Other
☐ DRW		
☐ OATH		
☐ 312		
☐ SPEC		

[RUSH] **MESSAGE:** ① Please initial/line through citations.

thank you

KEM

[XRUSH] **RESPONSE:**

INITIALS:

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REV 10/04

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NOTICE OF ALLOWANCE AND FEE(S) DUE

28554 7590 10/24/2005

VIERRA MAGEN MARCUS HARMON & DENIRO LLP
685 MARKET STREET, SUITE 540
SAN FRANCISCO, CA 94105

EXAMINER	
DUONG, FRANK	
ART UNIT	**PAPER NUMBER**
2666	

DATE MAILED: 10/24/2005

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/850,399	05/07/2001	Amit Haller	IXIM-01000US0	2705

TITLE OF INVENTION: SYSTEM, DEVICE AND COMPUTER READABLE MEDIUM FOR PROVIDING A MANAGED WIRELESS NETWORK USING SHORT-RANGE RADIO SIGNALS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1400	$300	$1700	01/24/2006

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE REFLECTS A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE APPLIED IN THIS APPLICATION. THE PTOL-85B (OR AN EQUIVALENT) MUST BE RETURNED WITHIN THIS PERIOD EVEN IF NO FEE IS DUE OR THE APPLICATION WILL BE REGARDED AS ABANDONED.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL should be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). Even if the fee(s) have already been paid, Part B - Fee(s) Transmittal should be completed and returned. If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

-85 (Rev. 07/05) Approved for use through 04/30/2007.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

or Fax **(571) 273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

28554 7590 10/24/2005

VIERRA MAGEN MARCUS HARMON & DENIRO LLP
685 MARKET STREET, SUITE 540
SAN FRANCISCO, CA 94105

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)

(Signature)

(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/850,399	05/07/2001	Amit Haller	IXIM-01000US0	2705

TITLE OF INVENTION: SYSTEM, DEVICE AND COMPUTER READABLE MEDIUM FOR PROVIDING A MANAGED WIRELESS NETWORK USING SHORT-RANGE RADIO SIGNALS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1400	$300	$1700	01/24/2006

EXAMINER	ART UNIT	CLASS-SUBCLASS
DUONG, FRANK	2666	370-335000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are enclosed:

☐ Issue Fee

☐ Publication Fee (No small entity discount permitted)

☐ Advance Order - # of Copies _____

4b. Payment of Fee(s):

☐ A check in the amount of the fee(s) is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director is hereby authorized by charge the required fee(s), or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.

☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

The Director of the USPTO is requested to apply the Issue Fee and Publication Fee (if any) or to re-apply any previously paid issue fee to the application identified above.
NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/850,399	05/07/2001	Amit Haller	IXIM-01000US0	2705

28554 7590 10/24/2005

VIERRA MAGEN MARCUS HARMON & DENIRO LLP
685 MARKET STREET, SUITE 540
SAN FRANCISCO, CA 94105

EXAMINER	
DUONG, FRANK	

ART UNIT	PAPER NUMBER
2666	

DATE MAILED: 10/24/2005

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 171 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 171 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571) 272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at (703) 305-8283.

PTOL-85 (Rev. 07/05) Approved for use through 04/30/2007.

EL

Notice of Allowability	Application No.	Applicant(s)	
	09/850,399	HALLER ET AL.	
	Examiner	Art Unit	
	Frank Duong	2666	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *08/29/05*.

2. ☒ The allowed claim(s) is/are *1-3, 5-31, 33-58 (now 1-56 accordingly)*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☐ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

FRANK DUONG
PRIMARY EXAMINER

PTO/SB/08a (07-05)
Approved for use through 07/31/2006. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 2

Complete if Known	
Application Number	09/850,399
Filing Date	May 7, 2001
First Named Inventor	Amit Haller
Art Unit	2666
Examiner Name	Duong, Frank
Attorney Docket Number	IXIM-01000US0

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US-			
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FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
PD		WO 00/39967	07-06-2000	Nokia Wireless Routers, Inc.	—	
PD		WO 01/048977	07-05-2001	Sony Electronics Inc.	—	

Examiner Signature		Date Considered	10/19/05

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional). 2 See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). 4 For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5 Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. 6 Applicant is to place a check mark here if English language Translation is attached.

PTO/SB/08b (07-05)
Approved for use through 08/30/2006. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Substitute for form 1449B/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 2 of 2

	Complete if Known
Application Number	09/850,399
Filing Date	May 7, 2001
First Named Inventor	Amit Haller
Art Unit	2666
Examiner Name	Duong, Frank
Attorney Docket Number	IXIM-01000US0

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
FD		FRODIGH et al., "Wireless ad hoc networking – The art of networking without a network", Ericsson Review No. 4, 2000, pp. 248-263	
FD		FARUQUE et al, "Design and Analysis of Ad Hoc Wireless Networks for Battlefield Applications", Part of the SPIE Conference on Digitization of the Battlespace IV, Orlando, Florida, April, 1999, pp. 118-122	
FD		GARCIA-LUNA-ACEVES et al., "WIRELESS INTERNET GATEWAYS (WINGS)", 1997 IEEE, pp. 1271-1276	

Examiner Signature	MC	Date Considered	10/19/05

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.
1 Applicant's unique citation designation number (optional). 2 Applicant is to place a check mark here if English language Translation is attached.
This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: **Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

ELECTRONIC INFORMATION DISCLOSURE STATEMENT

Electronic Version v18

Stylesheet Version v18.0

Title of Invention	A SYSTEM, DEVICE AND COMPUTER READABLE MEDIUM FOR PROVIDING A MANAGED WIRELESS NETWORK USING SHORT-RANGE RADIO SIGNALS

Application Number : 09/850399

Confirmation Number: 2705

First Named Applicant: Amit Haller

Attorney Docket Number: IXIM-01000US0

Art Unit: 2666

Examiner: Frank Duong

Search string: (6198948 or 6690929 or 6430408 or 6763247 or 6405027 or 6871063 or 6192257 or 20030143992 or 20040192384 or 20020132610 or 20020065099 or 20020010008 or 20030022699 or 20040196812 or 20040066769 or 20020010683 or 20010047424).pn

US Patent Documents

Note: Applicant is not required to submit a paper copy of cited US Patent Documents

init	Cite.No.	Patent No.	Date	Patentee	Kind	Class	Subclass
TD	1	6198948	2001-03-06	Sudo et al.			
	2	6690929	2004-02-10	Yeh			
	3	6430408	2002-08-06	Dorenbosch			
	4	6763247	2004-07-13	Hollstrom et al.			
	5	6405027	2002-06-11	Bell			
	6	6871063	2005-03-22	Schiffer			
TD	7	6192257	2001-02-20	Ray			

US Published Applications

Note: Applicant is not required to submit a paper copy of cited US Published Applications

init	Cite.No.	Pub. No.	Date	Applicant	Kind	Class	Subclass
TD	1	20030143992	2003-07-31	Humphrey et al.			
	2	20040192384	2004-09-30	Anastasakos et al.			
	3	20020132610	2002-09-19	Chaplin et al.			
	4	20020065099	2002-05-30	Bjorndahl			
	5	20020010008	2002-01-24	Bork et al.			
TD	6	20030022699	2003-01-30	Lin			

FD	7	20040196812	2004-07-10	Barber	—	—	—
FD	8	20040066769	2004-04-08	Ahmavaara et al.	—	—	—
FD	9	20020010683	2002-01-24	Aune	—	—	—
FD	10	20010047424	2001-11-29	Alastalo et al.	—	—	—

Remarks

Note: Remarks are not for responding to an office action.

An Information Disclosure Statement containing 2 Foreign Patent Documents and 3 Non Patent Literature Documents is being filed concurrently, via US mail.

Signature

Examiner Name	Date
[signature]	10/19/05

ELECTRONIC INFORMATION DISCLOSURE STATEMENT

Electronic Version v18
Stylesheet Version v18.0

Title of Invention	A SYSTEM, DEVICE AND COMPUTER READABLE MEDIUM FOR PROVIDING A MANAGED WIRELESS NETWORK USING SHORT-RANGE RADIO SIGNALS

Application Number: 09/850399 *09/850399*
Confirmation Number: 2705
First Named Applicant: Amit Haller
Attorney Docket Number: IXIM-01000US0
Art Unit: 2666
Examiner: Frank Duong
Search string: (6198948 or 6690929 or 6430408 or 6763247 or 6405027 or 6871063 or 6192257 or 20030143992 or 20040192384 or 20020132610 or 20020065099 or 20020010008 or 20030022699 or 20040196812 or 20040066769 or 20020010683 or 20010047424).pn.

US Patent Documents

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TD	3	6430408	2002-08-06	Dorenbosch			
TD	4	6763247	2004-07-13	Hollstrom et al.			
TD	5	6405027	2002-06-11	Bell			
TD	6	6871063	2005-03-22	Schiffer			
TD	7	6192257	2001-02-20	Ray			

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TD	1	20030143992	2003-07-31	Humphrey et al.			

	2	20040192384	2004-09-30	Anastasakos et al.
	3	20020132610	2002-09-19	Chaplin et al.
	4	20020065099	2002-05-30	Bjorndahl
	5	20020010008	2002-01-24	Bork et al.
	6	20030022699	2003-01-30	Lin
	7	20040196812	2004-07-10	Barber
	8	20040066769	2004-04-08	Ahmavaara et al.
	9	20020010683	2002-01-24	Aune
	10	20010047424	2001-11-29	Alastalo et al.

Remarks

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Signature

Examiner Name	Date
[signature]	10/19/05

Issue Classification	Application/Control No.	Applicant(s)/Patent under Reexamination	
	09/850,399	HALLER ET AL.	
	Examiner	Art Unit	
	Frank Duong	2666	

ISSUE CLASSIFICATION

ORIGINAL		CROSS REFERENCE(S)							
CLASS	SUBCLASS	CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)						
370	338	370	401	466	469				
INTERNATIONAL CLASSIFICATION									
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(Assistant Examiner) (Date)

Jana Wittcher 10/21/05
(Legal Instruments Examiner) (Date)

FRANK DUONG 10/19/05
PRIMARY EXAMINER
(Primary Examiner) (Date)

Total Claims Allowed: 56

O.G. Print Claim(s)	O.G. Print Fig.
1	1

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

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Index of Claims

Application/Control No.	Applicant(s)/Patent under Reexamination
09/850,399	HALLER ET AL.
Examiner	**Art Unit**
Frank Duong	2666

√	Rejected	–	(Through numeral) Cancelled	N	Non-Elected	A	Appeal
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Claim		Date								
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Search Notes	Application/Control No.	Applicant(s)/Patent under Reexamination
	09/850,399	HALLER ET AL.
	Examiner: Frank Duong	Art Unit: 2666

SEARCHED			
Class	Subclass	Date	Examiner
370	259, 260, 320, 321, 328-339	10/19/2005	FD
370	395.5	10/19/2005	FD
370	395.54	10/19/2005	FD
370	400-401	10/19/2005	FD
370	465-649	10/19/2005	FD
455	403, 422	10/19/2005	FD
455	550, 556	10/19/2005	FD
455	557	10/19/2005	FD
709	203, 208	10/19/2005	FD

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner
Interference Search		10/19/2005	FD

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
Updated EAST Search	10/19/2005	FD
Updated Inventorship Search	10/19/2005	FD
Updated IEEE/Internet Search	10/19/2005	FD

UNITED STATES PATENT AND TRADEMARK OFFICE

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United States Patent and Trademark Office
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P.O. Box 1450
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Bib Data Sheet

CONFIRMATION NO. 2705

SERIAL NUMBER	FILING DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
09/850,399	05/07/2001 RULE	370	2666	IXIM-01000US0

APPLICANTS

Amit Haller, Belmont, CA;

Peter Fornell, Lake Oswego, OR;
Avraham Itzchak, Ra'anana, ISRAEL;Amir Glick, Tel Aviv, ISRAEL;
Ziv Haparnas, Tel Aviv, ISRAEL;

** CONTINUING DATA **********

FD none

** FOREIGN APPLICATIONS **********

FD none

IF REQUIRED, FOREIGN FILING LICENSE GRANTED
** 07/02/2001

Foreign Priority claimed	STATE OR	SHEETS	TOTAL	INDEPENDENT
☐ yes ☑ no				
35 USC 119 (a-d) conditions met ☐ yes ☑ no ☐ Met after Allowance				
Verified and Acknowledged Examiner's Signature Initials	COUNTRY CA	DRAWING 9	CLAIMS 57	CLAIMS 5

ADDRESS
28554
VIERRA MAGEN MARCUS HARMON & DENIRO LLP
685 MARKET STREET, SUITE 540
SAN FRANCISCO , CA
94105

TITLE
System, device and computer readable medium for providing a managed wireless network using short-range radio signals

FILING FEE	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	39664	wlan or (wireless adj (lan or "local area")) or bluetooth$5	US-PGPUB; USPAT; EPO; DERWENT	OR	OFF	2005/10/19 11:28
L2	16229	1 and (cellular or gsm or "gprs" or "umts")	US-PGPUB; USPAT; EPO; DERWENT	OR	OFF	2005/10/19 11:29
L3	11443	2 and (internet or ((data or packet) near4 network))	US-PGPUB; USPAT; EPO; DERWENT	OR	OFF	2005/10/19 11:29
L4	328	3 and (nat or (network adj address adj translat$4))	US-PGPUB; USPAT; EPO; DERWENT	OR	OFF	2005/10/19 11:29
L5	54	4 and (domain adj name adj service)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2005/10/19 11:30
L6	7	5 and 370/328-339,351-355,395.5-395.54,400-401,465-466.ccls.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2005/10/19 11:30

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	25	haller-amit$.in.	US-PGPUB; USPAT; EPO; DERWENT	OR	OFF	2005/10/19 10:13
L2	21	fornell-peter$.in.	US-PGPUB; USPAT; EPO; DERWENT	OR	OFF	2005/10/19 10:13
L3	16	itzchak-avraham$.in.	US-PGPUB; USPAT; EPO; DERWENT	OR	OFF	2005/10/19 10:13
L4	11	glick-amir$.in.	US-PGPUB; USPAT; EPO; DERWENT	OR	OFF	2005/10/19 10:13
L5	28	haparnas-ziv$.in.	US-PGPUB; USPAT; EPO; DERWENT	OR	OFF	2005/10/19 10:13

Interference Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1	("first wireless device" and "second wireless device" and "network address translator" and internet).clm.	US-PGPUB; USPAT; EPO; DERWENT	OR	OFF	2005/10/19 14:26

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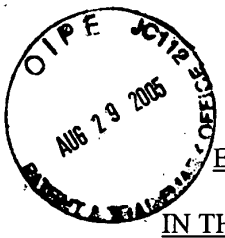

RESPONSE UNDER 37 C.F.R. §1.116
EXPEDITED PROCEDURE - EXAMINING GROUP 2600

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application		) PATENT APPLICATION	
Inventors:	Amit Haller, et al.	)	
		) Art Unit:	2666
Appl. No.:	09/850,399	)	
		) Examiner:	Duong,F.
Filed:	May 7, 2001	)	
Title:	A SYSTEM, DEVICE AND COMPUTER READABLE MEDIUM FOR PROVIDING A MANAGED WIRELESS NETWORK USING SHORT-RANGE RADIO SIGNALS	) **Customer No. 28554**	

CERTIFICATE OF MAILING UNDER 37 C.F.R. § 1.8

I hereby certify that this correspondence is being deposited in the United States Postal Service with sufficient postage as first class mail in an envelope addressed to **Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**, on August 25, 2005.

8/25/05

Kirk J. DeNiro, Reg. No. 35,854
Signature Date: August 25, 2005

RESPONSE TO OFFICE ACTION UNDER 37 C.F.R. § 1.116

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This RESPONSE is in reply to the outstanding Office Action.

AMENDMENTS to the CLAIMS begin on Page 2 of this paper.

REMARKS begin on Page 12 of this paper.

Attorney Docket No.: IXIM-01000US0
ixim/1000/1000.final response

AMENDMENTS TO THE CLAIMS

This listing of claim will replace all prior versions and listings of claim in the application.

1) (currently amended) A system for providing access to the Internet, comprising:

a first wireless device, in a short distance wireless network, having a software component to access information from the Internet by communicating with a cellular network in response to a first short-range radio signal, wherein the first wireless device communicates with the cellular network and receives the first short-range radio signal; and,

a second wireless device, in the short distance wireless network, to provide the first short-range radio signal,

wherein the software component includes a network address translator software component to translate between a first Internet Protocol ("IP") address provided to the first wireless device from the cellular network and a second address for the second wireless device provided by the first wireless device,

wherein the software component includes a service repository software component to identify a service provided by the second wireless device.

2) (previously presented) The system of Claim 1, wherein the second wireless device is selected from a group consisting of a desktop computer, a laptop computer, a personal digital assistant, a headset, a pager, a printer, a watch, and a digital camera.

3) (previously presented) The system of Claim 1, wherein the first wireless device is a cellular telephone using a protocol selected from a group consisting of a Global System for Mobile Communications ("GSM") protocol, a Code Division Multiple Access ("CDMA") protocol, a cellular telephone using a CDMA 2000 protocol, and a Time Division Multiple Access ("TDMA") protocol.

4) (cancelled)

5) (previously presented) The system of Claim 1, wherein the software component includes a domain naming service ("DNS") software component to translate between a human readable name and a second Internet Protocol ("IP") address.

6) (previously presented) The system of Claim 1, wherein the software component includes a security software component to control access between the cellular network and the first wireless device.

7) (previously presented) The system of Claim 1, wherein the second wireless device is a thin terminal.

8) (previously presented) The system of Claim 1, wherein the second wireless device includes a Bluetooth™ processor and a 2.4 GHZ transmitter.

9) (previously presented) The system of Claim 1, wherein the first wireless device includes a Bluetooth™ processor and a 2.4 GHZ transmitter.

10) (previously presented) The system of Claim 1, wherein the second wireless device includes a Bluetooth™ processor and a 5.7 GHZ transmitter.

11) (previously presented) The system of Claim 1, wherein the first wireless device includes a Bluetooth™ processor and a 5.7 GHZ transmitter.

12) (previously presented) The system of Claim 1, wherein the software component includes a plug and play software component to load and execute software for the second wireless device.

13) (previously presented) The system of Claim 1, wherein the software component includes a PIN number management software component to obtain and provide PIN numbers.

14) (currently amended) The system of Claim 1, wherein the ~~software component includes a~~ service repository software component identifies whether the service is available at a particular time.

15) (currently amended) The system of Claim 1, wherein the second wireless device includes an application software component that registers an availablity of the service with the service repository software component. ~~the second wireless device includes an application software component to provide a service; and, wherein the software component includes a management software component to access the service.~~

16) (currently amended) ~~A system for providing access to the Internet, comprising:~~

~~a first wireless device, in a short distance wireless network, having a software component to access information from the Internet by communicating with a cellular network in response to a first short-range radio signal;~~

~~a second wireless device, in the short distance wireless network to provide the first short-range radio signal; and,~~

~~a third wireless device, in the short distance wireless network to provide a second short-range signal, wherein the second wireless device communicates with the third wireless device through the first wireless device.~~ The system of Claim 1, furthering comprising:

a third wireless device, in the short distance wireless network, having an application software component to obtain the service from the second wireless device.

17) (currently amended) ~~A system for providing access to the Internet, comprising:~~

~~a first wireless device, in a short distance wireless network, having a software component to access information from the Internet by communicating with a cellular network in response to a first short-range radio signal;~~

~~a second wireless device, in a short distance wireless network to provide the first short-range radio signal; and,~~

~~a third wireless device, in a short distance wireless network to provide a second short-range signal, wherein the first wireless device provides access to the Internet for the second and~~

~~third wireless devices.~~ The system of claim 16, wherein the first wireless device includes a service logical driver corresponding to the service, and wherein the application software component uses the service logical driver to obtain the service from the second wireless device.

18) (previously presented) The system of Claim 1, wherein the software component operates with an operating system software component.

19) (previously presented) The system of Claim 18, wherein the operating system software component is a Linux operating system.

20) (previously presented) The system of Claim 18, wherein the operating system software component is a EPOC operating system.

21) (previously presented) The system of Claim 18, wherein the operating system software component is a PocketPCoperating system.

22) (previously presented) The system of Claim 18, wherein the operating system software component is a Stinger operating system.

23) (currently amended) The system of Claim 1, wherein the service repository software component identifies a class, attribute and instance of the service. ~~the first wireless device further includes 1) an application software component to provide a service and 2) a server software component.~~

24) (previously presented) The system of Claim 1, wherein the first wireless device further includes a firewall software component.

25) (previously presented) The system of Claim 1, wherein the first wireless device further includes a virtual private network ("VPN") software component.

26) (previously presented) A system for providing access to information on a cellular network, comprising:

a first wireless device, in a short distance wireless network, to provide a first short-range radio signal; and,

a second wireless device, in the short distance wireless network and the cellular network, to selectively transfer information, including Internet Protocol ("IP") data packets, between the first wireless device and the cellular network in response to a security software component,

wherein the second wireless device includes a service repository software component that identifies a plurality of services, in the short distance wireless network, associated with a plurality of wireless devices, and wherein the service repository software component searches for a service, in the plurality of services, to be used by an application software component stored in the first wireless device.

27) (previously presented) The system of claim 26, wherein the security software component is a firewall software component to control access to the cellular network.

28) (previously presented) The system of claim 26, wherein the security software component is a virtual private network ("VPN") to control access to the cellular network.

29) (previously presented) The system of claim 26, wherein the security software component is a uniform resource locator ("URL") filter to control access to the cellular network.

30) (previously presented) The system of claim 26, wherein the first short-range radio signal is selected from a group consisting of a HomeRF signal, an 802.11 signal and Bluetooth™.

31) (previously presented) The system of claim 26, wherein the information is provided in the form of data packets.

32) (cancelled)

33) (previously presented) The system of claim 26, wherein the second wireless device is coupled to the cellular network by either an Ethernet connection, DSL connection or a cable modem.

34) (previously presented) The system of claim 26, wherein the second wireless device is coupled to the cellular network by a landline network.

35) (previously presented) The system of claim 26, wherein the first wireless device provides execution space for executable software from the second wireless device.

36) (currently amended) A handheld device for providing a short distance wireless network, comprising:

a storage device;

a processor, coupled to the storage device; and,

the storage device to store a software component; and, the processor operative with the software component to:

provide an Internet Protocol ("IP") data packet from the handheld device to a terminal using short-range radio signals,

control access between the short distance wireless network and a cellular network,

translate between a first IP address provided to the handheld device and a second IP address for the terminal provided by the handheld device in the short distance wireless network,

enumerate a list of services available from the handheld device and the terminal, wherein the handheld device and terminal register services available on the list, and

search the list of services for a service to be used by an application software component stored on the terminal.

37) (previously presented) The device of Claim 36, further comprising:

a Bluetooth™ transmitter, coupled to the processor, to generate the short-range radio signals.

38) (previously presented) The device of Claim 36, further comprising:

a GSM transmitter, coupled to the processor.

39) (currently amended) The device of Claim 36, wherein the search includes searching the list of services by class, attribute or instance. ~~personal network provides a service and includes an application software component and, wherein the software component includes a network software component to disconnect the application software component from the service~~.

40) (currently amended) The device of Claim 36, wherein the software component includes a plug and play software component to identify the terminal in the ~~personal~~ short distance wireless network and obtain ~~an~~ the application software component for the terminal.

41) (currently amended) The device of Claim 36, wherein the software component includes a PIN number management software component to provide a PIN number used in pairing the handheld device to the terminal in the ~~personal~~ short distance wireless network.

42) (currently amended) The device of Claim 36, wherein the application software component uses a service logical driver stored in the storage device to obtain a service available on the handheld device. ~~the software component includes a service repository software component to provide services available in the personal network~~.

43) (previously presented) The device of Claim 36, wherein the software component includes a management software component.

44) (currently amended) A first wireless handheld device, comprising:

a storage device;

a processor, coupled to the storage device; and,

the storage device to store a software component; and, the processor operative with the software component to:

access the Internet through a cellular network,

provide a first short-range radio signal to a second wireless handheld device and a second short-range radio signal to a third wireless handheld device,

control access between the Internet and the first, second and third wireless handheld devices,

translate between a first Internet Protocol ("IP") address provided to the first wireless handheld device from the cellular network and a second address for the second wireless handheld device provided by the first wireless handheld device, and a third address for the third wireless handheld device provided by the first wireless device,

enumerate a list of services available from the first, second and third wireless handheld devices, wherein the first, second and third wireless handheld devices register services available on the list, and

search the list of services for a class of service to be used by an application software component at a particular time, the application software component stored on the second wireless handheld device .

45) (previously presented) The first wireless handheld device of Claim 44, wherein the second wireless handheld device is selected from a group consisting of a desktop computer, a laptop computer, a personal digital assistant, a headset, a pager, a watch, and a thin terminal a digital camera.

46) (previously presented) The first wireless handheld device of Claim 44, wherein the second wireless handheld device is a thin terminal.

47) (previously presented) The first wireless handheld device of Claim 44, wherein the first wireless handheld device includes a 2.4 GHZ transmitter coupled to the processor.

48) (previously presented) The first wireless handheld device of Claim 44, wherein the first wireless handheld device includes a 5.7 GHZ transmitter coupled to the processor.

49) (currently amended) The first wireless handheld device of Claim 44, wherein the first

wireless handheld device includes a service logical driver corresponding to a service available from the third wireless device, and the application software component uses the service logical driver to obtain the service from the third wireless device. ~~the software component includes an application software component to provide a service to the second wireless handheld device~~.

50) (currently amended) An article of manufacture, including a computer readable medium, comprising:

a short-range radio software component to communicate with a device in a short distance wireless network by using a short-range radio signal;

a cellular software component to communicate with a cellular network by using a cellular signal; ~~and,~~

a network software component to selectively transfer an Internet Protocol ("IP") data packet between the device and the cellular network;

a service repository software component to identify a plurality of available services from a plurality of devices in the short distance wireless network, the service repository software component having a uniform interface so that both a local application software component and a remote application software component identifies the plurality of available services; and

a plurality of service logical drivers corresponding to the plurality of available services that are used to obtain the plurality of services, the plurality of service logical drivers are used in obtaining the plurality of services.

51) (previously presented) The article of manufacture of Claim 50, further comprising security software component to control access between the short distance wireless network and the cellular network.

52) (previously presented) The article of manufacture of Claim 50, further comprising a network address translator software component to translate between a first Internet Protocol ("IP") address and a second IP address.

53) (previously presented) The article of manufacture of Claim 50 further comprising a

domain naming service ("DNS") software component to translate between a human readable name and an Internet Protocol ("IP") address.

54) (previously presented) The article of manufacture of Claim 50, further comprising a plug and play software component to identify the terminal in the short distance wireless network and obtain an application software component for the terminal.

55) (previously presented) The article of manufacture of Claim 50, wherein the article of manufacture is a memory storage device in a cellular telephone.

56) (previously presented) The article of manufacture of Claim 50, wherein the short-range radio software component is a Bluetooth™ component.

57) (previously presented) The article of manufacture of Claim 50, wherein the cellular software component is a GSM component.

58) (currently amended) A handheld device for providing a short distance wireless network, comprising:

a storage device;

means for identifying an availability of a plurality of services to a plurality of application software components in the short distance wireless network;

means for selectively providing ~~a~~ the plurality of services to ~~a~~ the plurality of application software components in the short distance wireless network; and

means for selectively transferring an Internet Protocol ("IP") data packet between a cellular network and a selected application software component in the plurality of application software components in the short distance wireless network.

REMARKS

The above Amendments and these Remarks are in reply to the outstanding Office action. Claims 1-3, 5-31 and 33-58 are presented herewith for consideration. Claims 1, 14-17, 23, 26, 36, 39-42, 44, 49-50 and 58 have been amended.

Filed concurrently herewith are an Information Disclosure Statement (IDS) and an Electronic Information Disclosure Statement (EIDS). The Examiner is respectfully requested to review the cited art and return initialed copies of the IDS and EIDS. A copy of the EIDS as filed is submitted herewith for the Examiner's convenience.

Claim 39 is rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. As suggested by the Examiner, claim 39 has been amended.

Claims 1-3, 5-18, 23-31, 33-50, 55-57 are rejected under 35 U.S.C. §102(e) as being anticipated by newly cited *Lord et al.* (U.S. Patent No. 6,763,012).

Claims 19-22 and 51-54 are rejected under 35 U.S.C. §103(a) as being unpatentable over *Lord et al.* in view of *Parekh*.

Claims 19-22 and 51-54 are rejected under 35 U.S.C. §103(a) as being unpatentable over *Lord et al.* in view of *Dell*.

Claim 1 has been amended to include many of the limitations of claim 14. In rejecting claim 14, the Examiner stated:

> "Lord further discloses wherein the software component includes a service repository software component (21) to obtain an availability of service from the wireless terminal (col. 4, lines 1-4; service management.). Office Action, page 6.

The Applicant's attorney respectfully disagrees. *Lord et. al* describes "a radio side protocol stack 21 comprising...Mobility Management/Service Management (MM/SM)..." (Emphasis added) that is used to interface with the "Packet Data Network (PDN)" and not "Terminal Equipment (TE) 14." There is no description that MM/SM "identify[ies] a service provided by the second wireless device" or TEs as called for in claim 1.

Amended claim 14 calls for "a service repository software component [that] identifies whether the service is available at a particular time." This limitation is not taught or suggested by MM/SM of *Lord et. al.*

Amended claim 15 calls for "the second wireless device includes an application software

component that registers an availablity of the service with the service repository software component" which is also not described by *Lord et. al.*

Amended claim 17 calls for "the first wireless device includes a service logical driver corresponding to the service, and wherein the application software component uses the service logical driver to obtain the service from the second wireless device" which is also not described by *Lord et. al.*

Amended claim 23 calls for "the service repository software component identifies a class, attribute and instance of the service" which is also not described by *Lord et. al.*

Independent claim 26 calls for "wherein the second wireless device includes a service repository software component that identifies a plurality of services, in the short distance wireless network, associated with a plurality of wireless devices, and wherein the service repository software component searches for a service, in the plurality of services, to be used by an application software component stored in the first wireless device" which is also not described by *Lord et. al.*

Independent claim 36 calls to "enumerate a list of services available from the handheld device and the terminal, wherein the handheld device and terminal register services available on the list, and search the list of services for a service to be used by an application software component stored on the terminal" which is also not described by *Lord et. al.*

Similarly, independent claim 44 calls to "search the list of services for a class of service to be used by an application software component at a particular time" which is also not described by *Lord et. al.*

Independent claim 50 calls for, among other limitations, "a plurality of service logical drivers corresponding to the plurality of available services, the plurality of service logical drivers are used in obtaining the plurality of services" which is also not described by *Lord et. al.*

Also, claim 58 calls for "means for identifying an availability of a plurality of services to a plurality of application software components in the short distance wireless network" which is also not described by *Lord et. al.*

Based on the above amendments and these remarks, reconsideration of claims 1-3, 5-31 and 33-58 is respectfully requested.

The Commissioner is authorized to charge any underpayment or credit any overpayment

to Deposit Account No. 501826 for any matter in connection with this response, including any fee for extension of time, which may be required.

Respectfully submitted,

Date: August 25, 2005

By: _____
Kirk J. DeNiro
Reg. No. 35,854

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RCE $
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Request for Continued Examination (RCE) Transmittal

Address to:
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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Application Number	09/850,399
Filing Date	May 7, 2001
First Named Inventor	Amit Haller
Art Unit	2666
Examiner Name	Duong, Frank
Attorney Docket Number	IXIM-01000US0

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. See Instruction Sheet for RCEs (not to be submitted to the USPTO) on page 2.

1. Submission required under 37 CFR 1.114 Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

   a. ☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

      i. ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____

      ii. ☐ Other _____

   b. ☑ Enclosed

      i. ☑ Amendment/Reply

      ii. ☐ Affidavit(s)/ Declaration(s)

      iii. ☑ Information Disclosure Statement (IDS)

      iv. ☑ Other Copy of Electronic IDS

2. Miscellaneous

   a. ☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of _____ months. (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

   b. ☐ Other _____

3. Fees The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.

   a. ☑ The Director is hereby authorized to charge the following fees, or credit any overpayments, to Deposit Account No. 501826. I have enclosed a duplicate copy of this sheet.

      i. ☑ RCE fee required under 37 CFR 1.17(e)

      ii. ☐ Extension of time fee (37 CFR 1.136 and 1.17)

      iii. ☐ Other _____

   b. ☑ Check in the amount of $ 790 enclosed

   c. ☐ Payment by credit card (Form PTO-2038 enclosed)

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SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

Signature		Date	August 25, 2005
Name (Print/Type)	Kirk J. DeNiro	Registration No.	35,854

CERTIFICATE OF MAILING OR TRANSMISSION

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Mail Stop RCE, Commissioner for Patents, P. O. Box 1450, Alexandria, VA 22313-1450 or facsimile transmitted to the U.S. Patent and Trademark Office on the date shown below.

Signature			
Name (Print/Type)	Kirk J. DeNiro	Date	August 25, 2005

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Mail Stop RCE, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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PTO/SB/17 (12-04v2)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Effective on 12/08/2004.
Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).

FEE TRANSMITTAL
For FY 2005

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($) 790.00

Complete if Known	
Application Number	09/850,399
Filing Date	May 7, 2001
First Named Inventor	Amit Haller
Examiner Name	Duong, Frank
Art Unit	2666
Attorney Docket No.	IXIM-01000US0

METHOD OF PAYMENT (check all that apply)

☑ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): _____

☑ Deposit Account Deposit Account Number: 501826 Deposit Account Name: Vierra Magen Marcus Harmon & DeNiro LLP

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

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☑ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17 ☑ Credit any overpayments

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FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

Application Type	FILING FEES Fee ($)	FILING FEES Small Entity Fee ($)	SEARCH FEES Fee ($)	SEARCH FEES Small Entity Fee ($)	EXAMINATION FEES Fee ($)	EXAMINATION FEES Small Entity Fee ($)	Fees Paid ($)
Utility	300	150	500	250	200	100	
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description	Fee ($)	Small Entity Fee ($)
Each claim over 20 (including Reissues)	50	25
Each independent claim over 3 (including Reissues)	200	100
Multiple dependent claims	360	180

Total Claims	Extra Claims	Fee ($)	Fee Paid ($)
_____ - 20 or HP =	_____	x 50	= 0

HP = highest number of total claims paid for, if greater than 20.

Indep. Claims	Extra Claims	Fee ($)	Fee Paid ($)
_____ - 3 or HP =	_____	x 200	= 0

HP = highest number of independent claims paid for, if greater than 3.

Multiple Dependent Claims Fee ($)	Fee Paid ($)
_____	_____

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee ($)	Fee Paid ($)
_____ - 100 =	_____	/ 50 = _____ (round up to a whole number)	x _____	= _____

4. OTHER FEE(S)

	Fees Paid ($)
Non-English Specification, $130 fee (no small entity discount)	
Other (e.g., late filing surcharge): RCE Fee	790

SUBMITTED BY

Signature		Registration No. (Attorney/Agent) 35,854	Telephone 415-369-9660
Name (Print/Type)	Kirk J. DeNiro	8/25/05	Date August 25, 2005

ELECTRONIC INFORMATION DISCLOSURE STATEMENT

Electronic Version v18
Stylesheet Version v18.0

Title of Invention	A SYSTEM, DEVICE AND COMPUTER READABLE MEDIUM FOR PROVIDING A MANAGED WIRELESS NETWORK USING SHORT-RANGE RADIO SIGNALS

Application Number: 09/850399 *09/850399*
Confirmation Number: 2705
First Named Applicant: Amit Haller
Attorney Docket Number: IXIM-01000US0
Art Unit: 2666
Examiner: Frank Duong
Search string: (6198948 or 6690929 or 6430408 or 6763247 or 6405027 or 6871063 or 6192257 or 20030143992 or 20040192384 or 20020132610 or 20020065099 or 20020010008 or 20030022699 or 20040196812 or 20040066769 or 20020010683 or 20010047424).pn.

US Patent Documents

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init	Cite.No.	Patent No.	Date	Patentee	Kind	Class	Subclass
	1	6198948	2001-03-06	Sudo et al.			
	2	6690929	2004-02-10	Yeh			
	3	6430408	2002-08-06	Dorenbosch			
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	5	6405027	2002-06-11	Bell			
	6	6871063	2005-03-22	Schiffer			
	7	6192257	2001-02-20	Ray			

US Published Applications

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init	Cite.No.	Pub. No.	Date	Applicant	Kind	Class	Subclass
	1	20030143992	2003-07-31	Humphrey et al.			

	2	20040192384	2004-09-30	Anastasakos et al.
	3	20020132610	2002-09-19	Chaplin et al.
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	6	20030022699	2003-01-30	Lin
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	9	20020010683	2002-01-24	Aune
	10	20010047424	2001-11-29	Alastalo et al.

Remarks

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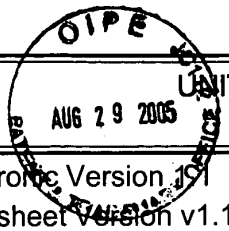

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Submission Type: Information Disclosure Statement

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us-ids	us-ids.dtd	7763
us-ids	us-ids.xsl	12026
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package-data	package-data.dtd	27025
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Sheet 1 of 2

Complete if Known	
Application Number	09/850,399
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First Named Inventor	Amit Haller
Art Unit	2666
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U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
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		WO 00/39967	07-06-2000	Nokia Wireless Routers, Inc.		
		WO 01/048977	07-05-2001	Sony Electronics Inc.		

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First Named Inventor	Amit Haller
Art Unit	2666
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		FRODIGH et al., "Wireless ad hoc networking -- The art of networking without a network", Ericsson Review No. 4, 2000, pp. 248-263	
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		GARCIA-LUNA-ACEVES et al., "WIRELESS INTERNET GATEWAYS (WINGS)", 1997 IEEE, pp. 1271-1276	

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(54) Title: A UNIFIED ROUTING SCHEME FOR AD–HOC INTERNETWORKING

(57) Abstract

Routing table update messsages that include both network–level and link–level addresses of nodes of a computer network are exchanged among the nodes of the computer network. Further, a routing table maintained by a first one of the nodes of the computer network may be updated in response to receiving one or more of the update messages. The routing table is preferably updated by selecting a next node to a destination node of the computer network only if every intermediate node in a path from the next node to the destination node satisfies a set of nodal conditions required by the first node for its path to the destination node and the next node offers the shortest distance to the destination node and to every intermediate node along the path from the next node to the destination node. The shortest distance to the destination node may be determined according to one or more link–state and/or node–state metrics regarding communication links and nodes along the path to the destination node. Also, the nodal characteristics of the nodes of the computer system may be exchanged between neighbor nodes, prior to updating the routing table. Preferred paths to one more destination nodes may be computed according to these nodal characteristics, for example using a Dijkstra shortest–path algorithm.

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A UNIFIED ROUTING SCHEME FOR AD-HOC INTERNETWORKING

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FIELD OF THE INVENTION

The present invention relates to routing protocols in computer networks and, more particularly, routing protocols for ad-hoc networks, in which both routers and hosts can move and in which routers can have both hosts and networks attached to them.

BACKGROUND

Packet-radio technology has the potential of becoming a major component of the global information infrastructure, at least in part because it requires no wiring and need not require third-party service providers or the configuration of forwarding tables. However, the routing approaches that have been proposed or implemented to date for the Internet or ad-hoc networks (i.e., those networks which do not have a preconceived topology) do not allow for non-technical users to install and operate such networks (or any multi-hop packet-radio networks) as seamless extensions of the Internet.

In traditional Internet routing approaches, bridges or routers are used to forward data packets using media access control (MAC)- or network-level addresses, respectively. Performing routing at the link level using transparent bridges has the advantage that limited configuration is required for the bridges and hosts used in the internetwork; furthermore, the frames forwarded by bridges can encapsulate any type of network-level protocol (e.g., Internet protocol (IP) and Internet packet exchange (IPX)). The disadvantage of using transparent bridges for network interconnection is that both data and control packets (frames) are sent over a spanning tree to avoid looping of packets, which means that data packets are sent over paths longer than the shortest paths and the available bandwidth is underutilized. Furthermore, in an ad-hoc network, maintaining a spanning tree may incur excessive overhead depending on mobility. On the other hand, performing routing at the network level facilitates aggregation of routing

updates, and permits data packets to be sent over the shortest paths using the available links efficiently. The disadvantages of this approach are that routers have to be configured with appropriate addressing information before they can start forwarding packets, network-level addresses have to be carefully allocated, and the router must understand which network-level protocol is being routed (e.g., IP or IPX).

All routing protocols proposed and implemented to date for either ad-hoc networks or the Internet fall into two major categories: table-driven and on-demand routing protocols. In a table-driven routing protocol, a router maintains a routing-table entry for each destination in the network and runs a routing-table update algorithm to maintain up-to-date entries. Table-driven routing protocols have been proposed based on topology broadcast or the dissemination of vectors of distances. In an on-demand routing protocol, a router maintains routing-table entries for only those destinations with which it needs to communicate. A typical on-demand routing protocol requires a router to use a flood search method to determine the shortest paths to destinations for which it does not currently have a routing-table entry.

Each type of protocol has its advantages and disadvantages. For example, a table-driven routing protocol supports datagram traffic very efficiently and can detect network partitions very quickly; however, each router must exchange routing information for all the destinations in the network or internetwork, which may be taxing on the battery life of tetherless wireless routers. By contrast, an on-demand routing protocol does not require routers to send updates regarding those destinations with which they do not communicate; however, routers need to search for an unknown destination before they are able to forward data to it. Consequently, on-demand routing approaches are typically not well suited for datagram traffic. On-demand routing also incurs much more control traffic than table-driven routing protocols when the network or internetwork becomes partitioned or routers fail, due to the resulting repeated generation of flood search packets, which only discover that the destinations are unreachable.

Routing in ad-hoc networks is typically accomplished by treating the entire ad-hoc network as an opaque sub-network using a routing protocol within the sub-network to forward data packets from one end of the sub-network to the other. In such methods, the ad-hoc network simply looks like a link (or set of links) to the IP layer. Although this approach is appealing at first glance, it does not avoid any of the address assignment,

router configuration, and management issues associated with Internet routing. Thus, what is needed is a new approach for routing within ad-hoc networks.

SUMMARY OF THE INVENTION

In one embodiment, routing table update messages that include both network-level addresses and other (e.g., link-level, possibly MAC-level) addresses of nodes of a computer network are exchanged among the nodes of the computer network. The update messages may exchanged in response to an indication that a new node has been added to the computer network or that one of the nodes has been dropped from the computer network (e.g., that communication with the node has been lost). Further, a routing table maintained by a first one of the nodes of the computer network may be updated in response to receiving one or more of the update messages.

The routing table is preferably updated by selecting a next node to a destination node of the computer network only if every intermediate node in a path from the next node to the destination node satisfies a set of nodal conditions required by the first node for its path to the destination node and the next node offers the shortest distance to the destination node and to every intermediate node along the path from the next node to the destination node. The shortest distance to the destination node may be determined according to one or more link-state and/or node-state metrics regarding communication links and nodes along the path to the destination node. Also, the nodal characteristics of the nodes of the computer system may be exchanged between neighbor nodes, prior to updating the routing table. Preferred paths to one or more destination nodes may be computed according to these nodal characteristics, for example using a Dijkstra shortest-path algorithm.

In some cases, the exchange of routing table update messages may involve exchanging node distance and node predecessor information among the nodes of the computer network. Such information may be included in the update messages and individual entries in each update message may be processed in order at a receiving node of the computer network. Transmitting nodes of the computer network preferably order the individual entries in the update messages according to distances to destination nodes. Further, for each entry of one of the update messages, one of the receiving nodes may determine whether an implicit path to one of the destination nodes defined by the node distance and node predecessor information is free of loops. In yet further cases, a routing table entry for a destination node that was established according to path information

provided by a first neighbor node, at a first of the nodes of the computer network may be updated according to information included within at least one of the update messages received from a second neighbor node.

In a further embodiment, routing tables for a computer network may be updated by disseminating routing table update information regarding nodes of the computer network that are well known throughout the network. In such cases, the update information includes both network-level and link-level addresses for the well-known nodes. Moreover, further updating may be accomplished by transmitting routing table update information regarding nodes that are not well known throughout the computer network in response to search queries regarding such nodes. In some cases, the search queries are flooded throughout the computer network on a best-effort basis. New search queries may be treated as network-level queries and retransmitted search queries treated as host-level search queries.

Upon receipt of one of the search queries, a first node of the computer network may search a query cache to determine whether it has already processed that search query. In addition, the first node may determine whether that search query is a host-level search query or not.

If the first node determines that the search query is a host-level query, the first node may respond to the search query if it has not already done so and if it is able to provide path information to a destination specified in the search query. Alternatively, if the first node has not already responded to the search query but does not have the path information to the destination, the first node may transmit a local request for the path information to local hosts associated with the first node. In those cases where the first node receives a local response to the local request, the first node transmits the path information from the local response in response to the search query. Otherwise, the first node transmits the search query to neighbor nodes of the computer network if there are any. On the other hand, if the first node determines that the search query is not a host-level query, the first node either transmits a response to the search query if the first node has path information to a destination specified in the search query or forwards the search query to neighbor nodes of the computer network, if any.

The routing table update information regarding nodes that are not well known throughout the computer network may be provided as search query response messages by one or more nodes of the computer network having path information relating to the nodes that are the subject of the search queries. In such cases, one of the nodes having the path

information adds a path entry for itself to the path information before providing an associated search query response message. The path entry includes a network-level and a link-level address of the node having the path information and may further include a network-level and a link-level address of a node from which the node having the path information received the search query.

Preferably, at least one of the nodes of the computer network maintains a table of the search queries it has transmitted. Such a table of search queries may include an indication of whether a particular search query is a network-level search query or a host-level search query.

Note, however, that network-level search queries may be retransmitted as host-level search queries within the computer network if no responses are received to network-level searches.

In yet another embodiment, a routing table in a computer network may be updated by specifying a path from an origin of a search query to a destination in the computer network that is the subject of the search query, the path including both network-level and link-level addresses of the destination. The path is relayed between nodes of the computer network, from a first node that produces the path to the origin of the search query. However, any one node of the computer network relays the path only if it is included in the path between the origin of the search request and the destination. Relaying nodes of the computer network that receive the path, may update respective routing tables to include the path but only retain the path in their routing tables if the path is associated with a node that is well known throughout the computer network. Otherwise, the path is removed from their respective routing tables after a specified period of time.

Still another embodiment provides routing table having a network-level address of a destination node of a computer network and a link-level address of the destination node. The network-level address and link-level address are preferably included in a single entry of the routing table regarding the destination node. The network-level address is preferably an Internet protocol (IP) address, while the link-level address is preferably a medium access control (MAC) address.

The single entry in the routing table may further include path information (e.g., distance and/or predecessor information) regarding the destination node. Such distance information may be based on link-state information and/or node-state information of a path within the computer network. In some cases, the path is a shortest path between the destination and a node that maintains the routing table. The predecessor information refers

to a node of the computer network that is the second-to-last hop from the node that maintains the routing table to the destination along the path.

Generally, the routing table is maintained by a router, which may also have a distance table that is configured to store routing tree information received by the router from neighbor nodes of the computer network. The router may further have a message retransmission list that is configured to include information regarding routing table update messages transmitted by the router to the neighbor nodes.

Still additional embodiments provide various cost metrics for a computer network. Among these are measures of interference over time to neighbor nodes of a first node of the computer network per data bit transmitted on a communication link used by the first node. Such a metric may be estimated using the RF transmit power used by the first node for the communication link, the link data rate and the RF-path loss on the communication link, which is determined by a neighbor node comparison of the RF transmit power to a received signal strength at the neighbor node.

Another cost metric may be a measure of node energy consumed per data bit for transmissions over a communication link within the computer network. Here, node energy is computed so as to account for all power not used by a node in a non-transmitting state.

A further cost metric may be a measure of the quality of a wireless communication link within the computer network. Such a metric may find use in determining which links of the network to utilize. For example, one may examine local routing information maintained by a first node of a computer network to determine whether alternate paths exist to a neighbor node of the first node, using a sequence of one or more links other than a candidate link through the computer network and compute a link quality of the candidate link. Then, if no alternate path exists to the neighbor node, or the link quality of the candidate link exceeds a defined threshold value, the candidate link may be accepted. If one or more alternate paths do exist to the neighbor node, then by comparing link qualities of the links along each of the alternate paths with the link quality of the candidate link one may decide to accept the candidate link if the link quality of the candidate link compares favorably with the link qualities of the links on the alternate paths.

Such a favorable comparison may be one wherein the link quality of the candidate link is equal to or better than a link quality of a worst one of the link qualities of the links on the alternate paths, or one wherein the link quality of the candidate link is equal to or better than a path quality function of the links along the alternate paths. For example, if the link

quality of any link in the computer network is equal to the probability of success for each packet transmitted over that link. Then the path quality function of the links along the alternate paths comprises the products of the link qualities for each of the links on the alternate paths.

Metrics for individual nodes of a computer network may also be used. For example, metrics which are an indication of the type of power available to the node, the power state of the node, or an indication of whether the node is an anchor for the computer network.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention is illustrated by way of example, and not limitation, in the figures of the accompanying drawings in which like reference numerals refer to similar elements and in which:

Figure 1 illustrates an ad-hoc network that includes a number of sub-networks and an interconnection to the Internet through a router maintained by an Internet service Provider (ISP);

Figure 2A illustrates another example of an ad-hoc network topology, including node IP-level and MAC-level addresses;

Figure 2B illustrates a routing tree communicated by one of the nodes of the ad-hoc network illustrated in Figure 2A in accordance with one embodiment of the present invention;

Figure 3 illustrates an example of a routing table that may be maintained by an Internet Radio (IR) according to one embodiment of the present invention;

Figure 4 illustrates an example of a distance table that may be maintained by an IR according to one embodiment of the present invention;

Figure 5 illustrates an example of a message retransmission list that may be maintained by an IR according to one embodiment of the present invention;

Figure 6 illustrates an example of a routing-table update message according to one embodiment of the present invention;

Figure 7 illustrates an example of a search query according to one embodiment of the present invention;

Figure 8 illustrates an example of a search query response according to one embodiment of the present invention;

Figure 9 illustrates a network having a topology useful for understanding the routing table update mechanisms found in an embodiment of the present invention; and

Figure 10 illustrates an example of a query sent table maintained by a node of an ad-hoc network in accordance with one embodiment of the present invention.

DETAILED DESCRIPTION

Presented below is an Ad-hoc Internet Routing (AIR) protocol that provides a unified scheme for ad-hoc internetworking. Because supporting traffic to and from the Internet is likely to be a key requirement of ad-hoc networks, the hosts and networks attached to the packet radios with which the ad-hoc network is built (which will be referred to as Internet Radios or IRs) need Internet addresses. These Internet addresses are needed even if the IRs support routing at the sub-network level or link level within the ad-hoc network. Assigning Internet addresses to IRs also provides benefits from the standpoint of network management, because it enables the use of standard and emerging network management products based on the simple network management protocol (SNMP).

AIR enables ad-hoc internets by supporting routing at the IP layer rather than below it. Thus, AIR advances the state of the art in routing in ad-hoc networks in a number of ways. For example, AIR uses both medium-access control (MAC) addresses and Internet addresses while providing shortest paths to known destinations. For some embodiments, the shortest (or preferred) path calculations may be made on the basis of link-cost metrics and/or node-cost metrics. Further, AIR permits an IR to act as the proxy destination node for all the hosts attached to the IR, or to act as an intermediary between senders and receivers of Address Resolution Protocol (ARP) requests. These address-mapping services allow the hosts attached to the IRs to perceive the ad-hoc internet as a single broadcast LAN. Also, AIR updates routing-table entries using both source- and destination-based routing-table update mechanisms.

AIR is discussed in greater detail below, with reference to certain illustrated embodiments. However, upon review of this specification, those of ordinary skill in the art will recognize that AIR may find application in a variety of systems. Therefore, in the following description the illustrated embodiments should be regarded as exemplary only and should not be deemed to be limiting in scope.

I. Overview of AIR Protocol

AIR is well suited for an ad-hoc internet that provides a seamless extension of the IP Internet to the ad-hoc wireless environment. In contrast to the IP Internet, mobility of hosts and routers, and changes to link- and/or node-costs are the rule, rather than the exception, in an ad-hoc internet. Figure 1 illustrates aspects of an exemplary ad-hoc network that will assist in understanding the remaining discussion.

Ad-hoc network 10 may be considered as a number of sub-networks 12a, 12b, 12c, which provide an extension of the Internet 14 through a number of IRs 16a-16i. Each IR 16a-16i may be a packet radio with an assigned IP address. In general, the IRs 16a-16i operate over a single channel using spread spectrum wireless communication techniques common in the art. For example, the IRs 16a-16i may operate in one of the unregulated UHF frequency bands, thereby obviating the need for operating licenses. At each IRs 16a-16i, AIR may run on top of a User Datagram Protocol (UDP), similar to the Routing Information Protocol (RIP). As the figure illustrates, an IR is essentially a wireless IP router; with the exceptions that: AIR substitutes for traditional internet routing protocols like RIP or the open shortest path first (OSPF) protocol, the AIR routing protocol interacts through shared tables with the link-layer protocols in order to reduce control traffic needed to maintain routing tables, and the AIR channel access protocols are designed for the broadcast radio links 24a-24j of ad-hoc network 10.

Coupling of ad-hoc network 10 to the Internet 14 is achieved through a router 18, which may be operated by an Internet Service Provider (ISP). As shown, a single ISP may operate a LAN 20 to which multiple IRs are connected. In such a scheme, IRs 16a and 16b may act as "AirHeads", providing gateway service to Internet 14 via router 18. Some IRs, e.g., IRs 16d and 16e of Figure 1, may be associated with hosts, 22a, 22b and 22c, that can be accessed by any Internet user through ad-hoc network 10.

AIR is based on a routing-table updating approach as introduced in the Wireless Internet Routing Protocol (WIRP) described by J.J. Garcia-Luna-Aceves et al., "Wireless Internet gateways," Proc. IEEE MILCOM 97, Monterey, CA, Nov. 2-5, 1997, pp. 1271-76; and S. Murthy and J.J. Garcia-Luna-Aceves, "An Efficient Routing Protocol for Wireless Networks," Proc. IEEE INFOCOM 97, Kobe, Japan, Apr. 1997. However, AIR extends WIRP in a number of ways. First, AIR allows IRs to use both MAC-level (i.e., link level) and Internet (i.e., IP) addresses in the routing tables. Second, AIR uses both table-driven and on-demand mechanisms to update routing-table entries. Third, AIR

supports proxy ARP services to the hosts attached to IRs. Fourth, AIR uses both link metrics and node characteristics to compute paths to destinations.

Another difference between AIR and WIRP is that AIR uses the services provided by a dedicated neighbor management protocol, which maintains the status of an IR's connectivity with its neighbors. In contrast, WIRP implements its own mechanisms to ascertain the connectivity of an IR with its neighbors.

Each IR communicates a hierarchical routing tree to its neighbors in an incremental fashion. The hierarchical routing tree reported by an IR consists of all the preferred paths by the IR to each network, IR, and host with which the IR needs to communicate or to which it needs to forward traffic according to requests received from neighbor IRs. An entire remote IP network is simply a node in the routing tree. Figure 2A shows a simple network topology and Figure 2B shows the routing tree that IR (or node) n3 notifies incrementally to its neighbors.

The way in which an IR disseminates routing information about a given destination is determined by the value of a dissemination-type flag in the routing table. Changes to routing-table entries corresponding to IP networks or nodes where servers are located are typically disseminated throughout the ad-hoc internet, while changes to routing-table entries corresponding to individual IRs and hosts are disseminated on demand. Figure 2B illustrates this point. Note that the routing tree notified by node n3 does not include node n0, because n0 is not a node that must be known throughout the ad-hoc internet and node n3 does not need to communicate with or forward data through n0. It is also important to note that the addresses used to identify nodes in the ad-hoc internet are both IP addresses and MAC-level addresses.

IRs exchange their hierarchical routing trees incrementally by communicating only the distance and second-to-last hop (predecessor) to each destination. In the case of destinations within or directly attached to an IR's own IP network, the second-to-last hop consists of an IR (i.e., a host-level IP Address). In the case of a remote IP network known to the IR and not directly attached to the IR's own IP network, the predecessor consists of another IP network. Hence, internet routing in AIR does not require an IR to store more routing-table entries than an Internet routing protocol like RIPv2 would, for example. An IR communicates updates to its routing tree by means of routing-table updates sent as a result of connectivity changes, periodically, or in response to on-demand search queries. AIR permits IRs to search for paths to known IP addresses

obtained through a name server, or to search for the actual location of an IP host that moves from one IR to another and remains quiet. Connectivity changes are communicated to AIR by the neighbor protocol implemented in the IR.

Routing information is exchanged among neighboring IRs by means of update messages, search queries, and replies to such queries. Update messages are used to update routing-table entries that must be known by all IRs in the ad-hoc internet. Search queries are used to update routing-table entries on a demand basis.

From the standpoint of host-level involvement, it is not efficient to require that all hosts in a large ad-hoc internet receive an ARP request whenever any given host sends such a request. Although IRs permit hosts to operate as if they were attached to a common LAN, IRs have much more routing information than do traditional transparent bridges. In particular, they know about both MAC and IP-level addresses of destinations. Accordingly, as long as IRs know which hosts are currently attached to them, they need not ask hosts to answer ARP requests, because the IRs attached to the destination hosts can answer for them. In some cases hosts that are already configured may relocate and remain silent after moving from one IR to another. In such cases, there may be no IR that can provide the correct mapping of IP to MAC address and the ARP request may have to be answered by the hosts themselves.

Two classes of search queries may be defined in AIR: IR-level searches and host-level searches. In an IR-level search, an IR receiving the query processes the query without forwarding any request to its attached hosts, if it has any. In a host-level search, an IR receiving the query processes the query as in the case of an IR-level search and also sends an ARP request to its attached hosts. IR-level searches are likely to suffice most of the time, because IRs know their attached hosts as soon as the hosts send ARP requests to the associated IRs. Accordingly, IRs may attempt IR-level searches before attempting host-level searches.

AIR can be functionally divided into three main components: the proxy and indirect ARP mechanisms, the routing-table update algorithm, and the reliable exchange of updates. Each of these functional components is addressed in the following sections.

II. Information Maintained in AIR

For the purposes of routing, each IR maintains a routing table, a distance table, and a message retransmission list. As shown in Figure 3, the entry for a destination *j* in

IR *i*'s routing table includes the destination's IP address, its MAC address, or both, the distance to the destination (D_{ij}), the successor (S_{ij}), and the predecessor (P_{ij}) along the preferred path (e.g., the shortest path) to the destination. The predecessor to a destination is the second-to-last hop along the preferred path.

The routing table also maintains two markers used to update the routing-table entries, a path traversal tag and a dissemination-type flag. The path-traversal tag for a destination *j* specifies whether the entry corresponds to a simple path (*tag* = correct), a loop (*tag* = error) or a destination that has not been marked (*tag* = null). This tag is used to reduce the number of routing table entries that need to be processed after each input event impacting the routing table. Also for destination *j*, the dissemination-type flag determines how the IR maintains the entry and how it disseminates updates to the entry. If the value of the flag is set (e.g., to one), the destination is well known in the ad-hoc internet. In such cases, the IR recognizes that it must keep an entry for the destination at all times, and that it must report changes to the distance or predecessor to the destination. If the value of the dissemination-type flag is not set (i.e., is zero), the IR does not report changes to the distance or predecessor information for that destination in update messages to its neighbors; rather, the IR keeps the entry for a finite amount of time given by an age field that is managed locally.

The routing table of a given IR contains an entry for a subset of all the destinations in the ad-hoc internet. The IR maintains routing-table entries for only those destinations with which it has to communicate or to which it has to relay information.

As illustrated in Figure 4, the distance table of an IR maintains the routing-tree information reported by each of its neighbor IRs. Each entry reported by a neighbor IR in an update message or a search query consists of a set of addresses for the destination (typically a MAC address, an IP address, or both), the distance to the destination, and the predecessor in the path to the destination. More generally, the set of addresses may include a network-level address and another address, for example a link-level address (e.g., addresses defined by the IEEE 802 family of standards for computer networks) or a sub-network address, where appropriate.

An underlying neighbor protocol may be used to update the routing table indicating changes in connectivity with neighbors. When the neighbor protocol detects a new neighbor or loss of connectivity with a neighbor, it updates an entry for the IR or host in the routing table and notifies AIR of the need to update the distance table and

predecessor information in the routing table. The neighbor protocol may also provide an IR with information about the cost of a link with a neighbor IR in both directions.

As illustrated in Figure 5, a Message Retransmission List (MRL) may be used to specify one or more retransmission entries. For example, a given MRL entry may specify: the update message that is being sent to neighbor IRs, a retransmission counter that is decremented every time the IR retransmits the same update message (in one embodiment, each update message may be sent a maximum number of times, for example four times), and an ACK-required flag for each neighbor IR specifying whether or not the neighbor has acknowledged the update message. An IR uses the MRL to ensure that updates are sent reliably to its neighbors.

III. Information Exchanged in AIR

A routing-table update message generally includes the identifier of the sending IR (typically its IP address), a sequence number assigned by the sending IR, and an update list of one or more entries. The update message may be formatted as a packet as shown in Figure 6. Appropriate header and/or trailer information may be included for addressing and/or error correction purposes, etc.

An update entry specifies whether the entry is an update to the routing table of the sending IR or an acknowledgment (ACK) to an update message. An update entry preferably specifies at least one address for a destination, a predecessor for the destination, and a dissemination-type flag that indicates the way in which the receiving IR should notify its own neighbors about changes in its distance or predecessor to that destination. An ACK entry should specify the sequence number and the source of the update message being acknowledged. The dissemination flag of an update entry is usually set, because an IR need only send update messages to its neighbor IRs concerning those destinations that must be widely known in the ad-hoc network.

As shown in Figure 7, a search query generally specifies the MAC and IP address of the sending IR, a sequence number, and the forward path traversed by the query from its originating IR to the IR forwarding the query. This forward path may be specified using entries that are the same as the update entries in update messages. The dissemination-type flag of a forward-path entry may or may not be set, depending on

whether the intermediate hop corresponds to an IR or network that must be known by other IRs or not.

As illustrated in Figure 8, a response to a search query may specify the MAC and IP address of the sending IR, the sequence number of the query being answered, and the complete path from the IR that originated the query to the destination. Note that the IR responding to a query has to notify a complete path to a destination only if it includes intermediate hops that are not known throughout the ad-hoc internet. However, in one embodiment of AIR, complete paths are used in order to simplify the protocol. Each hop in the path specified in a response to a search query is specified in terms of: the address(es) of the intermediate hop(s), the predecessor and distance to the hop(s), and the dissemination-type flag for the hop(s) (which may be set or not). The distance and predecessor information for each hop specified in the response may be obtained directly from the responding IR's routing table.

Because update messages are used to update routing information for well-known destinations, update entries always correspond to destinations that are known throughout the ad-hoc internet. In contrast, the entries of a reply to a search query may correspond to either well-known destinations or destinations that IRs receiving the reply need not mention to their neighbor IRs, except the neighbor that requested the information. In one embodiment of AIR, dissemination-type flags are included in update entries. Further, an IR may order the routing information it sends in update messages, search queries, or replies to such queries based on its distance to the destination.

IV. Proxy ARP and Indirect ARP Mechanisms

Returning now to Figure 1, it should be noted that AIR allows hosts, e.g., 22a, 22b and 22c, in the ad-hoc network 10 to operate as if they were all attached to a common local-area network (LAN). For example, hosts 22a and 22b attached to IR 16d through a LAN or a serial (or other) interface 26, view IR 16d as the destination, unless the destination is attached to the same LAN 26 or the hosts 22a and 22b are configured with the MAC address of destinations (i.e., as if they were physically attached to LAN 26). IR 16d is then capable of determining the correct paths to the true destinations (specified in terms of IP or MAC addresses) by means of the routing-table update mechanisms described below.

For a host to communicate with another host using end-to-end protocols running on top of the Internet Protocol (IP), the source host must first obtain the Internet address (IP address) of the destination host. This is accomplished by means of a directory service (e.g., the Domain Name System or DNS), which maps domain names to IP addresses. If the source and destination hosts share a common LAN, the source host needs also to find the MAC address of the destination host. The MAC addresses serve as the name of the hosts inside a LAN and permit the network interfaces with which hosts attach to the LAN to provide a host with only those packets addressed to it. For example, in Ethernet LANs the mapping of a destination's IP address to its MAC address is supported by the ARP.

Because an ad-hoc internet typically has multiple hops, when an attached source host (e.g., host 22a in Figure1) sends an ARP request for a destination host (e.g., host 22c) that is not directly attached to a common IR, the IR (e.g., 16d) connected to the source host acts like a destination and answers the ARP request. That is, it provides a proxy ARP service to all the hosts attached to it through a LAN or serial (or other) interface (e.g., LAN 26). The IR (e.g., 16d) then finds the shortest (e.g., as measured by an appropriate metric or set of metrics) path to the destination host (e.g., 22c) in collaboration with other IRs (e.g., IR 16e in this example) using the routing-table updating mechanisms, which are completely transparent to its attached hosts. Accordingly, an IR serves as the default router for all the hosts that attach to it through a common LAN or serial interface.

The mechanisms used by an IR to learn the MAC address of a destination are described within the context of routing-table updating. The IR responds to an ARP request from a host as soon as it obtains the next hop to the intended destination. The steps taken by an IR to obtain a path to a destination are transparent to the host sending an ARP request, because the allowed delays in getting an ARP response are typically longer than the time it takes to obtain a path to an intended destination if it can be reached in an ad-hoc internet.

An IR also provides what may be defined as indirect ARP service to its attached hosts. This service consists of forwarding an ARP request from an attached host towards the MAC address specified by the host. To illustrate, consider that, in some cases, hosts attached to an IR through a LAN may be configured with a default router other than the IR(s) directly attached to the LAN. This may occur after a host is relocated or IRs are

used to bridge two or more segments of a LAN. To permit a configured host to continue operating when its default router is not the IR(s) attached to the host's LAN segment, an IR is able to listen to frames (packets) sent to MAC addresses other than its own. If the IR has a routing-table entry for the MAC address, it can forward the packet accordingly. If the IR does not have a routing table entry for the MAC address, and the node with such an address has not been heard in the attached LAN, the IR may send a search query in order to find a path to the intended MAC address.

V. Routing-Table Updating

Routing-table updates are important because they serve as the means by which routers (which generally use "path finding" algorithms to determine preferred paths--typically shortest paths) ensure that they are using truly preferred paths to destinations. To illustrate, consider the network topology shown in Figure 9. In traditional approaches, a router *i* sets its next node to destination *j* to equal neighbor *k* only if the distances to *j*, and to every node in the path from *k* to *j*, through node *k* constitute the smallest distances for such destination *j* and for such intermediate nodes (e.g., *p*) in the path from *k* to *j* known at *i* among all the neighbors of node *i*. For AIR, however, a router *i* selects its next node to a destination *j* to equal neighbor *k* only if the following conditions are satisfied:

a) Every intermediate node in the path from *k* to *j*, reported incrementally by *k* to *i* and stored at *i*, satisfy the nodal condition required by *i* for its path to *j*, and

b) For all of router *i*'s neighbors, neighbor *k* offers the smallest distance to *j* and to every intermediate node along the path from *k* to *j*, which is reported incrementally by *k* to *i* and stored at *i*.

Furthermore, AIR extends the methodologies used in prior schemes for link-state routing. In such schemes, a router *i* may communicate to its neighbors the characteristics of the links (e.g., 30a and 30b) to each of its neighbors. A router that receives a link-state update from a neighbor may then propagate the update to its own neighbors (e.g., if the link-state update is more recent than the information maintained at the node) in one of two ways. The router may forward the update to all its neighbors other than the one sending the update, or the router may forward the update to all its neighbors if the link in the update is used by router *i* to reach at least one destination. A router then computes its

preferred paths to destinations based on the updated information by running a shortest-path algorithm.

In AIR, however, in addition to the link-state updates, a router *i* communicates to its neighbors its own nodal characteristics (i.e., the node-state metrics of node *i*). A router that receives a node-state update from a neighbor propagates the update to its neighbors if the node-state update is more recent than the information maintained at the node. Routers then compute preferred paths to destinations running a shortest-path algorithm (e.g., Dijsktra's or Bellman-Ford's algorithm) modified to eliminate from the computation those nodes that do not satisfy router *i*'s required value of nodal characteristics. The shortest-path algorithm may be implemented in a distributed manner over a hierarchical graph representing the connectivity of IRs (i.e., the nodes of the ad-hoc internet) and the IP networks they connect. Examples of nodal characteristics (or metrics) that may be communicated among nodes (and, hence used in shortest path computations) are presented below.

To expand on the above discussion then, an IR updates its routing table based on AIR control messages received from other IRs or messages sent by the neighbor protocol. The control messages that can cause an IR to modify its routing table are update messages or search queries from other IRs. As previously stated, the routing information contained in both update entries and query entries generally include the address (MAC address, IP address, or both), and the distance and predecessor to the destination along a preferred path. Because every IR reports to its neighbors the second-to-last hop in the shortest path to the destination, the complete path to any destination (called the implicit path to the destination) is known by the IR's neighbors, whether the destination is well-known in the ad-hoc internet or not.

When an IR receives an update message from a neighbor, it processes each update entry and ACK entry in order. Similarly, when an IR receives a reply to a search query, it processes each hop of the reported path one at a time and in the order in which the sender specifies them. Because IRs send routing information ordered according to their distances to destinations, it follows that an IR can safely execute the following path-traversal mechanism to determine if using a neighbor IR to reach a destination would result in a loop.

VI. Processing Update Messages

When an IR processes an update message from one of its neighbors, it processes each update entry reported by its neighbor IR in the order in which it was sent in its neighbor's update message. For each update entry in the message, the IR checks whether the implicit path reported by a neighbor IR to a given destination is free of loops, and checks the consistency of predecessor information reported by all its neighbors.

When an IR processes an update or reply entry reported by neighbor *k* regarding destination *j*, the IR updates the path information from neighbor *k* that it maintains in its distance table with the new path information reported by the neighbor. In addition, the IR determines if the path reported by any other neighbor *n* to the same destination includes neighbor *k*. If that is the case, then the IR substitutes the old path information reported by neighbor *n* regarding the subpath from *k* to destination *j* with the path information reported by neighbor *k* regarding its path to destination *j*.

As discussed above, to ensure that the implicit paths stored in an IR's routing table are loop free, the IR chooses a neighbor *n* as its successor (next hop) towards a destination if, and only if, (1) the distance to the destination through that neighbor is the smallest attainable distance to the destination through any neighbor, and (2) the distance to each intermediate hop in the path from the IR to the destination through neighbor *n* is the smallest attainable distance to that destination through any neighbor.

To determine the second condition above, the IR traverses the implicit path reported by its neighbor through the predecessor information. If a given intermediate hop along the path to a destination satisfies the second condition for loop freedom, the IR then checks if the same condition is true for the predecessor specified for that destination by its neighbor *n*. Hence, the IR carries out a path traversal from the destination back to itself to ensure that its neighbor *n* provides the shortest path to the destination and every intermediate hop in the path to the destination. The path-traversal tag is used to limit the processing required for an IR to accomplish this path traversal. More specifically, the tag allows the IR to stop the path traversal as soon as it reaches an intermediate hop that has a tag value equal to *correct,* which indicates that the path from itself to that hop through the same neighbor has been checked successfully before; or a value equal to *error*, which indicates that a loop has already been discovered along the proposed path to the destination.

VII. Processing Search Queries

Search queries are flooded throughout the ad-hoc internet on a best-effort basis in order for an IR to find a destination that is not known by all IRs of the ad-hoc internet. Because IRs need not keep a routing-table entry for every possible source of a search query, IRs cannot decide when to forward a query based on their shortest paths to the origins of the queries. Accordingly, IRs relaying queries should maintain a cache of the search queries that they have forwarded recently. The minimum information a relay IR requires to discard copies of the same query arriving from multiple neighbors then becomes the address of the origin of the query and the sequence number assigned by the origin to the query.

When an IR receives a search query, it first determines if the query is IR-level or host-level, and whether it has already processed the query by consulting its query cache. In the case of an IR-level query that is new, the IR either forwards the query if it does not know the route to the MAC or IP address specified in the query, or replies to the query if it has a current path to the destination.

In the case of a host-level query that is new, the IR replies to the query if it can provide a path and an address mapping for the destination. If the IR does not have the information, it first sends an ARP request locally (e.g., across a local LAN such as LAN 26 in Figure 1) and replies to the query if it obtains a positive response from an attached host; otherwise, the IR forwards the query to other IRs, if it has any other neighbors.

When an IR forwards a search query, it adds a path entry for itself to the forward path information contained in the query. This path entry includes: the IP or MAC address of the IR; its predecessor, which consists of the IP or MAC address of the IR from which the query was received; the distance from the origin of the query to the IR; and the dissemination-type flag for the IR forwarding the query. The IR computes the distance from the origin of the query to itself by adding the cost of the incident link from its neighbor to the distance reported in the forward path of the query for the neighbor that forwarded the query.

When an IR knows a path to the destination requested in a search query, it sends a reply to it specifying the complete path from the origin of the query to the destination. This path is simply the concatenation of the forward path specified in the query being answered and the path from the IR answering the query to the intended destination.

To permit search queries to be IR-level or host-level in a way that is completely transparent to the hosts of an ad-hoc internet, one embodiment of the AIR protocol treats new ARP requests as IR-level queries and retransmitted ARP requests as host-level queries, and uses a counter to limit the number of host-level queries sent for the same IP address during a time interval of a few seconds. In addition to consuming bandwidth, sending too many host-level requests would impact the hosts of an ad-hoc internet negatively after network partitions and/or IR or host failures.

When a host sends a new ARP request to its attached IR, the IR originates an IR-level query and keeps a copy of the query in a query-sent table for a query-timeout interval. As shown in Figure 10, an entry in the query-sent table includes the IP address of the intended destination, a query-type flag stating whether the entry corresponds to an IR- or host-level query, and a counter. The query-timeout interval is long enough for replies to the query to come back to the originating IR if there are other IRs with a path and address mapping to the requested destination, but is smaller than the ARP request timeout at the requesting host.

If the query-timeout expires for an entry in the query-sent table, the IR increments the counter of the entry in its query-sent table, retransmits the IR-level query, and restarts its query-timeout timer. If no reply is received to the retransmitted IR-level query, the IR changes the value of the query-type flag (e.g., to one) to reflect the fact that the next retransmission of the query must be a host-level query. The query-timeout is set to equal an ARP request timeout to allow the attached host to retransmit its ARP request. The IR does not retransmit a search query for the same address unless it receives an ARP request from its attached host. If the IR receives an ARP request for an IP address whose entry in the query-sent table has a query-type flag set to one, the IR sends a host-level query, increments the counter for the entry, and starts a query-timeout timer with a value long enough for the remote host to reply to the query.

An entry remains in the query-sent table of an IR for a long timeout period that should be larger than the ARP request timeout at the attached hosts, so that the attached host can retransmit an ARP request if necessary. In one embodiment of AIR, a host-level query is retransmitted only twice, after which an IR simply drops ARP requests from an attached host. This limits the traffic due to flooding of search queries over the ad-hoc internet due to ARP requests and also limits the number of remote ARP requests reaching the hosts.

VIII. Processing Replies to Search Queries

Replies specify complete paths from origins of queries to destinations, because relay IRs do not maintain an accurate account of the queries that they have forwarded; the cache maintained at each IR is only meant to reduce the possibility of an IR forwarding the same query multiple times. Accordingly, an IR must decide how to process a reply it receives from a neighbor based entirely on the information contained in the reply and not the contents of the cache it keeps for queries. More specifically, an IR receiving a reply for a query forwards the reply towards the origin of the query if it is listed in the forward path from the origin to the destination specified in the reply.

In addition to forwarding replies to the proper IRs when applicable, IRs also use replies to update their routing tables. An IR receiving a reply treats each path entry with the dissemination-type flag set in the path specified in the reply as an unreliable update entry. More precisely, if a path entry in a reply refers to a well-known destination, the IR updates its distance and routing tables as if the entry were an update entry, prepares its own routing-table update if needed, but does not send an acknowledgment. In addition, an IR treats each path entry with the dissemination-type flag reset as a temporal routing-table entry. The IR adds the routing information to its routing table, and keeps the information for a period of time.

As the replies from IRs travel back to the origin of the query, the originating IR starts obtaining one or more paths to the intended destination. In one embodiment of AIR, the IR originating a search query does not keep any state regarding the search queries that are still pending replies. The sequence number assigned to a search query is used only to limit the number of replicas of the same query that relay IRs forward. This design assumes that the hosts attached to the IRs will be the ones requesting the transmission of more queries if they do not obtain any reply from their attached IRs after a timeout. In practice, the timeouts used in hosts are much longer than the time needed for queries and their replies to traverse an ad-hoc internet.

An IR originating a search query may receive as many replies as there are IRs in the ad-hoc internet that know about the destination and are reached by the query through paths of IRs that do not know about the destination. In one embodiment of AIR, IRs maintain routing-table entries for either well-known destinations that every IR must know, or on-demand destinations that IRs know only temporarily through the replies to

queries for those destinations. Therefore, it is anticipated that the most replies an originating IR will receive equals the number of neighbor IRs that a destination IR has, if the destination is an IR or a network, or as many replies as IRs are attached to a host, if the destination is a specific host. In most cases, on-demand routing will serve host-specific routes. When an IR that originated a search query receives the first reply to the query, it should erase the entry for the query in its query sent table.

IRs maintain on-demand routing information for a finite period of time, and add routing-table entries to their routing tables with information they receive in replies to search queries, without notifying their neighbors of such changes to their routing tables. An IR keeps a routing-table entry with a zero value of the dissemination-type flag for a finite time period equal to a maximum entry age, which in one embodiment may be set to approximately 3 minutes or another appropriate time. The IR may reset the age of the entry (e.g., by updating an associated age field, which may be part of each routing table entry as shown in Figure 3) each time it forwards a packet for the destination or receives a new reply with information about the destination.

IX. Reliable and Unreliable Distribution of Routing Information

The reliable transmission of update messages is implemented by multicasting update messages, and then acknowledging these with messages carrying both updates and acknowledgments to one or more other update messages.

After receiving an update message free of errors, a node is required to acknowledge it. An update message may be retransmitted if acknowledgments are missing after a finite timeout equal to the update interval. An IR keeps track of which neighbor IRs have not acknowledged an update message by means of its MRL. Each retransmission of an update message may specify the subset of neighbors that need to acknowledge the message.

In some cases, the information contained in an update message may be obviated by a subsequent update message. In one embodiment of AIR, old update messages are therefore discarded, and all the up-to-date path information contained in the old update messages are included in the new update message, together with the new information the new update message must convey to all neighbor IRs. In other schemes, the new update message may include information regarding which portions of old update message to discard, etc. An IR may receive an acknowledgment to an update message that has been

replaced by a more recent update message; in such a case, the IR simply ignores the information in the acknowledgment.

In contrast to the way in which update messages are exchanged, in one embodiment of AIR search queries and their replies are sent unreliably among IRs. The IRs originating search queries retransmit such queries only once, and it is up to the hosts to persist in finding destinations for which there are no routing table entries at each IR. As noted above, however, AIR preferably limits the number of search queries allowed over the ad-hoc internet for a given remote destination.

X. Simple Network Configuration Through AIR

With traditional Internet routing protocols, a router has to be configured with the IP addresses and masks of the attached LANs, as well as its own address and mask. Further, hosts attached to routers through a serial link or a LAN have to be configured with their IP address and mask and the IP addresses of their default routers. This amount of configuration information is required in existing Internet routing solutions because Internet routing protocols require IP addresses to accomplish routing. Therefore, Internet routers cannot start forwarding data to destinations until they are assigned their proper IP addresses and they can only send data towards IP destinations; which means that hosts must be properly configured with IP addresses before routers can start forwarding data to them.

AIR simplifies the configuration of hosts and IRs in the ad-hoc internet because it permits IRs to use both MAC and IP addresses to establish paths to destinations. AIR thus enables the implementation of a simple Dynamic IR Configuration Protocol (DICP) and permits IRs to start forwarding data for hosts immediately after they are turned on.

As mentioned above, in the ad-hoc internet each IR registers with an AirHead, i.e., an IR that interconnects the ad-hoc internet to the rest of the Internet, such as IR 16a in Figure 1. An AirHead is configured with an IP address, LAN sub-networks for attached LANs, and a default router address for the wired segment to which it attaches to interconnect to the rest of the Internet. The AirHead then receives an IP sub-network for the ad-hoc internet it serves.

The AirHead (e.g., IR 16a) may use a standard Internet routing protocol (e.g., RIP or OSPF) over the wired LAN (e.g., LAN 20) connecting to its default router (e.g., router 18) to advertise its sub-network (e.g., 12a and/or 12b) to the default router. The AirHead

is the only IR that needs to be configured in this traditional approach, because it is the only IR that must use standard Internet routing mechanisms to interconnect to the rest of the Internet.

Other IRs (e.g., 16c) may obtain an IP address and domain name from their associated AirHead (e.g., 16a), and may serve DHCP (Dynamic Host Configuration Protocol) packets from attached hosts (e.g., 22a and/or 22b). The DICP provides mutual authentication between new IRs and AirHeads, which can be accomplished by a packet-limited dialogue between the IR and AirHead to exchange certificates and public keys, and authenticate identities. To save address space or permit installation before a global IP network assignment is obtained, AirHeads can use a private IP address space to assign IP addresses to IRs and hosts. This, of course, makes the hosts and IRs in the ad-hoc internet invisible to the rest of the Internet; accordingly, the AirHead must provide the translation of private IP addresses to the IP address space allocated to the ad-hoc internet it serves. Importantly, however, the operation of AIR does not change with the type of IP addresses (public or private) used in an ad-hoc internet. With the services provided by AirHeads and the DICP, and given that AIR uses both MAC and IP addresses for routing, IRs can start operating after they are turned on. Immediately after startup, the IRs can start sending search queries in response to ARP requests.

XI. AIR Routing Metrics

As indicated above, most network routing protocols operate on "metrics" to determine the best path or paths for data traffic to take between source and destination nodes. These metrics are most often "link-state" metrics, which give an indication of the desirability (or inversely, the "cost") of routing traffic over a particular link. The simplest link metric is to give each link a cost of "1", which will cause the routing algorithm to choose paths that take the shortest number of links (or "hops"). Another common link metric is the delay across the link, averaged over some recent history and typically including both queuing and transmission delay. This will result in the routing algorithm choosing paths of minimum delay. Less common is the use of "node-state" metrics, which gives an indication of the cost to route packets through a particular node. To effectively route traffic in the self-configuring, multi-hop wireless network environment of an ad-hoc network, the AIR protocol combines traditional link-state

metrics with new types of both link- and node-state metrics. Of course, these routing metrics may find use in other types of networks as well.

The link-state metrics used by AIR include LinkNetImpact, LinkEnergy and LinkQuality, each of which is described in detail below.

LinkNetImpact is a metric that provides the cost in interference over time to an IR's neighbors per data bit and may be measured in,

(normalized-number-of-nonintended-receiving-nodes) * (secs per bit).

The normalized number of nonintended nodes gives an indication of the number of other nodes in the network, other than the intended receiver-node(s) for this link, which would be interfered with by a transmission over this link. For example, in the ad-hoc network 10 shown in Figure 1, when IR 16e transmits over a path including link 24c to reach Internet 14 through IRs 16d, 16c and 16a, that transmission may have the unintended effect of interfering with receptions by IR 16f (and potentially other transmissions and receptions by IRs in the sub-network 12b).

Because some nodes may be closer to the transmitter than others, this "normalized" number of neighbors may be computed in a number of ways. For example, (1) by including only those nonintended nodes that would receive the transmission at an RF power above a certain threshold power level; (2) by summing the interference levels of all nonintended nodes with the interference level at each node equal to the received RF power level of transmissions over this link by each of these nodes; or (3) a combination of methods (1) and (2).

To estimate the LinkNetImpact for use of a particular link, nodes may tag each (or selected) transmissions with the RF transmit-power used for that transmission. Any individual node may then measure the received signal strength of tagged transmissions made by its nearby nodes, and compute the difference between the transmit power (tagged in the packet) and the received signal strength. This difference will estimate (depending on measurement accuracy) the RF path-loss from the transmitting node. Periodically then (depending on rate of node mobility or other environmental dynamics), the node may relay the computed RF path-loss from each of its nearby nodes back to its neighbors. Given the path-loss to each of its nearby nodes, and given the transmitted power and link-date-rate (bits per sec) used for a link to a particular neighbor node, the transmitting node can compute the LinkNetImpact for use of this link.

Note that transmit power and link-date-rate, used for a node's different links, may vary from link to link. These will, in general, be set by link management protocols according to the data-rate and transmit-power that give reasonably reliable use of that link. In fact, the link manager may provide the routing algorithm (e.g., AIR) with multiple choices of links to the same neighbor that tradeoff lower transmit power (with lower LinkNetImpact) for LinkQuality for instance.

LinkNetImpact differs from prior schemes (e.g., Jim Stevens, Rockwell; Michael Pursley, Univ. of Illinois) where network "interference" was used as a link metric for routing algorithms, in that a measure of the link utilization (e.g., in secs per bit) was not included in such schemes.

LinkEnergy is a metric that provides the node energy consumed per data bit for transmissions over a selected link and its use recognizes that for mobile, portable, or unattended wireless nodes that may be solar- or battery-powered, the power used for transmissions over each link can be a significant consideration. The units for this metric are

Energy (in Joules or Watts * secs) / bit.

This metric may include all additional power not normally consumed for the node in its quiescent state (when not actively transmitting). This will include the power to transmit over the selected link, adjusting for the RF transmit power setting used for the link, and may or may not include the power required to put the node in an active state (if necessary). Given such a link metric, the routing algorithm can choose paths that minimize the total energy per bit communicated through the network, or may use this metric in combination with others to achieve a combined routing optimization.

In the past (e.g., Theresa Meng, Stanford), algorithms for minimum energy routing have been introduced but such schemes did not consider the speed of the links (which may be adaptive or selectable).

LinkQuality is a metric that provides a combined indication of the desirability of a link in terms of other basic metrics such as LinkReliability, LinkMaxTransmissionUnit (LinkMTU) size, LinkEnergy, and LinkRcvSignalStrength. Although many of these basic metrics may be used elsewhere as sole determining metric criteria, the combination and the way that the metric is used in AIR is unique. Such a metric may be passed as part of a routing table update message (e.g., as part of the distance information described above). Thus, the metric may be used for routing decisions. The metric may also be

used in determining whether to add a node as a neighbor at all, e.g., depending upon whether the corresponding link exhibits a better LinkQuality than an existing path to the target node.

In the self-configuring, multi-hop wireless environments common to ad-hoc networks, links to neighbors must be automatically selected by the nodes. This is in stark contrast to typical routing algorithms where the links to neighbor nodes are fixed, or in cellular wireless networks and conventional wireless LANs where selection of links is drastically simplified by the limitation that each mobile system is limited to one or more links with pre-determined "base-station" nodes.

There are a number of reasons why it may desirable to limit the list of actively used links to neighbor nodes. Each active link used by a node consumes memory resources within that node for such purposes as packet queues and maintaining link statistics. Each active link used by a node often requires additional fields in control packets in the MAC, Link, and/or Routing protocols, translating to additional network overhead traffic. In addition, by limiting a node's active links to only the closest nearby nodes, overall network efficiency is often increased due to the fewer number of nodes interfered with by transmissions (see LinkNetImpact metric above).

In AIR, a LinkQuality metric may be computed for each link being used by a node, based on some combination of traditional metrics (see above for some examples; in other cases, combinations of LinkNetImpact and/or LinkEnergy together and/or with the reliability of the link may be used as well). This metric may then communicated throughout the network as part of AIR's update packets. An important aspect of the use of this metric is making the decisions on which links to keep. Specifically, in making a decision on whether or not to add or delete a particular candidate link to a neighbor from it's actively used neighbor links, a node will:

1. Examine the node's local routing information to determine whether alternate paths exist to the neighbor, using a sequence of one or more other links through the network.
2. Compute the LinkQuality of the candidate link (using probing or other methods to compute the basic metrics required for the LinkQuality metric).
3. If no alternate path exists to this neighbor node, accept the candidate link into this node's list of active links.

4. If one or more alternate path(s) do exist to the neighbor node, then compare the LinkQualities of the links along each of the alternate path(s) with the LinkQuality of the candidate link. If the LinkQuality of the candidate link compares favorably with the links on the alternate path(s), then accept the candidate link.

In alternative situations, after examining the local routing information and performing any comparisons, if the LinkQuality is determined to be above a defined threshold value, then the candidate link may be accepted.

Depending on the metrics used to compute the LinkQuality, favorable comparison may mean that the candidate link's LinkQuality is equal to or better than the link with the worst LinkQuality along the alternate path. Alternatively, favorable results may mean that the candidate link's LinkQuality is equal to or better than some other PathQuality function of the links along the alternate path. For example, if LinkQuality was simply equal to the probability of success for each packet transmitted over the link, then the following PathQuality function may be appropriate to use for comparison purposes:

$$\text{PathQuality} = \prod_i [LinkQuality(i)],$$

where LinkQuality(i) is the LinkQuality over the i^{th} link along the alternate path. Thus, the function computes the probability that a packet with one transmission attempt over each link on the alternate path will successfully reach the destination (neighbor node).

If the number of active neighbor links for each node is limited, then steps 3, 4, and 5 above, can be modified to add a new candidate link and reject an existing link (if necessary to meet the limitation on the number active links to neighbors). This may be achieved by comparing the LinkQuality and alternate path(s) of the new link with the LinkQualities, and alternate paths(s) of the existing links. For example, each existing link's LinkQuality can be increased (or weighted) by some value (to favor existing links), and then these can be compared with the LinkQuality of the candidate link. The link with the worst LinkQuality value (as weighted, if appropriate) may be deleted (or simply not accepted in the case of the candidate link). Excluding existing links that have no alternate path, or only poor alternate paths (e.g., as measured according to the PathQuality function discussed above) can further extend this method.

In prior schemes (e.g., Beyer, Shacham; BBN), algorithms for selecting neighbor links were presented which limit the number of active links for each node. However, these schemes did not make use of link-state information available from a link-state routing protocol such as AIR.

Node-state metrics that may be used by AIR (e.g., as part of routing table update messages) include NodePowerType, NodePowerState and NodeAnchorFlag. These measures are discussed in turn.

NodePowerType is a metric that indicates the type of power available to a node. For example, values may include Unlimited-Power, Battery-Power (with the power-capacity of the battery as an optional argument), and/or Solar-Power. This metric can be included in the update packets of the routing protocol and used by the routing algorithm to steer packets towards power-capable nodes when allowed by network or traffic stream performance goals.

NodePowerState indicates the current state (e.g., "up", "standby", "down") and/or power schedule of a node (i.e., the power-conservation state of a node). For example, values may include Powered-Up, Powered-Standby, and Powered-Down. This metric may be included in the update packets of the routing protocol and used by the routing algorithm to steer packets towards nodes that are in more active states. This allows packets to follow paths of lower delays (because nodes that are in relatively inactive states are typically sensing the channel less often, and thus, forwarding through these nodes will take longer). Further, the scheme allows nodes that are powered-down to remain in that state rather than waking them up to forward packets.

NodeAnchorFlag is a metric that may be used to assist the user with network installation and/or maintenance. In a self-configuring, multi-hop network, a node's connectivity with the rest of the network cannot be determined simply by deciding whether it has links with one or more nodes (as is the case for cellular or wireless LAN networks, where each node is required to have a direct link with a "base-station" node). Therefore, AIR includes this metric, which indicates whether or not a node has been selected by the user to serve as an "anchor" for the network. By passing the state of this metric to the other nodes in the network, each node is able to provide an indication to the user as to whether or not it has a path (possibly over multiple hops) to one or more network anchors. For instance, this state may be displayed on an LED or other display,

indicating whether or not a node is currently "anchored," thus facilitating network installation.

Thus, if a single anchor node is selected by the user, then as long as each other node has a path (over one or more hops) to the anchor node (i.e., each network node is anchored), the user can be sure that each node also has connectivity with every other node in the network. Also, by designating the node(s) with connectivity to the Internet as the network anchor(s), then all anchored nodes will also have connectivity to the Internet. An anchor then may be thought of a node that has or provides connectivity to a server or a service for the computer network or a node that monitors connectivity, e.g., to the Internet or some other resource, for the computer network.

Thus a unified routing scheme for ad-hoc internetworking has been described. Although the foregoing description and accompanying figures discuss and illustrate specific embodiments, it should be appreciated that the present invention is to be measured only in terms of the claims that follow.

CLAIMS

What is claimed is:

1. A method comprising exchanging routing table update messages that include both network-level addresses and other addresses of nodes of a computer network among the nodes of the computer network.

2. The method of claim 1 wherein the other addresses of nodes comprise link-level addresses.

3. The method of claim 2 wherein the link-level addresses comprise MAC addresses.

4. The method of claim 3 wherein the update messages are exchanged in response to an indication that a new node has been added to the computer network, an indication that one of the nodes has been dropped from the computer network, or an indication that a link-state metric of a communication link of the computer network has changed.

5. The method of claim 3 further comprising updating a routing table maintained by a first one of the nodes of the computer network in response to receiving one or more of the update messages.

6. The method of claim 5 wherein updating the routing table comprises selecting a next node to a destination node of the computer network only if every intermediate node in a path from the next node to the destination node satisfies a set of nodal conditions required by the first node for its path to the destination node and the next node offers the shortest distance to the destination node and to every intermediate node along the path from the next node to the destination node.

7. The method of claim 6 wherein the shortest distance to the destination node is determined according to one or more link-state metrics regarding communication links between nodes along the path to the destination node.

8. The method of claim 7 wherein the shortest distance to the destination node is further determined according to one or more node-state metrics regarding the nodes along the path to the destination node.

9. The method of claim 6 further comprising transmitting nodal characteristics of the first node to neighbor nodes of the first node, prior to updating the routing table.

10. The method of claim 6 further comprising receiving at the first node, nodal characteristics of neighbor nodes of the first node, prior to updating the routing table.

11. The method of claim 3, further comprising computing at a first of the nodes of the computer network, preferred paths to one or more destination nodes according to nodal characteristics of the nodes of the computer network.

12. The method of claim 11 wherein the nodal characteristics are transmitted to the first node by neighbor nodes of the first node.

13. The method of claim 12 wherein a local shortest-path algorithm is used to compute the preferred paths.

14. The method of claim 3 wherein exchanging routing table update messages comprises exchanging node distance and node predecessor information among the nodes of the computer network.

15. The method of claim 14 wherein individual entries in the update messages are processed in order at a receiving node of the computer network.

16. The method of claim 15 wherein transmitting nodes of the computer network order the individual entries in the update messages according to distances to destination nodes.

17. The method of claim 16 wherein for each entry of one of the update messages, one of the receiving nodes determines whether an implicit path to one of the destination nodes defined by the node distance and node predecessor information is free of loops.

18. The method of claim 3 further comprising updating a routing table entry for a destination node, the entry established according to path information provided by a first neighbor node, at a first of the nodes of the computer network according to information included within at least one of the update messages received from a second neighbor node.

19. A method of updating routing tables for a computer network, comprising disseminating routing table update information regarding nodes of the computer network that are well known throughout the network, the update information including both network-level and link-level addresses for the well-known nodes.

20. The method of claim 19 further comprising transmitting routing table update information regarding nodes that are not well known throughout the computer network in response to search queries regarding such nodes.

21. The method of claim 20 wherein the search queries are flooded throughout the computer network on a best-effort basis.

22. The method of claim 21 wherein upon receipt of one of the search queries, a first node of the computer network searches a query cache to determine whether the first node has already processed that search query.

23. The method of claim 21 wherein upon receipt of one of the search queries, a first node of the computer network determines whether that search query is a host-level search query or not.

24. The method of claim 23 wherein if the first node determines that the search query is a host-level query, the first node responds to the search query if it has not already done so and if it is able to provide path information to a destination specified in the search query.

25. The method of claim 24 wherein if the first node has not already responded to the search query but does not have the path information to the destination, the first node transmits a local request for the path information to local hosts associated with the first node.

26. The method of claim 25 wherein if the first node receives a local response to the local request, the first node transmits the path information from the local response in response to the search query.

27. The method of claim 26 wherein if the first node does not receive a local response to the local request, the first node transmits the search query to neighbor nodes of the computer network if there are any.

28. The method of claim 23 wherein if the first node determines that the search query is not a host-level query, the first node either transmits a response to the search query if the first node has path information to a destination specified in the search query or forwards the search query to neighbor nodes of the computer network, if any.

29. The method of claim 20 wherein the routing table update information regarding nodes that are not well known throughout the computer network is provided as search query response messages by one or more nodes of the computer network having path information relating to the nodes that are the subject of the search queries.

30. The method of claim 29 wherein one of the nodes having the path information adds a path entry for itself to the path information before providing an associated search query response message.

31. The method of claim 30 wherein the path entry includes a network-level and a link-level address of the node having the path information.

32. The method of claim 31 wherein the path entry further includes a network-level and a link-level address of a node from which the node having the path information received the search query.

33. The method of claim 20 wherein new ones of the search queries are treated as network-level queries and retransmitted ones of the search queries are treated as host-level search queries.

34. The method of claim 20 wherein at least one of the nodes of the computer network maintains a table of the search queries it has transmitted.

35. The method of claim 34 wherein the table of search queries includes an indication of whether a particular search query is a network-level search query or a host-level search query.

36. The method of claim 20 wherein network-level search queries are retransmitted as host-level search queries within the computer network if no responses are received to network-level searches.

37. A method for updating a routing table in a computer network comprising specifying a path from an origin of a search query to a destination in the computer network that is the subject of the search query, the path including both network-level and link-level addresses of the destination.

38. The method of claim 37 wherein the path is relayed between nodes of the computer network, from a first node that produces the path to the origin of the search query.

39. The method of claim 38 wherein any one node of the computer network relays the path only if it is included in the path between the origin of the search request and the destination.

40. The method of claim 38 wherein relaying nodes of the computer network that receive the path, update respective routing tables to include the path.

41. The method of claim 40 wherein the relaying nodes of the computer network retain the path in the respective routing tables if the path is associated with a node that is well known throughout the computer network, otherwise, the path is removed from the respective routing tables after a specified period of time.

42. A routing table, comprising:

a network-level address of a destination node of a computer network; and

another address of the destination node.

43. The routing table of claim 42 wherein the network-level address and other address are included in a single entry of the routing table regarding the destination node.

44. The routing table of claim 43 wherein the network-level address comprises an Internet protocol (IP) address.

45. The routing table of claim 44 wherein the other address comprises a medium access control (MAC) address.

46. The routing table of claim 43 wherein the single entry further includes path information regarding the destination node.

47. The routing table of claim 46 wherein the path information comprises distance information.

48. The routing table of claim 47 wherein the distance information is based on link-state information and node-state information of a path within the computer network.

49. The routing table of claim 48 wherein the path is a shortest path between the destination and a node that maintains the routing table.

50. The routing table of claim 49 wherein the path information further comprises predecessor information refers to a node of the computer network that is the second-to-last hop from the node which maintains the routing table to the destination along the path.

51. A router comprising the routing table of claim 42.

52. The router of claim 51 further comprising a distance table that is configured to store routing tree information received by the router from neighbor nodes of the computer network.

53. The router of claim 52 further comprising a message retransmission list that is configured to include information regarding routing table update messages transmitted by the router to the neighbor nodes.

54. A cost metric for a computer network comprising a measure of interference over time to neighbor nodes of a first node of the computer network per data bit transmitted on a communication link used by the first node.

55. The cost metric of claim 54 as estimated using the RF transmit power used by the first node for the communication link, the link data rate and the RF-path loss on the communication link, which is determined by a neighbor node comparison of the RF transmit power to a received signal strength at the neighbor node.

56. A cost metric for a computer network having a plurality of nodes comprising node energy consumed per data bit for transmissions over a communication link within the computer network.

57. The cost metric of claim 56 wherein node energy is computed so as to account for all power not used by a node in a non-transmitting state.

58. A cost metric for a computer network organized as a self-configuring, multi-hop wireless environment, the cost metric comprising a measure of the quality of a wireless communication link within the computer network.

59. The cost metric of claim 58 wherein the measure of the quality of the wireless communication link within the computer network comprises a packet success rate measured over a history of packet transmissions across the communication link.

60. The cost metric of claim 58 wherein the measure of the quality of the wireless communication link within the computer network comprises a combination of a measure of the reliability of the communication links and a measure of interference experienced over time on the communication link as caused by transmissions from a neighboring node of the communication network per data bit.

61. The cost metric of claim 58 wherein the measure of the quality of the wireless communication link within the computer network comprises a combination of the reliability of the communication link and a measure of node energy consumed per data bit for transmissions over the communication link.

62. The cost metric of claim 58 wherein the measure of the quality of the wireless communication link within the computer network comprises a measure of node energy consumed per data bit for transmissions over the communication link and a measure of interference experienced over time on the communication link as caused by transmissions from a neighbor of the node of the communication network per data bit.

63. A routing table update message comprising the cost metric of claim 58.

64. A method, comprising determining whether to include a node of a computer network as a neighbor node in a routing table according to a value of the cost metric of claim 58.

65. A method, comprising:

examining local routing information maintained by a first node of a computer network to determine whether alternate paths exist to a neighbor node of the first node, using a sequence of one or more links other than a candidate link through the computer network;

computing a link quality of the candidate link;

if no alternate path exists to the neighbor node, accepting the candidate link; and

if one or more alternate paths do exist to the neighbor node, then comparing link qualities of the links along each of the alternate paths with the link quality of the candidate link and accepting the candidate link if the link quality of the candidate link compares favorably with the link qualities of the links on the alternate paths.

66. The method of claim 65 wherein a favorable comparison is one wherein the link quality of the candidate link is equal to or better than a link quality of a worst one of the link qualities of the links on the alternate paths.

67. The method of claim 65 wherein a favorable comparison is one wherein the link quality of the candidate link is equal to or better than a path quality function of the links along the alternate paths.

68. The method of claim 65 further comprising the step of accepting the candidate link if the link quality of the candidate link exceeds a defined threshold value.

69. The method of claim 67 wherein the link quality of any link in the computer network is equal to the probability of success for each packet transmitted over that link.

70. The method of claim 67 wherein the path quality function of the links along the alternate paths comprises the products of the link qualities for each of the links on the alternate paths.

71. A cost metric for a node of a computer network comprising an indication of the type of power available to the node.

72. A routing table update message comprising the cost metric of claim 71.

73. A cost metric for a node of a computer network comprising an indication of the power state of the node.

74. A routing table update message comprising the cost metric of claim 73.

75. A metric for a node of a computer network comprising an indication of whether the node is an anchor for the computer network.

76. A routing table update message comprising the metric of claim 75.

77. The metric of claim 75 wherein an anchor comprises a node that has or provides connectivity to a server or a service for the computer network.

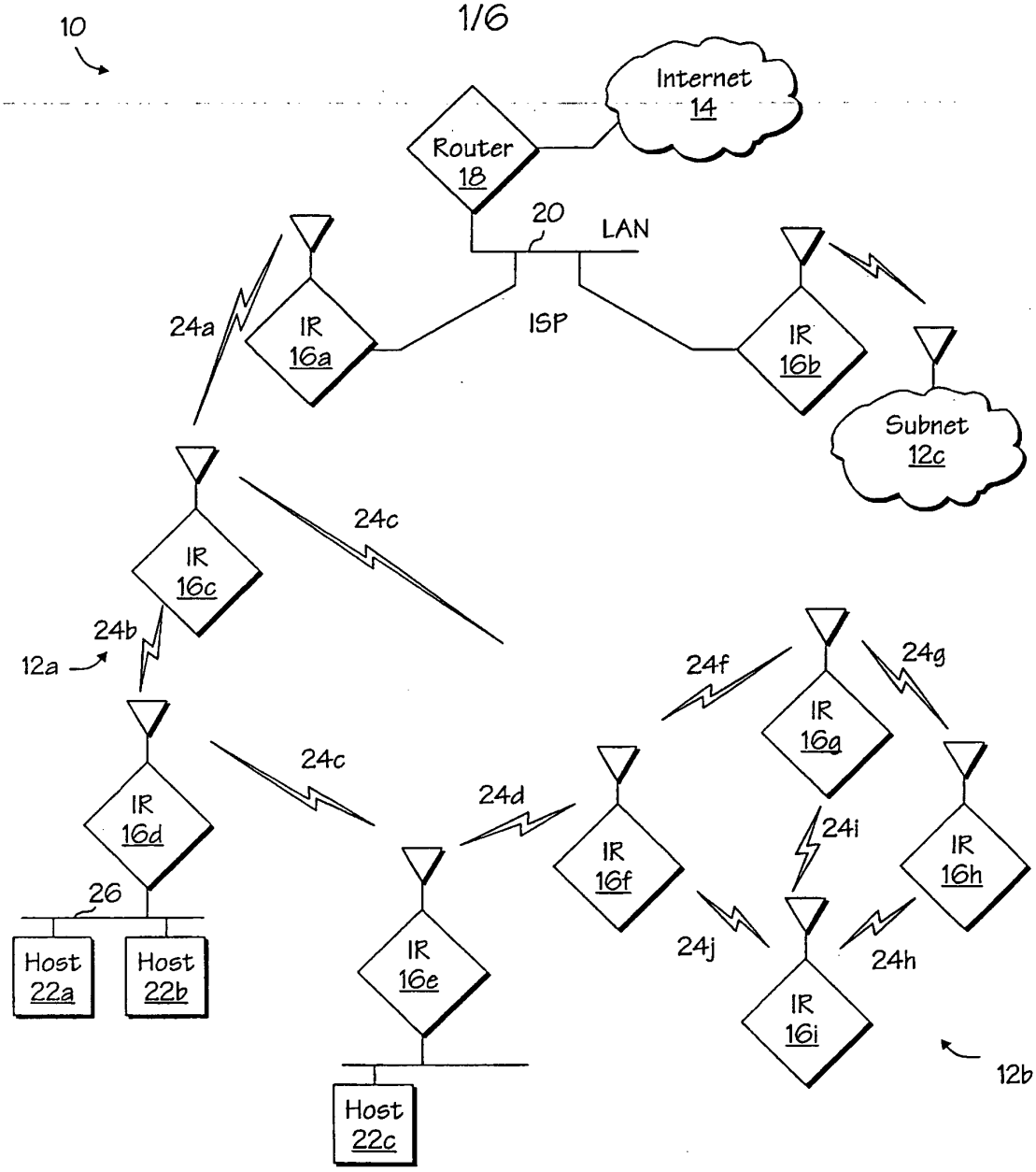
78. The metric of claim 75 wherein an anchor comprises a node that monitors connectivity to the Internet for the computer network.

79. A method, comprising transmitting routing table update messages among nodes of a computer network, one or more of the routing table update messages comprising information regarding services provided by one or more of the nodes or connectivity provided by the one or more nodes.

80. A method, comprising transmitting routing table update messages among nodes of a computer network, one or more of the routing table update messages comprising installation information regarding the network.

81. The method of claim 80 wherein the one or more routing table update messages further comprise information regarding network management.

82. The method of claim 81 wherein the one or more routing table update messages comprise information regarding anchor nodes of the network.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Internet
14
Router
18
20
LAN
ISP
24a
IR
16a
IR
16b
Subnet
12c
24c
IR
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24b
12a
24f
24g
IR
16g
24c
24d
IR
16d
IR
16f
24i
IR
16h
26
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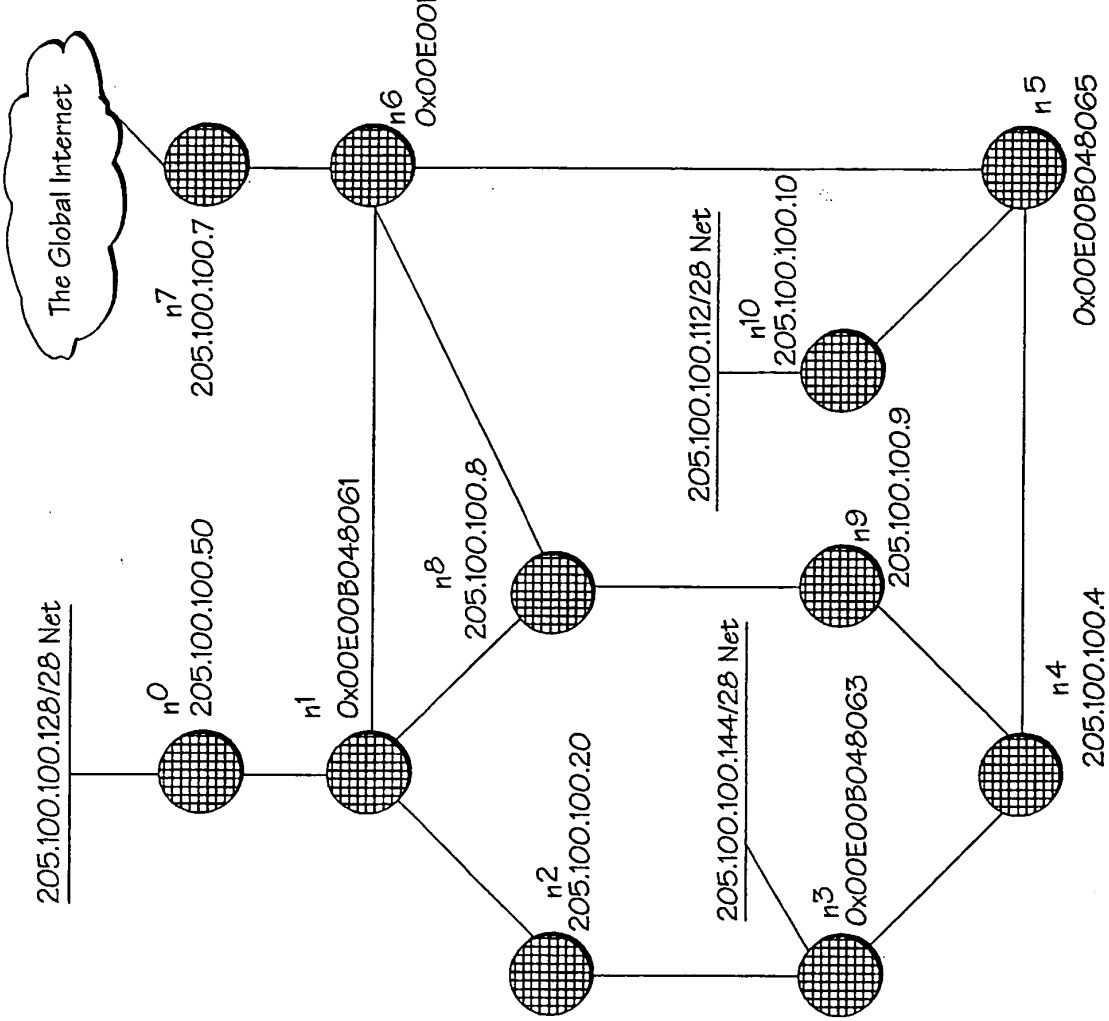
Host
22b
IR
16e
24j
24h
IR
16i
12b
Host
22c

Fig. 1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n6
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n5
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n10
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n9
n8
205.100.100.8
205.100.100.50
n0
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n1
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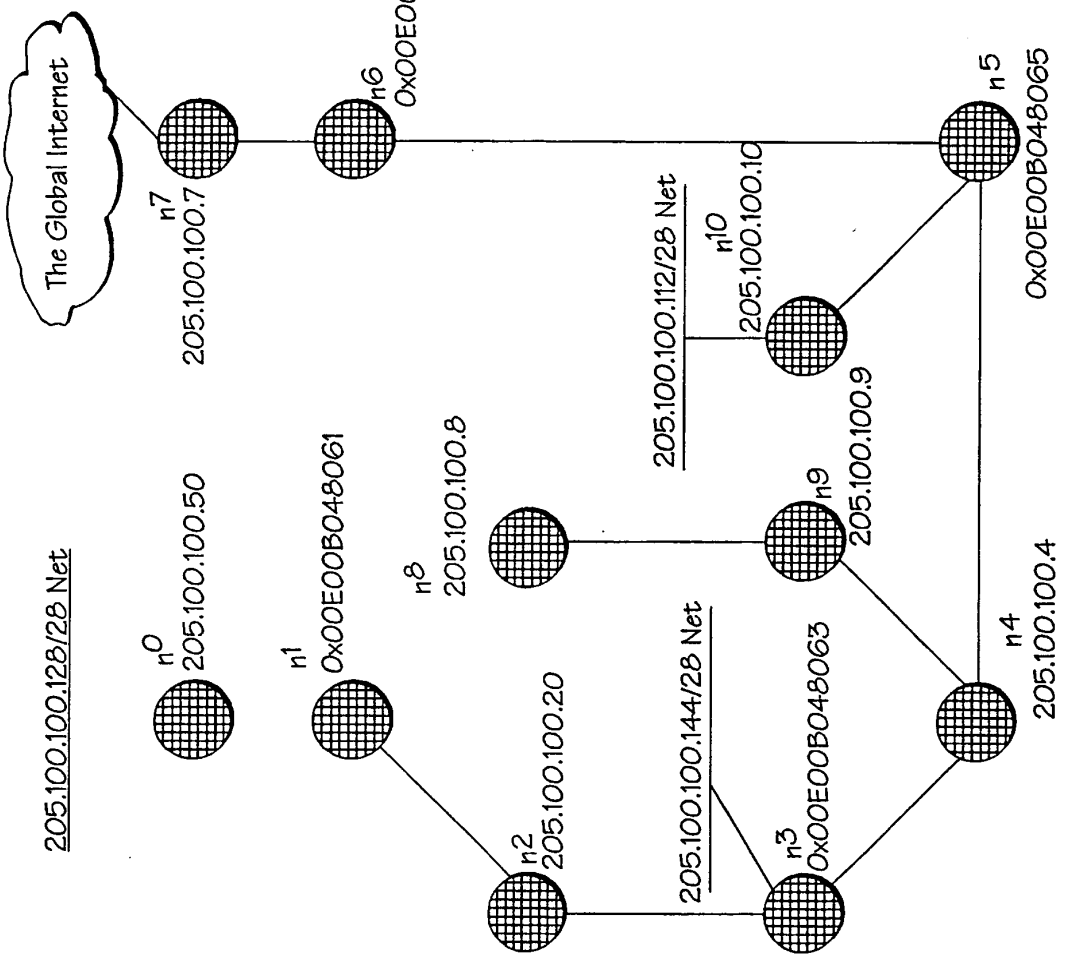
n2
205.100.100.20
n3
0x00E00B048063
n4
205.100.100.4

Fig. 2A


The Global Internet
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205.100.100.9
n9
205.100.100.8
n8
205.100.100.50
n0
205.100.100.128/28 Net
n1
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205.100.100.144/28 Net
n2
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n3
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n4
205.100.100.4

Fig. 2B

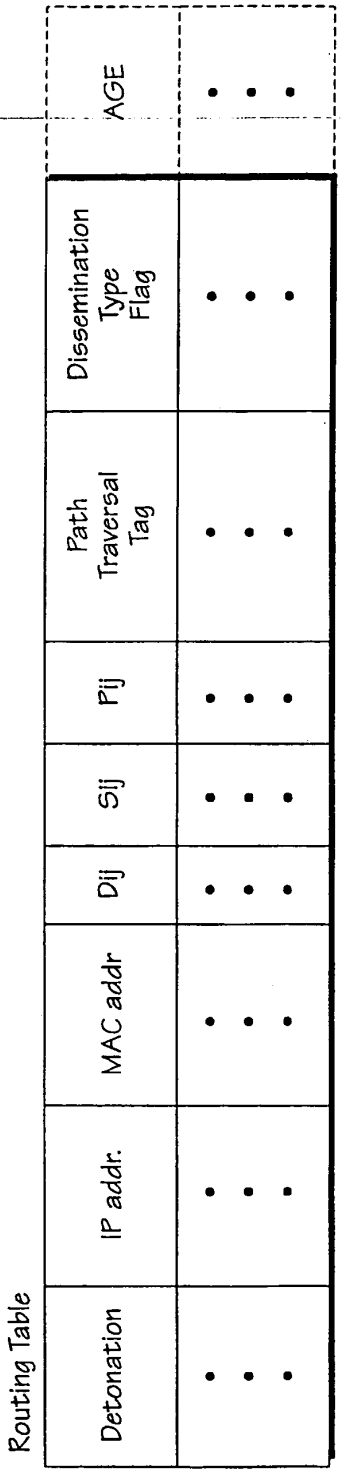

Fig. 3

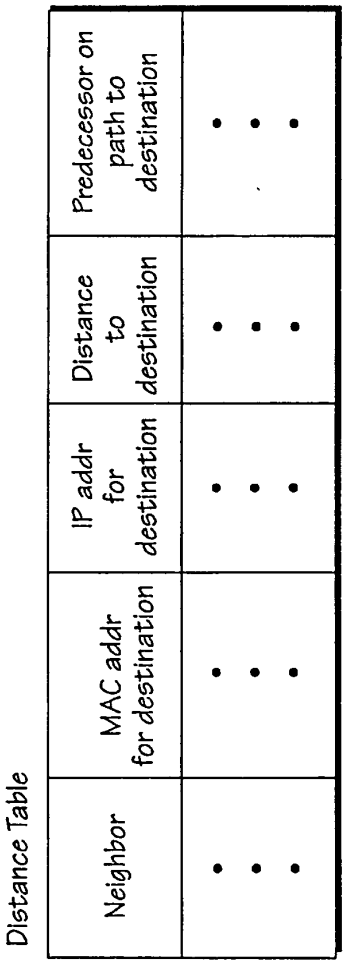

Fig. 4

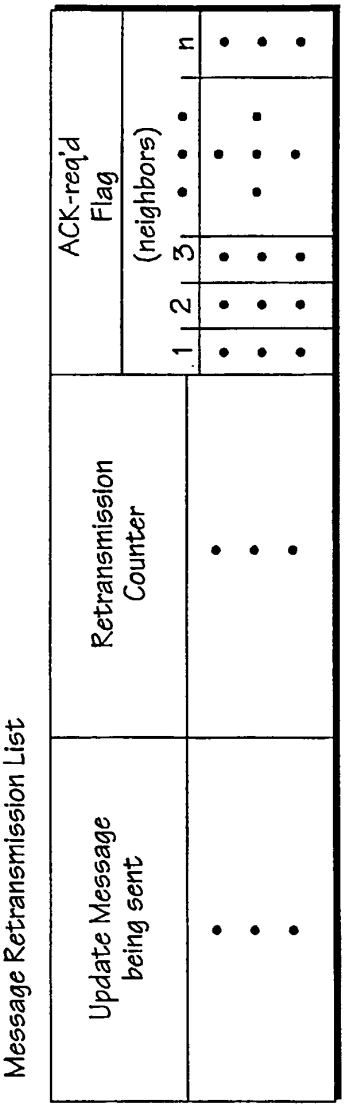

Fig. 5

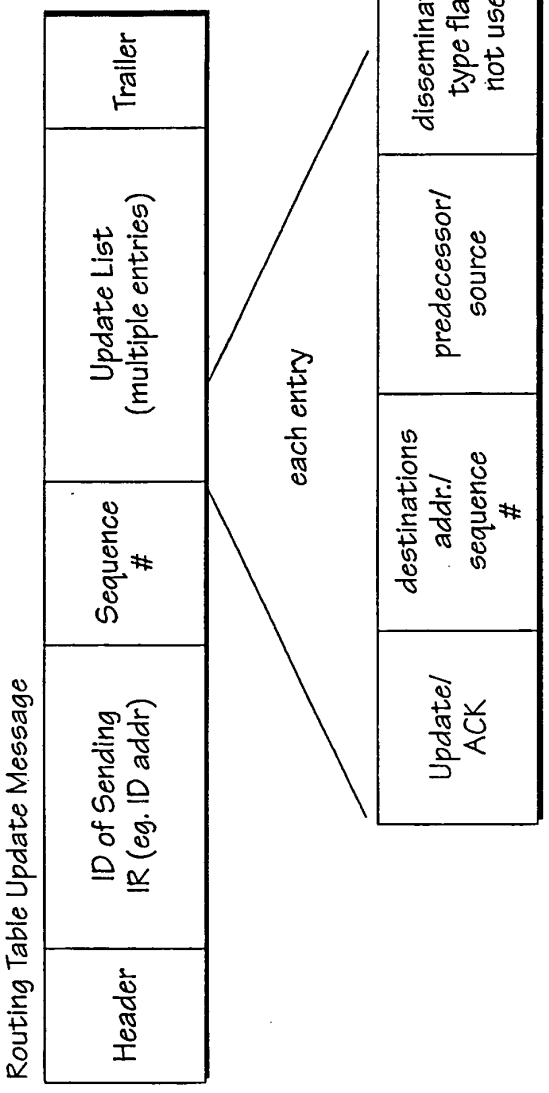

Fig. 6

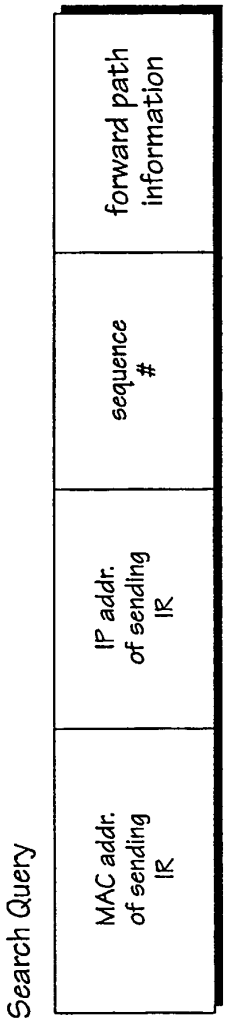

Fig. 7

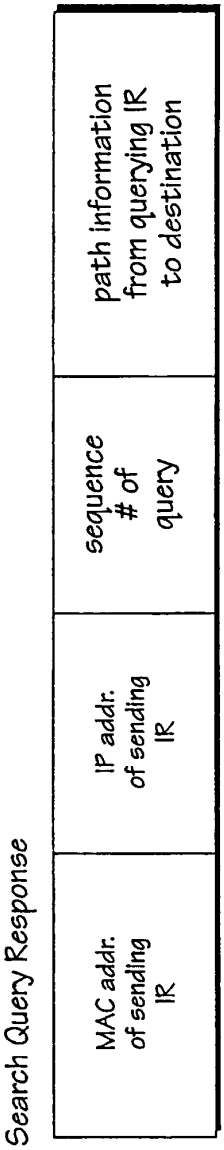

Fig. 8

Fig. 9

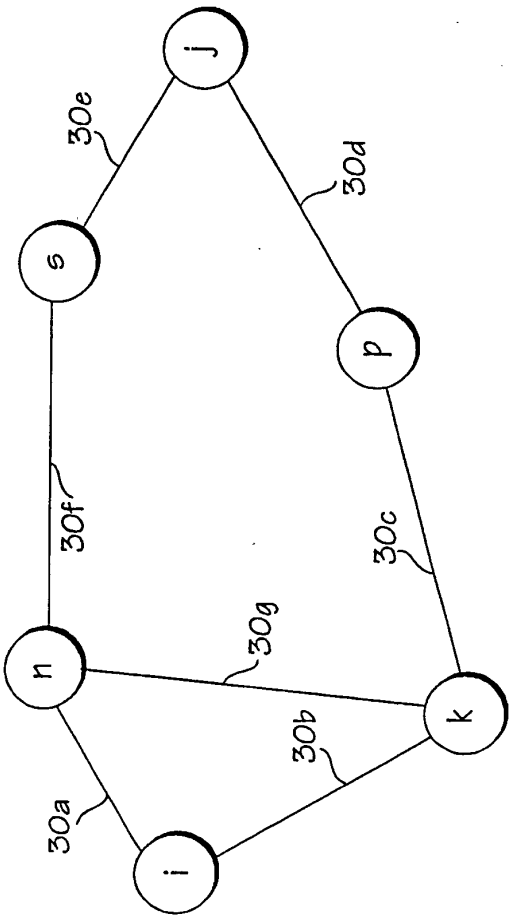

Fig. 10

Query Sent Table

IP addr. of destination	Query-Type Flag	Counter

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(10) International Publication Number
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(51) International Patent Classification[7]: H04L 12/56

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(22) International Filing Date:
22 September 1999 (22.09.1999)

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09/221,228 23 December 1998 (23.12.1998) US

(71) Applicant: NOKIA WIRELESS ROUTERS, INC. [US/US]; 785 Castro Street, Suite A, Mountain View, CA 94041 (US).

(72) Inventors: BEYER, David, A.; 468 Paco Drive, Los Altos, CA 94024 (US). GARCIA-LUNA-ACEVES, Joaquin; 82 Lakewood Circle, San Mateo, CA 94402 (US). FRIVOLD, Thane, J.; 3105 Parkdale Way, Redwood City, CA 94061 (US).

(74) Agents: FAHMI, Tarek, N. et al.; Blakely, Sokoloff, Taylor & Zafman LLP, 7th floor, 12400 Wilshire Boulevard, Los Angeles, CA 90025 (US).

(81) Designated States *(national)*: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:
— *With international search report.*

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11 January 2001

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

(54) Title: A UNIFIED ROUTING SCHEME FOR AD-HOC INTERNETWORKING

Distance Table

Neighbor	MAC addr for destination	IP addr for destination	Distance to destination	Predecessor on path to destination
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•

(57) Abstract: Routing table update messsages that include both network-level and link-level addresses of nodes of a computer network are exchanged among the nodes of the computer network. Further, a routing table maintained by a first one of the nodes of the computer network may be updated in response to receiving one or more of the update messages. The shortest distance to the destination node may be determined according to one or more link-state and/or node-state metrics regarding communication links and nodes along the path to the destination node. Also, the nodal characteristics of the nodes of the computer system may be exchanged between neighbor nodes, prior to updating the routing table.

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INTERNATIONAL SEARCH REPORT

Intern ial Application No
PCT/US 99/21236

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04L12/56

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, PAJ, INSPEC, COMPENDEX, IBM-TDB

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	LUNA-ACEVES J J G ET AL: "WIRELESS INTERNET GATEWAYS (WINGS)" ANNUAL MILITARY COMMUNICATIONS CONFERENCE,US,NEW YORK, NY: IEEE, 3 November 1997 (1997-11-03), pages 1271-1276, XP000792611 ISBN: 0-7803-4250-X cited in the application page 1273, left-hand column, line 20 -right-hand column, line 53	1
A	--- -/--	19,37

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

[X] 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	Date of mailing of the international search report
3 October 2000	16. 10. 2000

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	Ströbeck, A

2

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Intern .ial Application No
PCT/US 99/21236

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
A	RAJAGOPALAN B ET AL: "A RESPONSIVE DISTRIBUTED ALGORITHM FOR SHORTEST-PATH ROUTING WITHIN AUTONOMOUS SYSTEMS" INTERNETWORKING: RESEARCH AND EXPERIENCE,GB,JOHN WILEY AND SONS, vol. 2, no. 1, March 1991 (1991-03), pages 51-69, XP000669932 ISSN: 1049-8915 page 57, line 29 -page 58, last line	1,19,37
A	EP 0 465 201 A (DIGITAL EQUIPMENT CORP) 8 January 1992 (1992-01-08) column 9, line 53 -column 10, line 2 column 10, line 45 -column 11, line 18	1,19,37, 42,51
X	WO 96 19887 A (SALBU RESEARCH AND DEVELOPMENT (PROPRIETARY) LIMITED) 27 June 1996 (1996-06-27) page 12, line 15 -page 13, line 1 page 21, line 17 -page 22, line 4 page 23, line 25 -page 25, line 4	58,59, 65,66
A		54-57, 60-64, 67-70
A	US 5 115 433 A (BARAN PAUL ET AL) 19 May 1992 (1992-05-19) column 3, line 48 -column 4, line 19 column 8, line 3 - line 31	56,57, 71-74
X	US 5 737 318 A (MELNIK GEORGE A) 7 April 1998 (1998-04-07) column 2, line 13 - line 34	79,80
A		75,76, 81,82

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 99/21236

Box I Observations where certain claims were found unsearchable (Continuation of item 1 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 II Observations where unity of invention is lacking (Continuation of item 2 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.

Form PCT/ISA/210 (continuation of first sheet (1)) (July 1998)

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. Claims: 1-53

   A method, a routing table and a router in a computer network for exchanging routing table update messages including both network-level addresses and other addresses.

2. Claims: 54, 55

   A cost metric for indicating interference on a link.

3. Claims: 58-70

   A cost metric, a routing table update message and a method for indicating link quality.

4. Claims: 56, 57, 71-74

   A cost metric and a routing table update message for indicating node energy consumed for transmission over a communications link or the type of power available to a node or the power state of a node.

5. Claims: 75-82

   A metric and a routing table update message indicating if a node is an anchor node and a method for transmitting routing table update messages including node connectivity or installation information.

INTERNATIONAL SEARCH REPORT

Information on patent family members

Interr. ..al Application No
PCT/US 99/21236

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		WO 9724840 A	10-07-1997
		JP 11501491 T	02-02-1999

Form PCT/ISA/210 (patent family annex) (July 1992)

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(19) World Intellectual Property Organization
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(71) Applicant: SONY ELECTRONICS INC. [US/US]; 1 Sony Drive, Park Ridge, NJ 07656 (US).

(72) Inventors: BARANOWSKI, Robert; 14370 Bourgeois Way, San Diego, CA 92129 (US). BERG, Roger, William; 7066 Rockrose Terrace, Carlsbad, CA 92009 (US).

(74) Agents: HEID, David, W. et al.; Skjerven Morrill MacPherson LLP, 25 Metro Drive, Suite 700, San Jose, CA 95110 (US).

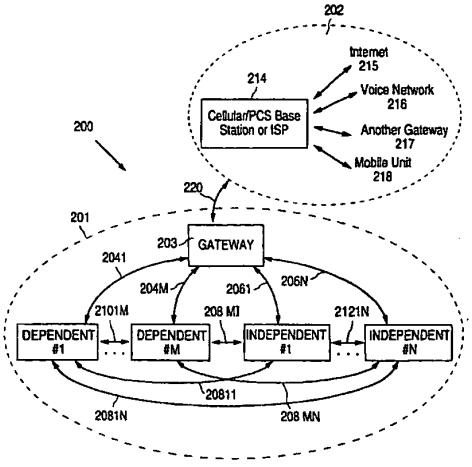
(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:
— *Without international search report and to be republished upon receipt of that report.*

[Continued on next page]

(54) Title: INFORMATION GATEWAY SYSTEM AND METHOD



(57) Abstract: Device and method for communicating between a plurality of devices. A communication device is partitioned into various units, each performing a function of the communication device. A subnet is established for the units, the units including a master device acting as the master of the subnet and performing an exclusive master function and a plurality of slave devices acting as the slaves of the subnet and performing other functions of the communication device. The master device negotiates with the slave devices and intelligently routes a message to the slave devices having capability to process the message. In one embodiment, the message is from an external network. In one embodiment, the message is from a slave device in the subnet. The same protocol is used for communicating with the master device. In one embodiment, the master device communicates with a slave device via a wireless communication path such as radio frequency and InfraRed. The external network is an established network, such as an internet, a mobile unit, a voice network, or another subnet.

WO 01/48977 A2

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

INFORMATION GATEWAY SYSTEM AND METHOD

FIELD OF THE INVENTION

This invention relates to networking of electronic devices. More particularly, this invention relates to networking of local electronic devices with an external network using a common gateway.

BACKGROUND OF THE INVENTION

In recent years, the networking ability has increased in dramatic fashion to include a variety of electronic devices, such as cellular phones, televisions, stereos, etc. Accordingly, cost and complexity must be added to these electronic devices to make them "internet-ready" or "network-capable." Several technologies have been used to make an electronic device network-capable, including wired and wireless connections.

One example of wired connections is the use of routers to connect various networks that would otherwise remain separate. Routers connect networks using a variety of methods and perform functions such as verifying the validity of the data packet, consulting a data structure called a routing table to see where the data packet should go next, queuing the data packet for delivery, forwarding the data packet and exchanging routing information with other routers. Typically a message being routed has an associated destination address called a MAC (Media Access Control) address which the router uses to direct the message. The router does not have the intelligence to decide where the message should go, but merely directs the message to the destination where the sender wants the message to be delivered.

The router can be a wireless router. A wireless router is typically constructed of a computer platform, an Ethernet interface to a local area network (LAN), and a radio modem which changes the Ethernet data stream to a radio frequency suitable for wireless transmission. Wireless routers have similar functionality as wired routers and use MAC addresses to route messages.

A wireless system eliminates many hardware requirements and adds mobility to the user. Generally, wireless communication is accomplished through the use of InfraRed or

radio waves. The IEEE 802.11 specification provides standards for both the InfraRed and the radio frequencies. In the arena of radio frequencies, two standards have been developed, namely, "direct sequence" which uses a wide range of frequencies for data transmission and "frequency hopping" which provides data transmission utilizing both frequency and time domain variations. InfraRed signals cannot traverse walls, closed doors, etc., as radio waves can. Both radio and InfraRed schemes are expensive as they require additional circuitry and protocol processing to communicate on a wireless network because the system must be compatible with many wide area networks (WANs) and digital standards that are used for wireless data.

Bluetooth technology addresses the compatibility problem by developing a technology specification for small form factor, low-cost, short range radio links between portable devices. Bluetooth technology uses a universal bridge to existing data networks, a peripheral interface, and a mechanism to form small private ad hoc groups of connected devices away from fixed network infrastructures.

FIG. 1 shows a Bluetooth network topology. Devices 121 through 124 form a piconet 12. A piconet is a general purpose, low powered, ad hoc radio network consisting at least two linked devices, such as a portable personal computer (PC) and a cellular telephone, but can consists up to eight linked devices. All of the devices on the piconet are peer units having identical communication connections and implementations.

The first unit to establish communication in piconet 12 acts as the master and the other units act as the slaves, for the duration of the piconet connection. Network connection for piconet 12 is established as follows. Before any links in a piconet are created, all devices are in STANDBY mode. In this mode, an unconnected unit periodically "listens" for messages at its defined frequency or its defined hop sequence. The linking procedure is initiated by any of the devices which then becomes the master. A linkage is made by a PAGE message if the address is already known, or by an INQUIRY message followed by a subsequent PAGE message if the address is unknown. In the initial PAGE state, the master unit sends a train of 16 identical page messages on 16 different hop frequencies defined for the device being paged (slave unit). If there is no response, the master unit transmits a train on another 16 hop frequencies in a wake-up sequence. The INQUIRY message is typically used for finding Bluetooth devices, including public

printers, fax machines and similar devices with an unknown address. Once the network connection is established, data is sent through the network to the designated device.

In general, piconet 12 is established when communication needs to be established from or to a device in piconet 12, e.g., a waiting message for one of the devices in piconet 12; one of the devices in piconet 12 is initiating communication to another device in piconet 12; or one of the devices in piconet 12 is initiating communication to a device in another piconet. For example, in FIG. 1, communication may be initiated by device 121 sending a message to a device in piconet 14. Hence, device 121 becomes the master unit and the remaining devices in piconet 12, i.e., devices 122, 123 and 124, become the slave units.

Master unit 121 establishes the clock and hopping sequence to synchronize slave units 122, 123 and 124 in piconet 12. Each of the links 125 through 127 in piconet 12 includes logical link control (LLC) and media access control (MAC). Each of the devices 121 through 124 in piconet 12 is represented by a MAC address which is a 3-bit physical address such as those used by Ethernet and token ring to distinguish between units participating in piconet 12. When all communication to and from devices in piconet 12 ceases, piconet 12 is broken.

Piconet 12 is again established when one of the devices establishes communication. However, when piconet 12 is re-established, a different device may be the master unit instead of device 121, depending on which device establishes communication first.

Piconet 14 similarly contains linked devices 141 and 142. In one embodiment, device 141 is the master unit and device 142 is the slave unit. Hence, device 141 establishes the clock and hopping sequence to synchronize slave unit 142 in piconet 14.

Piconets 12 and 14 are independent from each other and do not have to be synchronized. Multiple independent and non-synchronized piconets, e.g., piconets 12 and 14, communicate through network connection 16 and form a scatternet 10. Network connection 16 is, for example, an ISP (Internet Service Provider).

With the configuration shown in FIG. 1, all devices are equal in terms of network awareness and capability. The devices may change roles, with one device serving as a master for many slaves, then later serving as a slave to a new master. In other words, every device must have the capabilities to be a master. In addition, for any two devices to

connect, defined profiles are required, the profile being a specific protocol. For example, a cordless telephone requires a cordless telephony profile; a headset requires a headset profile; a fax machine requires a fax profile; and so on.

A conventional gateway is typically a combination of software and hardware that connects two different networks using different protocols, or which use the same protocols but do not otherwise communicate. Some gateways, i.e., application gateways, forward data from one network to another in addition to translating protocols. Other gateways simply forward data from one network to another, without performing protocol translation. In other words, the gateway either has the intelligence to differentiate and translate different protocols or is a "dumb" channel which just passes the data to a known address.

Conventional gateways are specific to the hardware platform of the two networks, the communication protocols of the two platforms and the specific applications being run. Generally, a conventional gateway is embodied as a software resident on a Web server host, or as a software application resident on a device separate from a Web host. In the latter case, the gateway may communicate with the Web host through the Internet, or directly by other means. Examples of conventional gateways include Gopher and FTP (File Transfer Protocol), both of which are client/server protocols. Conventional gateways have the disadvantages of needing to change gateways with different applications or services.

Therefore, what is needed is a simple and inexpensive communications system to network various electronic devices.

SUMMARY OF THE INVENTION

Device and method for communicating between a plurality of devices are provided. In accordance with the present invention, a communication device is partitioned into various units, each performing a function of the communication device. A subnet is established for the units, the units including a master device acting as a dedicated master of the subnet and performing an exclusive master function of the communication device and a plurality of slave devices acting as the slaves in the subnet and performing other functions of the communication device. The master device negotiates with the slave devices and intelligently routes a message to the slave devices having capability to process the

message. In one embodiment, the message is from an external network. In one embodiment, the message is from a slave device in the subnet. The same protocol is used for all communication with the master device. In one embodiment, the master device communicates with the slave devices via a wireless communication path such as radio frequency or InfraRed. The external network may be, for example, an established network such as an internet, a public land mobile network, a POTS (plain old telephone system) network, or another subnet.

In one embodiment, the master device sends a synchronization message to the slave devices in the subnet. The master device registers a slave device by storing a device capability word of the slave device. The capability word may include, for example, data format and display resolution. in one embodiment, the master device assigns a device identification number to the registering slave device. In one embodiment, the master device sets an address in an address table if the number of slave devices is less than a predetermined maximum allowable number. In one embodiment, the master device resets an address in the address table when a corresponding slave device is disconnected from the subnet. In one embodiment, the master device assigns a group identification number to a plurality of slave devices having substantially the same capabilities.

In one embodiment, where an external network is coupled to the master device, the master device queries the external network for waiting data. If there is waiting data, the external network notifies the master device by sending a notification word which contains message type information. The master device then determines whether any slave devices in the subnet is capable of processing the waiting data. The master device then notifies the slave devices capable of processing the waiting data. In the alternative, the master device notifies one slave device that is capable of processing the waiting data. The slave device that has been notified acknowledges the master device if it is ready for a download. in one embodiment, a user selects the slave device to be used. The master device, after receiving the acknowledgment, requests a download from the external network which then sends the waiting data to the master device. The master device then routes the waiting data to the slave device. In one embodiment, the master device selects a format of the waiting data as a function of processing capabilities of the slave device.

In one embodiment, the slave device notifies the master device if the slave device is not capable of processing the waiting data. The master device then requests the waiting data in a second format. In one embodiment, the slave device notifies the master device of the slave device's available processing capabilities.

In one embodiment, the master device upgrades a software in a slave device by searching for an upgrade software in an external network and checking, for example, version information.

The master device, in one embodiment, comprises a first interface linked to the slave device, a first memory for storing operating software, application software and device configuration information for the master device, a second memory for storing data and a microprocessing for controlling the first interface, the first memory and the second memory. In one embodiment, the master device comprises a battery for providing power to the master device. In one embodiment, the master device comprises an operator interface. In one embodiment, the master device comprises a second interface for communicating with the external network.

The slave devices may be, for example, a pen phone, a watch phone, a wireless headset, or a miniature wireless display device.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention may be better understood, and its numerous objects, features, and advantages made apparent to those skilled in the art by referencing the accompanying drawings.

FIG. 1 shows communication links for Bluetooth Technology.

FIG. 2 shows a communication system including a subnet having internal links and a link to an external communication network, all in accordance with the present invention.

FIG. 3 shows one embodiment of a gateway device in accordance with the present invention.

FIG. 4 shows the functional parts of a communication device.

FIG. 5, which is comprised of FIGs. 5A and 5B arranged as illustrated in the key to FIG. 5, shows in flowchart of gateway communication process.

FIG. 6 is an embodiment of a gateway structure for a networked car.

FIG. 7 is an embodiment of a gateway structure for a networked house.

FIG. 8 is an embodiment of a gateway structure for a networked camera.

FIG. 9 is an embodiment of a gateway structure for music-on-demand.

FIG. 10. is an embodiment of a gateway structure for a restaurant guide.

FIG. 11 shows a pen phone wireless audio device.

FIG. 12 shows a watch phone wireless audio device.

FIG. 13 shows a wireless headset.

FIG. 14 shows a microdisplay.

The use of the same reference symbols in different drawings indicates similar or identical items.

DETAILED DESCRIPTION OF THE INVENTION

A system and a method of network access using a single device that serves as a gateway for various electronic devices are provided. In accordance with the present invention, functions of a communication device are broken apart and each function of the communication device is embodied in a device in a local network (i.e., a subnet) which includes a gateway device and at least one dependent/independent device (or slaves). The devices may physically reside in the same or separate units. The gateway device is the master for the subnet and has the intelligence to establish communication between the dependent/independent devices in the subnet and a peripheral system connected to an external network or between the dependent/independent devices themselves, by using a simple protocol. The external network is an established network.

FIG. 2 shows a communication system 200, including a subnet 201 and an external communication network 202. Subnet 201 is typically an unlicensed wireless link and consists various components making up a particular communication system, including a cellular/PCS phone. In general, subnet 201 is made up of a gateway device 203 and various dependent and independent devices linked together. In one embodiment, subnet 201 has low power, small footprint, 10-meter range and high data rates for at least 10 devices within the range.

Gateway device 203 acts as a master to all dependent/independent devices in subnet 201. Unlike Bluetooth where every device in the piconet may take on a role of either a

master or a slave, gateway device 203 is the exclusive master in the subnet and has a fixed role as the master of the subnet. A device having a fixed role of being a master and performing exclusive functions of a master has the advantage of less cost and complexity because the dependent/independent devices do not have to have the intelligence and sophistication of a master unit. In other words, the dependent/independent devices do not require the more expansive and complicated software and/or hardware to perform the more complicated functions of a master. Instead, the dependent/independent devices only requires a very simple communication interface to communicate with the fixed master. The dependent/independent devices are sometimes referred to as "slaves."

Gateway device 203 in one embodiment acts as a network gateway between external communication network 202 and the dependent/independent devices in subnet 201. Dependent devices 1 through M are devices that communicate most of their information to and from external communication network 202 via gateway device 203. For example, a display may need to receive display information from an external communication device and may not have functions on its own. Independent devices 1 through N, on the other hand, have substantial functionality when not communicating to gateway device 203 and their feature set is enhanced in the presence of a gateway device. For example, a television has substantial functionality of receiving and displaying the video and audio signals from a network outside of the gateway and in the presence of a gateway device, it may acts as a display unit for a computer.

In one embodiment, gateway device 203 acts as a gateway between various dependent/independent devices in a subnet. For example, a personal computer in the subnet may turn on a television, also in the subnet, via gateway device 203.

In the example where the communication device is a cellular phone, gateway device 203 may house the cellular RF circuitry, a battery and the wireless circuitry needed to communicate with all dependent/independent devices in subnet 201. The dependent/independent devices may include a stereo providing microphone and speaker functionality, a computer providing dialing function and a television providing a display function. The stereo, computer and television each fits in the independent device category because they have substantial functionality without any gateway devices.

FIG. 3 shows a gateway device in detail. In general, gateway device 203 consists of an external network interface 402 for communicating to an external network such as the internet, a voice network, another gateway device in a subnet, or a mobile unit; an internal network interface 404 for communicating to a dependent/independent device in a subnet residing a short distance from each other and from the gateway device, e.g., within 10 feet of each other; a microprocessor 406 for controlling all other units in gateway device 203; a flash/ROM (read-only memory) 408 for storing the operating system, device configuration information, user interface and their related application software; a RAM (random access memory) 410 for buffering a device list and message contents; and an optional operator interface 412 such as a display or a keyboard for displaying status or user input. Units in gateway device 203 generally depend on the feature set choices, hence is implementation oriented. For example, microprocessor 406 can be an 8-bit microprocessor and memory 408 is a size suitable to the selected feature set.

Application software, in one embodiment, gives the gateway device intelligence to decide where to route a particular message based on the type of the message received. Gateway device 203 may further include a battery (not shown) for providing power to the components making up gateway device 203.

In one embodiment, gateway device 203 has a design that looks like a pager (as shown in FIGs. 6 through 10). However, the actual gateway device 203 can be of any design, the design being typically dependent upon the required battery size and a convenient way for the user to travel with the gateway device. In general, there is no limitation in the shape or size of the gateway device packaging. Each of the dependent/independent device in the subnet has a transmitting and receiving circuit and related software to communicate with the gateway device. The communication path between the gateway device and the dependent/independent devices can be either wired or wireless.

Referring back to FIG. 2, in one embodiment, the communication between gateway device 203 and dependent devices 1 through M, e.g., links 2041 through 204M, and between gateway device 203 and independent devices 1 through N, e.g., links 2061 through 206N, is accomplished by any type of wireless links such as, but are not limited to, digital radio frequency (RF), analog RF or InfraRed. The communication between

gateway device 203 and the dependent/independent devices can also be accomplished by any wireless links that fall under any air interface (i.e., the standard operating system of a wireless network) such as AMPS (advanced mobile phone service), TDMA (time division multiple access), CDMA (code division multiple access) or GSM (global system for mobile communications). Other wireless technologies, such as Bluetooth technology, wireless IEEE 1394 or any other existing or unique protocol, can be used as well. Alternatively, the wireless links described above can be replaced with wired links, although wired links decrease portability.

Similarly, the dependent devices and the independent devices may communicate with each other wirelessly via gateway device 203. For example, dependent device 1 can communicate with independent device 1 via link 2041 (from dependent device 1 to gateway device 203) and link 2061 (from gateway device 203 to independent device 1).

Alternatively, dependent devices and independent devices may communicate directly with each other without gateway device 203. For example, dependent device 1 can communicate directly with another dependent device M via link 2101M; independent device 1 can communicate directly with another independent device N via link 2121N; and dependent device M can communicate directly with independent device N via link 208MN. These direct communication links are accomplished through either wired or wireless links. It is noted, however, that additional hardware/software may be needed for such direct connections.

The information transmitted between gateway device 203 and any of the dependent/independent devices in subnet 201 are made up of control information and payload data. The control information is for establishing the communication link between gateway device 203 and a dependent/independent device in subnet 201 and for negotiating device capability. Negotiating device capability is described in detail later with reference to FIG. 5. The payload data is any data that needs to be transferred to a device in the subnet and includes information such as, but not limited to, voice information, video information or text information. The payload data can be of any format.

The external communication network 202 is composed of wired or wireless communication devices and/or networks. For example, the devices/networks in external communication network 202 may be, but are not limited to, an internet 215, a voice

network 216, another subnet with a gateway device 217, or a mobile unit 218. The communication devices/networks in the external communication network 202 communicate with, for example, a cellular/PCS (personal communications services) base station or an internet service provider (ISP) 214 which is linked to gateway device 203 in subnet 201 via link 220. Again, link 220 may be either wired or wireless.

Gateway device 217 similarly has associated dependent and independent devices connected in a subnet (not shown). Therefore, a device in subnet 201 may communicate with a device in the other subnet via gateway device 203, cellular/PCS base station or ISP 214 and gateway device 217. For example, a user can initiate download of a song playing on a stereo in subnet 201 to a PC (personal computer) in the subnet where gateway device 217 is the master.

How gateway device 203 facilitates communication is discussed in detail later in reference to FIG. 5. In general, the gateway device facilitates communication by serving as the system master. By being a master, gateway device 203 is always aware of the number and type of devices that are within its range and capable of communication (e.g., powered on, physically linked) by registering each device's capabilities and storing this information in its memory. The gateway device then uses the type of each device to decide what type of data is routed to it. For example, video type of data is routed to a television, a computer screen or a LCD display but is not routed to an oven, a telephone or a radio. Routing is accomplished using a simple protocol which is discussed in detail below. Therefore, the gateway device has routing intelligence. It is noted that the gateway device is always the dedicated master and the only master, unlike Bluetooth where each device in the piconet can change its role from a slave to the master and vice versa.

FIG. 4 shows an application where a typical communication device such as a cellular/PCS phone is replaced with wirelessly networked units in a local network in accordance with the present invention. A typical cellular/PCS handset 310 has a transceiver 300, a user interface 304 and an audio/visual/data source 302 linked by various hard-wired communication paths, e.g., communication paths 301, 303 and 305. Transceiver 300 in one embodiment contains an RF transceiver, a battery and an antenna. User interface 304 may contain, for example, a keypad and a display. Audio/visual/data

source 302, in one embodiment, is a headset. Additional examples for the make up of a local network for a communication device are described below.

Transceiver 300 provides a communication path 301 from data source 302 to the outside world, e.g., an external network, over a communication medium 306. User interface 304 relates status of the data from data source 302 and communication medium 306. User interface 304 also allows the user to control the connectivity of communication medium 306 and communication information that is being transferred to/from transceiver 300 via communication path 305. Typically, communication paths 301, 303 and 305 are hardwired within a phone unit.

In accordance with the present invention, transceiver 300, user interface 304 and audio/visual/data source 302 in the above-described cellular/PCS phone 310 may be broken apart into separate units. For example, transceiver 300 can be placed in a cellular/PCS radio module; user interface 304 can be placed in a heads-up display; and audio/visual/data source 302 can be placed in a microphone located in a car stereo. The cellular/PCS radio module, the heads-up display and the stereo microphone in this example, are separate and independent units. The communication paths 301, 303 and 305, in one embodiment, are wired links as before. However, communication paths 301, 303 and 305, in one embodiment, are replaced by wireless links established using any conventional means described above.

Transceiver 300 acts as the gateway device between the external network and the dependent/independent devices, e.g., user interface 304 and audio/visual/data source 302. Gateway device, in addition to transceiver 300, may include, for example, a battery to provide power to the gateway device and circuitry for interfacing with an external network and dependent/independent devices in the subnet. User interface 304 and audio/visual/data source 302 are either independent or dependent devices, depending on their functionality. For example, if user interface 304 is a heads-up display, it is a dependent device because it has limited functionality without a gateway device. However, if user interface 304 is a television, it is an independent device because it has substantial functionality without any gateway devices.

In general, any combination of the devices mentioned above, e.g., transceiver 300, user interface 304 and audio/visual/data source 302, can be created to satisfy the

application. For example, transceiver 300, user interface 304 and data source 302 can be placed in a single communication unit; transceiver 300, user interface 304 and data source 302 can be in their respective units; transceiver 300 can be in one unit and user interface 304 and data source 302 can be in another unit; user interface 304 can be in one unit and transceiver 300 and data source 302 can be in another unit; and data source 302 can be in one unit and transceiver 300 and user interface 304 can be in another unit.

FIG. 5 shows the flow of events after a gateway device has been established on a network and a device starts communicating with the gateway device. The process starts in step 500. The gateway device periodically sends a synchronization message to the dependent/independent devices in the subnet through the gateway device's control channel (step 502) to see if any new devices are in the subnet. If a new device is, for example, within range and capable of communication, e.g., powered on (step 503), the dependent/independent device synchronizes to the gateway device (step 504) and registers the dependent/independent device's capabilities with the gateway device (step 506). To register, the dependent/independent device sends a device capability word indicating the dependent/independent device's capability. The capability word contains capability bits representing various capabilities such as video capable, stereo capable, etc. For example, if a device is stereo capable, the stereo capability bit is set to a "one;" if the device is audio capable, the audio capability bit is set to a "one;" if the device is video and stereo capable, both video and stereo capability bits are set to "one." In one embodiment, the device capability word contains other information, such as format of the data, resolution of the display, etc. In one embodiment, the device capability word indicates to the gateway device the dependent/independent device's presence in the subnet. In one embodiment, the device capability word is 32 bits long. Of course, the device capability word can be of any length, depending on the amount and the detail of information desired for each dependent/independent device.

The gateway device receives the device capability word from the device notifying its presence. The gateway device then assigns the dependent/independent device a device identification number (device ID) and stores the device capability word and the corresponding identification number (step 507). In one embodiment, the device ID is eight bits long, which gives a number 0 to 255. In this embodiment, a maximum of 256

dependent/independent devices can be networked in a subnet. The maximum number of dependent/independent devices in a subnet is predetermined to allow a sufficient number of devices to be networked together, yet does not create an over-crowded network. This is opposed to the Bluetooth technology where the maximum number of devices in a piconet is eight.

If the number of registering devices exceeds the predetermined maximum allowable number, no new device will be registered until a registered device is taken off the device list. In one embodiment, the maximum allowable number is 256. In one embodiment, when a device ID becomes available, the gateway device reassigns the unused device ID number to the next registering device. In one embodiment, the gateway device assigns the device ID consecutively. For example, the first registering device is assigned a device ID of one; the second registering device is assigned a device ID of two; and so on. In one embodiment, the gateway device assigns a registering device the first available device ID. For example, device IDs 1, 2, 4, 5, 6, 8 are in use, the next registering device will be assigned a device ID of 3.

A device ID becomes available, for example, when a registered device is disconnected, goes out of range or powered off. In one embodiment, a registered device sends a predetermined "powerdown" message notifying the gateway device that it is powering off. For example, when a device is to be turned off by, e.g., pushing a power button, a signal is generated to signal software to do a clean shut down. In one embodiment, signal quality is monitored. A signal quality below an acceptable level and a bit error rate increase above a predetermined rate indicate the device is going out of range.

In one embodiment, the gateway device continuously polls the registered devices to update network connections. In one embodiment, the gateway device continuously sends a synchronization message at a predetermined time interval to register any added devices and de-register disabled devices. Therefore, the device list is continuously updated. By continuously updating the device list, the system becomes more efficient because the master unit will avoid sending messages to a disabled or inoperable device.

In one embodiment, the gateway device maintains an address table which is filled with zeroes initially to indicate that no device is registered with the gateway device. When a device registers with the gateway device, the gateway device looks for the first zero in the

table and assigns the device to that address. The gateway device then sets the address to a "one." In one embodiment, a disconnecting device sends a signal to the gateway device to reset the address back to a zero.

The above embodiment requires at least two tables to match the address with the capability words. Specifically, one table is needed to assign the address to a certain device and another table is needed to match the address to a capability word. In an alternative embodiment, capability words are stored in the address table. In this embodiment, if all bits of the capability words are zero, the address is not used. However, if not all bit are zero, the address is in use. Only one table is needed to match the capability word to the address. In general, any appropriate method can be used to assign device IDs.

In one embodiment, a group ID is assigned to a group of dependent/independent devices having substantially the same capabilities. The gateway device can then broadcast a message to multiple devices. For example, a television, a computer screen and a palm top are all video capable and thus can be assigned to a common group ID. A dependent/independent device with a device ID and a group ID will ignore messages that are not broadcast messages and are not addressed to it or its group. The dependent/independent device will only respond to messages that are broadcast messages or are addressed to it or to its group. For example, if a message is addressed to a video capable group, the television and the computer monitor will respond but not the stereo.

After the gateway device assigns the device ID and/or the group ID, the gateway device stores the device ID and the device capability word in a memory at the gateway device (step 507). In the alternative, the device list, including the device ID and the corresponding device capability word are pre-programmed into a memory instead of generated by the polling process described above.

The gateway device, now knowing the capability of each dependent/independent device in the subnet, queries the external network through the network control channel to check for any waiting data (step 508). The network control channel also checks for waiting data when no new device is in the subnet in response to the synchronization message (step 503). The query is sent to, for example, an internet server. The server receives the query from the gateway device and looks for waiting data (step 512). If there is waiting data (step 513), the server notifies the gateway device of the waiting data through the network

control channel (step 514). The notification message includes information indicating the type waiting data. For example, the waiting data may be in HTML format, text or graphics.

The gateway device receives the notification message from the server and checks its device list to see if any device is capable of processing the waiting data. If one or more dependent/independent devices are capable of processing the data, the gateway device informs the appropriate dependent/independent device of the waiting data (step 518). In one embodiment, when multiple dependent/independent devices have similar or the same capability, the gateway device will select a device to process the waiting data and send the notification message to that particular dependent/independent device. The gateway device may select the device based on, for example, efficiency. For instance, if a video image of 32-bit resolution is waiting to be directed and there is a computer screen with a 32-bit resolution and a palm top with an 8-bit resolution in the subnet, the gateway device will direct the image to the computer screen. In another embodiment, all the dependent/independent devices that are capable of processing the waiting data are notified. In this embodiment, a 32-bit image is sent to all video capable devices, e.g., both the computer screen and the palm top.

An example is used to illustrate the routing function of a gateway device. When an MPEG-4 (Motion Pictures Experts Group standard which support two-way video traffic, lower bandwidth lines and user interactivity that allows one to select parts of a program and ignore others) capable device connects to the network, the gateway device is responsible for finding the proper MPEG-4 connection on the external network side and routing MPEG-4 data whenever possible. Similarly, if the device has the capability to browse web pages, the gateway device requests the type of pages the device is capable of, e.g., HTML (Hypertext Markup Language), HDML (Hand-Held Device Markup Language), DHTML (Dynamic HTML), or text only. The type of pages can also be one that runs Java (Java is a portable object-oriented language which is compiled into byte codes), ActiveX (ActiveX provides a framework for dynamically extending capabilities of Web clients (browsers) as well as Web servers), or any of the common browser plugins.

In one embodiment, if no device is available or capable to process the waiting data, the gateway device waits.

The dependent/independent device or devices receive the notification of waiting data from the gateway device. The dependent/independent device then sends an acknowledgment to the gateway device through the control channel to inform the gateway device that it is ready for downloading (step 522). This handshake is to ensure that the device is ready to receive the waiting data. If the dependent/independent device is not ready, has been disconnected, powered off or gone out of range, the gateway device will not receive such acknowledgment from that dependent/independent device. In the embodiment where only one dependent/independent device is notified, the gateway device waits for a predetermined time delay, then searches its device list to select another dependent/independent device capable of processing the waiting data and repeats the process. In the embodiment where multiple dependent/independent devices are notified, the gateway device waits for a predetermined time delay, then sends the waiting data to all the dependent/independent devices that returned an acknowledgment.

In one embodiment, the user may select the dependent/independent device that he wants to use for the download. In one embodiment, a list of all dependent/independent devices having capability of processing the waiting data is displayed, for example, on a computer screen or a television screen. The user then selects a dependent/independent device from, for example, a keyboard or a remote control. The gateway device then notifies the selected dependent/independent device of waiting data. If the selected dependent/independent device is ready for downloading, it sends an acknowledgment back to the gateway device as described above. The gateway device, having received the acknowledgment from the selected device, downloads the waiting data to the selected device. In one embodiment, the user may select multiple dependent/independent device for the download.

In one embodiment, where all registered devices having capability for processing the data are notified, a list of acknowledging devices is displayed. The user then selects from the list of devices that are ready for download. The gateway device then sends the waiting data to the selected device. In one embodiment, multiple dependent/independent devices may be selected.

When one or more devices respond with an acknowledgment message, the gateway device requests download from the external network through its network control channel

(step 524). In one embodiment, where the data can be downloaded in various format compatible with the dependent/independent device, the server selects the download site based upon the best format the dependent/independent device is capable of processing. For example, if the waiting data is video data, a computer with a full screen is capable of processing full resolution, thus, the format downloaded is in full data format. However, if the device is a PDA which has a lower resolution, a data format with narrower bandwidth is requested. If only one format is available, data in that format is downloaded.

The server receives the data request from the gateway device, retrieves the data from the external network and sends data in the appropriate format to the gateway device through the network data channel (step 528). The gateway device routes the data to the appropriate device(s) that are ready for the download through the data channel (step 530

The dependent/independent devices receive and then process the received data (step 532). The process continues in step 534 where a decision of whether a network request from a registered device is made. The gateway then process the request step 536. The request can be, for example, a request for a different display resolution. In one embodiment, the server may restore a stored resolution. In one embodiment, the server may modify, e.g., reduce the resolution, based on the request. The process returns to step 502.

If there is no waiting data (step 513), step 534 is executed.

In one embodiment, the gateway device is capable of locating the appropriate software upgrade for any device in the subnet. For example, the gateway device may look for upgrades for the devices that are registered, the device may periodically detect an incompatibility and notify the gateway device, or the user may request an upgrade such as from a peripheral manufacturers website. The gateway device is then responsible to locate the upgrade in the network and then gets the upgrade from the network to the device. In general, the initiation of the upgrade is application software dependent. In one embodiment, the user prompts the system to look for an upgrade. This is because the user may have to pay for access to the external network on a minute by minute basis and should be afford the opportunity to decide when and how often the upgrade is performed. Typically, incompatibility is detected by comparing the version number of the application software, similar to PC application software version detection.

The protocol used for gateway communication is now described. In general, the goal of a routing algorithm is to be simple, fast, easy to implement, robust - that is, to make few errors while sending a data packet to its next destination, and resilient to network changes. In one embodiment, the protocol is packetized to allow multiple devices to communicate at once. The air (wireless) protocol can use a Time-Division Multiple Access (TDMA) structure, assigning time slots to devices to prevent collisions. A Code Division Multiple Access (CDMA) structure can also be employed to give better performance, but typically at a higher processing and materials cost. In one embodiment, each data path has an associated priority so that high priority data is transferred faster. In this embodiment, the gateway device is responsible for holding off a lower priority data stream to preference a higher priority data stream. In another embodiment, data security provisions are provided to take into consideration of another user's device, e.g., another gateway device, within the range of a gateway device. In one embodiment, error detection is employed to insure the robustness of the link. In another embodiment, error correction is employed to further insure the robustness of the link.

In accordance with the present invention, the communication between any device and the gateway device follows a simple protocol. In one embodiment, the command set includes the following example of commands and command categories, shown in TABLE I,. It is noted, however, that different commands and command categories may be used.

TABLE I

Category	Command	Function
Connection	Register	Registers a dependent/independent device with the gateway device; assigns a device ID to each registering dependent/independent device; stores device capability and corresponding device ID in a memory at the gateway device.
	Open_Path	Creates a dedicated communication path, e.g., voice, data, or image, for a real time connection. The command Open_Path includes a phone number as the

		destination if the sender is a call origination.
	Close_Path	Closes a communication path that was opened with the command Open_Path.
Status	Display	Displays various status, such as battery level, cellular RSSI (received signal strength indication), message waiting, etc.
	Status	Requests items that are used in the Display command plus connecting status
Data	Receive	Requests data from the external network or a dependent/independent device.
	Transmit	Sends data to the external network or a dependent/independent device.
	Message	Alerts the user of a waiting message.
Memory	Write	Writes stored parameter, including configuration, address book, and image.
	Read	Reads back any stored parameter.
Upgrade	Upgrade	Requests an upgrade from the external network or instructs a dependent/independent device to update with the file that follows the command.

It is noted that a simple command set keeps the interface simple between the gateway device and the dependent/independent devices. There are no internet-protocol specific commands in Table I for, e.g., checking E-Mail, doing FTP (File Transfer Protocol) or HTML (Hypertext Markup Language), or UDP (User Datagram Protocol) because these commands are handled by the gateway device, not by the individual dependent/independent devices on the network. Instead, a dependent/independent device simply sees in the Display command, for example, that E-Mail is waiting. The dependent/independent device then optionally requests the waiting E-Mail with a Receive command. The E-Mail message is then read from the external network and transmitted from the gateway device with a Transmit command that has the E-Mail message as its data.

Therefore, although the gateway device handles the difficult task of connecting the dependent/independent device to the external network or another dependent/independent device that is compatible with the dependent/independent device, the protocol between the dependent/independent device and the gateway device is simple enough to keep the dependent/independent device simple, small, and inexpensive, yet powerful enough to provide user satisfaction.

The following examples illustrate specific applications using a gateway device.

The first example is a networked car shown in FIG. 6. While a user is driving along and listening to car stereo 606, the gateway phone 602 in a briefcase in the back seat receives an incoming call. Gateway phone 602 sends a signal to mute car stereo 606 and sends a signal to display a message "CALL" at a heads-up display 604. After pressing the "ANSWER" button on car stereo 606 acknowledging that it is ready to download data, the user has a hands free conversation with the calling party, using the microphone anywhere in the car, such as car stereo 606. In this example, the subnet consists of gateway phone 602, car stereo 606 and heads-up display 604, with gateway phone 602 being the gateway device, car stereo 606 being an independent device and heads-up display 604 being a dependent device. Gateway phone 602 communicates with a cellular/PCS base 608 and routes the phone message to car stereo 606 and heads-up display 604 on the subnet.

The calling party asks the receiving party to meet him in a restaurant that the receiving party has never been to. After hanging up, the receiving party presses the "VOICE RECOGNITION" button on car stereo 606 and says "DIRECTIONS" and the name of the restaurant. The driving direction appears in heads-up display 604 in text format. Heads-up display 604 points out the next turn to take and an arrow follows the turn in a field of view through the windshield. In this scenario, gateway phone 602 is the gateway device communicating to an ISP 610 to retrieve direction 612 from the internet. Gateway phone 602 then routes the direction information to heads-up display 604.

Another example is a networked house shown in FIG. 7. While watching television 702 with audio through a user's home stereo 704, the user's gateway phone 706 on his belt receives a call from a caller via cellular PCS base 710. The gateway phone 706 sends a signal to mute the user's stereo 704 and sends a signal to display "INCOMING CALL" and the caller ID information on the user's television screen 702.

Caller ID provides information about the calling party. The caller ID service is typically available to telephone subscribers for a small additional monthly fee. Under current wireline standards, frequency-encoded digital caller ID information is transmitted between the first and second ring signals. Information about a calling party is thus received, stored, and displayed by a caller ID device before a user would normally answer a ringing telephone. Caller ID information is typically recorded by caller ID devices whether the associated telephone is answered or not. Typically, a conventional caller ID device is within a phone unit or connected to a phone via a wired link. The caller ID device usually receives, stores and displays digital caller ID information.

In accordance with the present invention, the gateway device receives and stores the caller ID information in a memory at the gateway device and transmits it wirelessly to television 702 for display. Thus, there is no need for a dedicated caller ID device or adding additional hardware to the phone itself. In one embodiment, the gateway device stores a video or audio image associated with a directory match ID with the incoming call. Such video image may be a digital picture, clip art file, wave (e.g., *.wav) or a *.mp3 file for audio imaging. In another embodiment, the display device stores the caller ID information.

The user then hits the "PHONE" button on a remote control device 708 to answer the call. Gateway phone 706 receives the answer signal from remote control device 708 and negotiates the video format of the call with the cellular PCS base 710 so that the video format is compatible with television 702. If data format is compatible with television 702, the image of the caller is displayed in a picture-in-picture (PIP) window (or full screen, if the television is not capable of PIP.) In one embodiment, the voice conversation comes through stereo 704 and uses the microphone in remote control device 708. If the incoming call is not a video call, no video is displayed. If the caller sends his location, a map pops up on television 702, with the location of the caller highlighted. If the user gets up and leave the room, the hands-free conversation is continued on the next closest stereo, television, or personal computer.

In the above example, the subnet first includes gateway phone 706, television 702 and stereo 704 in the living room. When the user leaves the living room, i.e., the gateway device moves, television 702 and stereo 704 may go out of range and drop out of the subnet. However, when the user walks into another room, e.g., the bedroom, another

television or stereo or personal computer may come into range and register with gateway phone 706, forming a new subnet. Gateway phone 706 which was routing video data to television 702 in the living room may now route the video data to a computer in the bedroom.

In the home networking environment, the gateway principles can be applied to create a very simple wireless network between home entertainment devices, appliances, security systems, and other electronics and to create a gateway device for all of these devices to access an external network over a cable, phone, or antenna.

The next example is a photographer who carries a cellular/PCS phone that works as a gateway device as shown in FIG. 8. After receiving a voice call on his cellular/PCS phone 804 to alert him of an event, the photographer can send pictures from his digital camera 802 wirelessly through his gateway phone 804 to a destination 806 on the internet. The camera simply sends the data, while the gateway phone 804 does the internet negotiations over the cellular/PCS system 808 to place the photo where it should go. In this example, gateway phone 804 is the gateway device and digital camera 802 is an independent device on the subnet. If digital camera 802 is within range of the photographer's PC 806, the photos can be sent to PC 806 using the same protocol, and PC 806 can act as the gateway device. The development cost of a combined cellular/PCS camera would be much higher than the separate units, so developing separate units, i.e. peripheral devices, is not only less costly, but also allows piece by piece upgrades.

Another example is music-on-demand shown in FIG. 9. While listening to music on a mini-disc or portable music player 902, the user can preview the latest music release from a source 906 on the internet via ISP 908, and purchase the music release with the touch of a button on mini-disc or portable music player 902. After purchase, the song is downloaded from source 906 to gateway device 904 which negotiates and routes the song to mini-disc or portable music player 902. The mini-disc can be replaced with, for example, a small flash-card or flash box that holds music and replays it on demand.

An additional example is a restaurant guide shown in FIG. 10. A PDA 1002 can get location information from a gateway device 1004 (from the CDMA infrastructure) and request entertainment information for the area from existing HTML systems. Gateway device 1004 routes the data from the selected web site 1006 to PDA 1002 for formatting.

This approach allows PDAs the benefit of connectivity while keeping the size small and the design simple.

To satisfy user demand of smaller cellular phones, a phone is split into smaller pieces to give the user the perception of a smaller phone. Putting the large battery, RF and call processing circuitry off on a belt or in a purse and leaving a small audio device in the user's hand gives the perception of a very small phone. The difficulty in splitting the phone into smaller pieces is that the user must be able to control the phone from this small device so the phone itself never leaves the belt or the purse.

Applying gateway architecture to the cellular/PCS phone environment has some immediate benefits to the end user. For example, the biggest change to the user is that the large RF circuitry and associated battery (e.g., the gateway device) can be in a remote location, even during a phone conversation. The user interface could be in a tiny device the size of a credit card. The audio can be carried to/from the user through a very small headset. The user may rely on the headset with voice recognition for dialing, and may never see the gateway device during the course of the day. The user will perceive the cellular phone as being a very small, manageable device. Furthermore, the cellular/PCS phone provides high-speed connection and can be used in applications that benefit every target consumer. The consumers can "mix-and-match" their internet-ready equipment, purchasing only the items that they need. The gateway device also gives basic devices (wrist watch, refrigerator, alarm clock) an added dimension of connectivity without significantly increasing product cost.

In addition, the gateway architecture benefits the manufacturers as well. To cover all possibilities in the market, a manufacturer would need to create an array of products that are all cellular/PCS compatible, or make the cellular/PCS phone modular so that it can be connected to one device at a time. However, by allowing the cellular/PCS phone to act as a gateway device for all peripheral devices that can talk to it by adding a simple, low power, wireless interface to the gateway device for each peripheral device, a device could be made "internet-ready" for a cost much less than by adding full power cellular circuitry for each peripheral device.

Since the gateway concept can be applied to a wide variety of devices on any kind of network, the alternate uses have a very wide range. The principles can be applied

wherever device cost can be lowered and size can be reduced by moving high-power complex communication circuitry off a common device.

Some implementations of the dependent/independent device are now described. The first implementation is a pen phone wireless audio device shown in FIG. 11. The pen phone wireless audio device 1100 is in the shape and size of a pen and has functionality of a pen. In addition, pen phone wireless audio device 1100 has added functionality of a telephone. In one embodiment, the cellular/PCS communication circuitry, e.g., the transceiver, is placed in a gateway device. The pen phone wireless audio device provides a user interface device that is separate from the transceiver. The pen phone wireless audio device acts as a dependent device of the gateway device because its functionality is limited without a gateway device to route audio or process voice commands.

The pen phone wireless audio device 1100 incorporates for example, a microphone at the bottom 1102 and a speaker at the top 1104 of pen phone wireless audio device 1100. The microphone is electrically coupled to a transmitting circuit while the speaker is electrically coupled to a receiving circuit. The transmitting circuit and the receiving circuit communicate with a gateway device having a transceiver via wireless communication paths. The user may, for example, have a two-way conversation by holding the pen phone wireless audio device up to the side of his face, aligning the top of the pen phone wireless audio device with his ear and the bottom of pen phone wireless audio device 1100 near the mouth.

For an incoming call, pen phone wireless audio device 1100, upon reception of a radio signal, informs the user of signal reception by a ring indication. In one embodiment, the ring indication is audible. In another embodiment, ring indication is vibration. Both ring indications can be accomplished by conventional hardware and software. For example, audio sound can be implemented by any suitable piezo electric transducer and internal vibration can be implemented by any suitable rotating counter weight. To initiate a call, dialing in one embodiment, is accomplished either with voice recognition (with VR processing in the gateway device) or a modification of Jogdial Navigator™ dialing system manufactured by Sony Electronics Inc.

In one embodiment, a voice recognition apparatus as that described in U.S. Patent No. 5,335,261 entitled "Radio Telephone Apparatus" by Fujinaka, Akihiko, and assigned

to Sony Corporation, hereby incorporated by reference in its entirety, is used. The voice recognition apparatus includes a microphone device for sensing the initiating voice and a voice recognition circuit for recognizing a voice input to the microphone and for performing a dialing operation based on the voice. Optionally, the voice recognition apparatus further includes a mute switch which enables/disables the voice recognition circuit. Typically, when set to the voice recognition mode following the off-hook operation, the radio telephone apparatus is in a state of waiting for entry of the destination-identifying voice, that is, in the state in which the voice inputted to a microphone device may be transmitted as electrical signals to the voice recognition circuit. When the destination-identifying voice is inputted to the microphone device, the voice recognition circuit proceeds to identify the destination by associating the information corresponding to the electrical signals transmitted from the microphone device with destination-related information stored in the memory. The voice recognition circuit then proceeds to control the transmitting circuit etc. of the radio telephone apparatus for effectuating the transmitting operation. Alternatively, any known voice recognition and auto-dial may be used.

The jog-dial dialing system as described in U.S. Patent No. 5,905,964, entitled "Portable Communication Apparatus" by Sudo, Fukuharu, issued on May 18, 1999, and assigned to Sony Corporation, is hereby incorporated by reference in its entirely. In one embodiment, the jog-dial dialing system described in the '964 patent which has an up, down and click input is modified for the present application in that the up/down is translated into rotation of the pen body 1106, and the click is a button on top 1108 of the pen. This combination is then used to scroll through selections that are shown on, e.g., a liquid crystal display 1110 comprising a matrix of pixels, and to choose the desired telephone number with a click. New numbers can be entered by the spin-and-click method, or dialed using voice recognition. The pen phone wireless audio device 1100 retains the writing functionality of a pen.

The next implementation of the dependent/independent device is a watch phone wireless audio device shown in FIG. 12. Watch phone wireless audio device 1200 is an implementation of a user interface device that is separated from the transceiver, which is the gateway device in this example. Watch phone wireless audio device 1200 incorporates

a microphone, speaker, and limited user interface, similar to the pen phone wireless audio device described above. Watch phone wireless audio device 1200 also fits into the dependent category of gateway devices, since its functionality is limited without a gateway device to route audio or process voice command.

Watch phone wireless audio device 1200 incorporates a microphone electrically coupled to a transmitting circuit and a speaker electrically coupled to a receiving circuit. The transmitting circuit and the receiving circuit communicate with a gateway device via wireless communication paths.

In one embodiment, watch phone wireless audio device 1200 with a display 1202 allows a two-way conversation, for example, by using the watch phone wireless audio device 1200 as a speakerphone. In one embodiment, the conversations take place at arm's length. In other words, both the microphone and the speaker are embedded in the device. In another embodiment, wristband 1204 has a speaker that flips out to sit in the palm of the hand with a microphone (not shown) attached to wristband 1204, allowing a conversation when the palm is cupped over the ear. The speaker and the microphone may be any suitable speakers and microphones. Alternatively, a speaker wire (not shown) may run up the user's arm and into the ear of the speaker to give more private conversation. In another embodiment, both the ear plug and the microphone use wire connections.

The gateway device, in one embodiment, is controlled with voice commands as that described in the '261 patent. In one embodiment, the gateway device is a keypad (not shown) that includes multiple pressure-activated switches for user input. In the alternative, a jog-dial 1206 may be added to give a user interface similar to that described in the '964 patent. Another embodiment incorporates a suitable touch screen with handwriting recognition.

A third example of a dependent/independent device is a wireless headset 1301 with hookswitch control and call alert shown in FIG. 13. In one embodiment, the headset has a normal functionality of receiving and transmitting radio signals. In addition, the headset performs functionality such as incoming call indication, caller ID information (e.g., LED display, LCD display), hookswitch control, volume control and battery indication (e.g., LED display, beeper). The headset incorporates a microphone electrically coupled to a transmitting circuit and a speaker electrically coupled to a receiving circuit. The

transmitting circuit and the receiving circuit communicate with a gateway device via wireless communication paths. When an incoming call is received by a gateway device, the gateway device mutes, e.g., the stereo the headset is connected to, and activates an incoming call indication in the form of, for example, a beep or a ring to alert the user of an incoming call.

Hookswitch control operates such that when the hookswitch is open, all parts of the telephone are disconnected from the telephone line except a ringer circuit. When a calling party places a telephone call to a receiving party, switching equipment in the central office notifies the receiving party's telephone to alert the receiving party to an incoming telephone call. When the receiving party lifts the handset from its cradle to answer the incoming telephone call, the hookswitch closes, and the connection between the calling party and the receiving party.

In one embodiment, the headset, combined with voice recognition for dialing and feature control, gives the user enough control to never touch the actual phone in normal operation. In one embodiment, the headset can be folded in half when not in use. In one embodiment, the headphone can fold and unfold for hookswitch control. In one embodiment, the microphone is separated from the headset to allow attachment to a lapel or sun visor in a vehicle.

The fourth implementation of a dependent/independent device is a miniature wireless display device 1401 shown in FIG. 14 along with a U.S. 5-cent coin to illustrate the relative size of device 1401. Miniature wireless display devices are displays that use a silicon chip as the substrate material. The chip also houses the addressing electronics (at least an active matrix with integrated drivers), usually implemented in standard CMOS technology. This mature technology generates very reliable and stable circuits and allows very small pixel pitches (<10 um) and high display resolutions. Microdisplays are small and can be used in projectors, head-mounted displays, view-finders or other lens-view display systems. Different electro-optical effects can be used to generate the image: Electroluminescence (EL), vacuum fluorescence (VF), reflective Liquid Crystal effects and tilting or deforming of micromirrors (requires micro-machining). The most popular combination is Liquid Crystal on Silicon (LCOS) which provides a virtual SVGA 15" monitor at a distance of greater than 2 feet when viewed through the viewfinder. The

actual display itself may measure only one quarter inch on a diagonal. Navigation keys are located on the device to interact with the software that is controlling the displayed image from the gateway device.

The virtual display fits into the gateway concept in that the information that is shown is either generated by the gateway device or routed by the gateway device to the display from a source on the infrastructure. The display can be used for picture/video review or web browsing. Because it is small and wireless, it can be attached to a keychain or a retractable tether.

Although the invention has been described with reference to particular embodiments, the description is only an example of the invention's application and should not be taken as a limitation. Various other adaptations and combinations of features of the embodiments disclosed are within the scope of the invention as defined by the following claims.

CLAIMS

We claim:

1. A method for communicating between a device and a slave, comprising:

establishing a subnet, comprising:

providing a dedicated master device;

providing said slave device;

linking said slave device to said master device with a first communication path; and

communicating a message from a device to said slave device through said master device.

2. The method of Claim 1, wherein said master device routes a message to said slave device in accordance to its capability.

3. The method of Claim 1, further comprising:

sending a synchronization message to said slave device from said master device; and

registering said slave device with said master device.

4. The method of Claim 3, wherein said registering comprises providing to said master device information defining capabilities of said slave device.

5. The method of Claim 4, wherein said information comprises a device capability word having a plurality of capability bits indicating device capabilities.

6. The method of Claim 5, wherein said capability word includes a data format.

7. The method of Claim 5, wherein said capability word includes display resolution.

8. The method of Claim 1, wherein said second device is in an external network, further comprising linking said master device to said second device with a second communication path.

9. The method of Claim 8, further comprising said master device querying said external network for waiting data.

10. The method of Claim 9, further comprising said external network checking for waiting data.

11. The method of Claim 10, further comprising said external network notifying said master device of waiting data.

12. The method of Claim 11, wherein said notifying comprises said external network sending a notification word to said master device, said notification word comprising message type.

13. The method of Claim 12, further comprising said master device determining whether said slave device is capable of processing said waiting data.

14. The method of Claim 13, further comprising said master device notifying said slave device if said slave device is capable of processing said waiting data.

15. The method of Claim 14, further comprising said slave device acknowledging said master device when said slave device is ready for a download.

16. The method of Claim 15, further comprising said master device requesting a download from said external network.

17. The method of Claim 16, further comprising downloading said waiting data from said external network to said slave device through said master device.

18. The method of Claim 17, wherein said master device selects a format of said waiting data as a function of processing capabilities of said slave device.

19. The method of Claim 17, further comprising said slave device notifying said master device if said slave device cannot process said waiting data.

20. The method of Claim 19, wherein said waiting data has a first format, further comprising said master device requesting said external network to send said waiting data in a second format, different from said first format.

21. The method of Claim 19, further comprising said master device informing said external network of available processing capabilities of said slave device.

22. The method of Claim 1, wherein said device is a second slave device, further comprising linking said second slave device to said master device.

23. The method of Claim 22, wherein said second slave device has a capability word, further comprising:

assigning a device identification number to said second slave device; and storing said capability word and said device identification number in a device list in a memory in said master device.

24. The method of Claim 23, wherein said assigning a device identification number comprises said master device assigning a device identification number when the number of registered slave devices is less than a predetermined maximum allowable number.

25. The method of Claim 23, wherein said assigning comprises said master device setting an address in an address table in said memory.

26. The method of Claim 25, further comprising said master device resetting an address in said address table when a corresponding slave device is disconnected from said subnet.

27. The method of Claim 23, further comprising said master device checking said device list for slave devices capable of processing waiting data.

28. The method of Claim 27, further comprising:

said master device selecting a slave device as a function of the processing capabilities of said slave devices; and

said master device notifying said selected slave device of said waiting data.

29. The method of Claim 28, further comprising said master device waiting for a predetermined time for an acknowledgment from said notified slave device.

30. The method of Claim 29, wherein said master device does not receive said acknowledgment, further comprising selecting from said device list a second slave device capable of processing said waiting data.

31. The method of Claim 27, further comprising said master device notifying all slave devices capable of processing said waiting data.

32. The method of Claim 31, further comprising said master device waiting for a predetermined time for acknowledgments from said notified slave devices.

33. The method of Claim 32, further comprising said master device broadcasting said waiting data to all notified slave devices that sent an acknowledgment.

34. The method of Claim 27, further comprising a user selecting a slave device for downloading.

35. The method of Claim 34, wherein said selecting comprises selecting from a list of all slave devices capable of processing said waiting data.

36. The method of Claim 35, further comprising said master device notifying said selected slave device of said waiting data.

37. The method of Claim 36, further comprising:

said master device waiting for a predetermined time period for an acknowledgment from said selected slave device; and

downloading said waiting data from said external network to said selected slave device through said master device if said selected slave device returns an acknowledgment to said master device.

38. The method of Claim 34, further comprising:

said master device notifying all slave devices capable of processing said waiting data;

said master device waiting for a predetermined time for acknowledgments from said notified slave devices;

said user selecting from a list of slave devices that sent an acknowledgment to said master device; and

said master device notifying said selected slave device of said waiting data.

39. The method of Claim 38, further comprising downloading said waiting data from said external network to said selected slave device through said master device.

40. The method of Claim 23, further comprising:

said master device sending a synchronization message to said slave devices at a predetermined time intervals; and

said master device updating said device list.

41. The method of Claim 40, wherein said updating comprises deleting slave devices that are selected from the group consisting of disconnected devices, powered off devices and devices that are out of range of said master device.

42. The method of Claim 22, wherein said subnet comprises a plurality of slave devices, further comprising assigning a group identification number to a group of slave devices in said subnet.

43. The method of Claim 42, wherein said group is a subset of said plurality of slave devices.

44. The method of Claim 42, wherein said group of slave devices have substantially the same device capabilities.

45. The method of Claim 22, wherein each of said plurality of slave devices has a capability word, further comprising:

assigning a device identification number to each of said plurality of slave devices; and

programming a device list in a memory in said master device, said device list comprising said device capability words and said device identification numbers.

46. The method of Claim 22, further comprising sending a message from said slave device to said second slave device, comprising:

said slave device notifying said master device of said message;

said master device determining whether said second slave device is capable of processing said message;

said master device notifying said second slave device of said message if said second slave device is capable of processing said message;

said second slave device acknowledging said master device when said second slave device is ready for download; and

downloading said message from said slave device and storing said message in a memory at said master device; and

downloading said message from said master device to said second slave device.

47. The method of Claim 22, further comprising preparing for transmission a message from said slave device to said second slave device, comprising:

said slave device notifying said master device of said message;

said master device determining whether said second slave device is capable of processing said message;

said master device notifying said slave device if said second slave device is incapable of processing said message.

48. The method of Claim 47, further comprising said master device notifying said slave device of the device capabilities of said second slave device.

49. The method of Claim 1, further comprising said master device upgrading a software in said slave device.

50. The method of Claim 49, wherein said upgrading comprises searching for an upgrade software in an external network.

51. The method of Claim 1, wherein said linking said slave device to said master device comprises wirelessly linking said slave device to said master device.

52. A communication system, comprising:

a subnet comprising:

a dedicated master device performing an exclusive master function of a first device;

a slave device performing a function of said first device; and

a communication path linking said master device and said slave device; and

a second device coupled to said subnet wherein said second device communicates to said slave device through said master device.

53. The communication system of Claim 52, wherein said first device is a cellular phone and said master device is a transceiver.

54. The system of Claim 52, wherein said master device comprises:

a first interface linked to said slave device;

a first memory for storing operating software, application software and device configuration information for said master device;

a second memory for storing data; and

a microprocessor, said microprocessor controlling said first interface, said first memory and said second memory.

55. The system of Claim 54, wherein said first interface comprises:

a transceiver for transmitting and receiving data from said slave device; and

a circuitry for wireless communication between said master device and said slave device.

56. The system of Claim 54, wherein said first memory stores a device list.

57. The system of Claim 56, wherein said device list comprises a capability word and a device identification number of said slave device.

58. The system of Claim 57, wherein said subnet comprises a plurality of slave devices, said device list comprising a capability word and a device identification number for each of said plurality of slave devices.

59. The system of Claim 54, wherein said data stored in said second memory comprises a device list, said device list comprising device capability word and device identification number for said slave device.

60. The system of Claim 59, wherein said device capability word comprises a plurality of capability bits selected from the group consisting of a stereo capable bit, an audio capable bit and a video capable bit.

61. The system of Claim 59, wherein said device capability word comprises data format information.

62. The system of Claim 59, wherein said device capability word comprises display resolution information.

63. The system of Claim 59, wherein said subnet comprises a plurality of slave devices, said device list further comprises a group identification number for a group of slave devices in said subnet.

64. The system of Claim 63, wherein said group is a subset of said plurality of slave devices.

65. The system of Claim 63, wherein the slave devices in said group have substantially the same capability.

66. The system of Claim 54, wherein said data in said second memory comprises message content of a message to and from said slave device.

67. The system of Claim 54, wherein said master device further comprises an operator interface.

68. The system of Claim 54, wherein said master device further comprises a battery for providing power to said master device.

69. The system of Claim 54, wherein said master device further comprises a second interface for communicating with an external network, said second interface being controlled by said microcontroller.

70. The system of Claim 69, wherein said second interface comprises:
a transceiver for transmitting and receiving data from said external network; and

a circuitry for communicating between said master device and said external network.

71. The communication system of Claim 52, wherein said second device is in an external network and said second device is coupled to said master device via a second communication path.

72. The system of Claim 71, wherein said external network comprises a second device, said master device negotiates with said slave device via said first communication path to determine whether to download a message from said second device to said slave device via said second communication path.

73. The system of Claim 71, wherein said external network is selected from the group consisting of an internet, a voice network, a second subnet, and a mobile unit.

74. The system of Claim 52, wherein said function comprises user interface.

75. The system of Claim 52, wherein said function comprises data source.

76. The system of Claim 52, wherein said first communication path is wireless.

77. The system of Claim 76, wherein said first communication path uses signals selected from the group consisting of digital radio frequency, analog radio frequency and InfraRed.

78. The system of Claim 76, wherein said first communication path is an air interface selected from the group consisting of advanced mobile phone service (AMPS), time division multiple access (TDMA), code division multiple access (CDMA) or global system for mobile communications (GSM).

79. The system of Claim 76, wherein said first communication path is established using a protocol selected from the group consisting of Bluetooth and wireless IEEE 1394.

80. The system of Claim 52, wherein said slave device is a pen phone.

81. The system of Claim 80, wherein said pen phone comprises a microphone electrically coupled to a transmitting circuit, said transmitting circuit transmitting data to said master device via said first communication path.

82. The system of Claim 80, wherein said pen phone comprises a speaker electrically coupled to a receiving circuit, said receiving circuit receiving data from said master device via said first communication path.

83. The system of Claim 80, wherein said pen phone comprises a circuit for ring indication.

84. The system of Claim 83, wherein said circuit for ring indication is selected from the group consisting of an internal vibrator, a ringer circuit and a beeper circuit.

85. The system of Claim 80, further comprising a voice recognition circuit for recognizing a voice input to a microphone and for performing a dialing operation based on said voice.

86. The system of Claim 85, further comprising a switch for enabling said voice recognition circuit.

87. The system of Claim 80, further comprising a jog-dial for selecting a phone number from a phone list stored in a memory at said pen phone.

88. The system of Claim 87, wherein the body of said pen phone rotates to jog phone numbers in said phone list.

89. The system of Claim 87, further comprising a select button to select the currently selected phone number.

90. The system of Claim 80, further comprising a display.

91. The system of Claim 90, wherein said display displays a currently selected phone number.

92. The system of Claim 52, wherein said slave device is a watch phone.

93. The system of Claim 92, wherein said watch phone comprises a microphone electrically coupled to a transmitting circuit, a speaker electrically coupled to a receiving circuit and an user interface.

94. The system of Claim 93, wherein said speaker flips out from the body of said watch phone and said microphone is attached to a wristband of said watch phone.

95. The system of Claim 93, wherein said speaker is separated from the body of said watch phone, further comprising a speaker wire connecting said speaker to said receiving circuit.

96. The system of Claim 93, further comprising a voice recognition circuit for recognizing a voice input to said microphone and for performing a dialing operation based on said voice.

97. The system of Claim 93, wherein said user interface is a keypad for performing a dialing operation based on positions of pressure-activated switches of said keypad.

98. The system of Claim 93, wherein said user interface is a jog-dial for selecting a phone number from a phone list stored in a memory in said watch phone.

99. The system of Claim 93, wherein said user interface is a touch-screen for performing a dialing operation.

100. The system of Claim 52, wherein said slave device is a wireless headset.

101. The system of Claim 100, wherein said wireless headset comprises a microphone electrically coupled to a transmitting circuit, a speaker electrically coupled to a receiving circuit and a user interface.

102. The system of Claim 101, wherein said microphone is separate from the body of said wireless headset.

103. The system of Claim 101, further comprising a volume control circuit for controlling said speaker.

104. The system of Claim 101, further comprising a voice recognition circuit for recognizing a voice input to said microphone and for performing a dialing operation based on said voice.

105. The system of Claim 101, further comprising hookswitch control for connecting and disconnecting said transmitting circuit and said receiving circuit and a call alert device for notifying a user of an incoming call.

106. The system of Claim 105, wherein the body of said wireless headset folds and unfolds for said hookswitch control.

107. The system of Claim 100, wherein said headset comprises a display for displaying status of said communication system.

108. The system of Claim 100, wherein said headset comprises a battery indicator for indicating battery status.

109. The system of Claim 52, wherein said slave device is a miniature wireless display device.

110. The system of Claim 52, wherein said second device is a second slave device in said subnet.

111. A communication device for performing an exclusive master function, comprising:

a first interface for linking to a slave device in a subnet, said communication device being a dedicated master of said subnet;

a second interface for linking to an external network;

a first memory for storing operating software, application software and device configuration information for said communication device;

a second memory for storing data; and

a microprocessor for controlling said first interface, said second interface, said first memory and said second memory.

112. The device of Claim 111, wherein said first interface comprises:

a transceiver for transmitting and receiving data from said slave device in said subnet; and

a circuitry for wireless communication between said communication device and said slave device.

113. The device of Claim 111, wherein said second interface comprises:

a transceiver for transmitting and receiving data from said external network; and

a circuitry for communicating between said communication device and said external network.

114. The device of Claim 111, further comprising a battery for providing power to components in said communication device.

115. The device of Claim 111, further comprising a display.

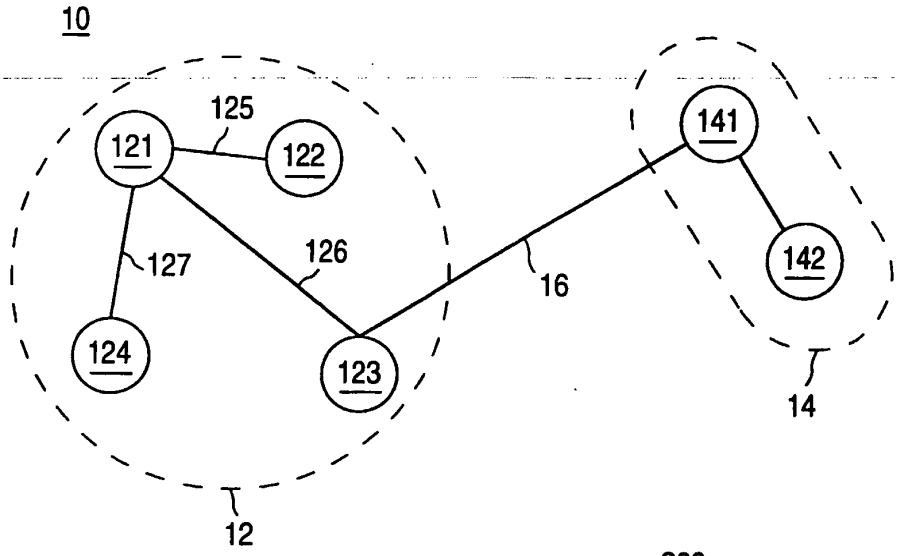


FIG. 1
(PRIOR ART)

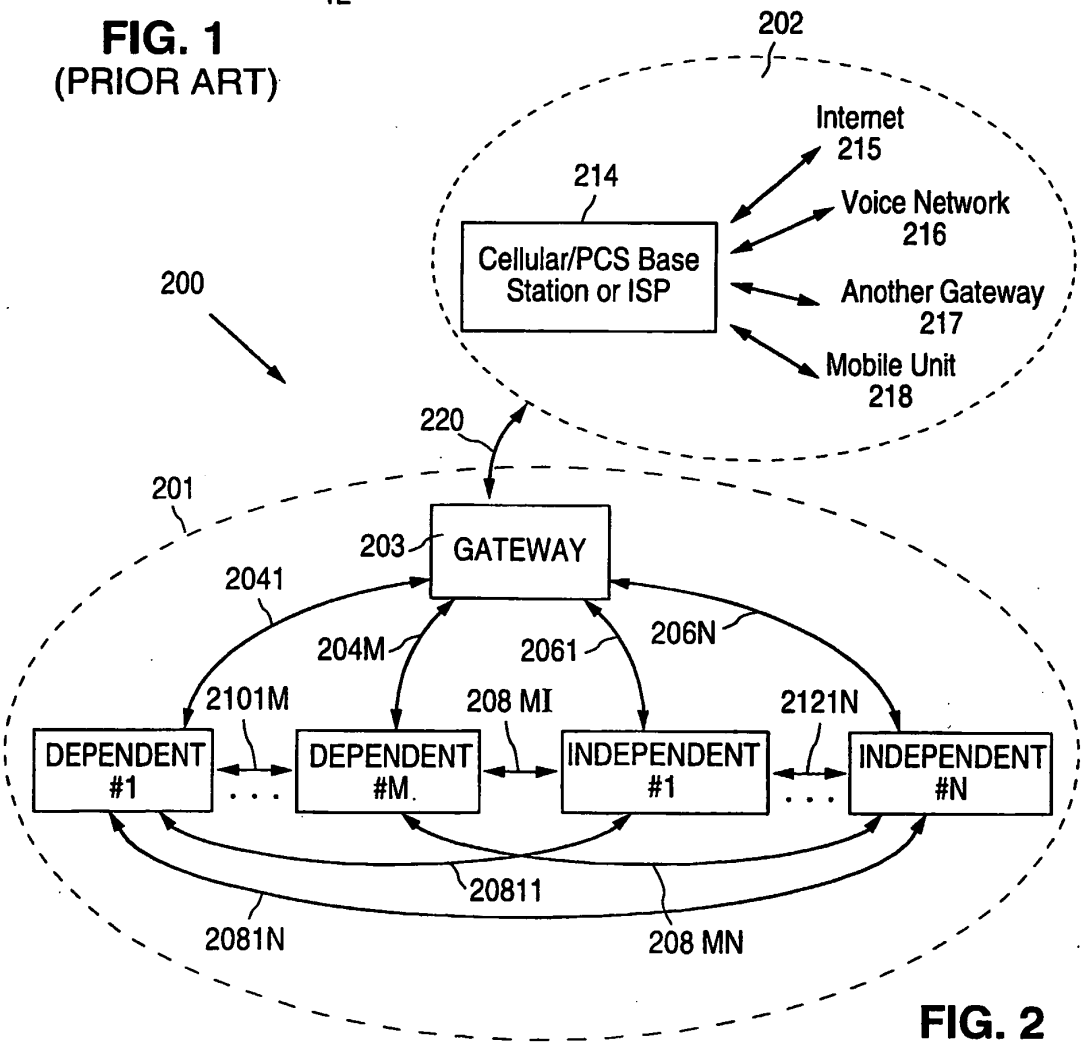


FIG. 2

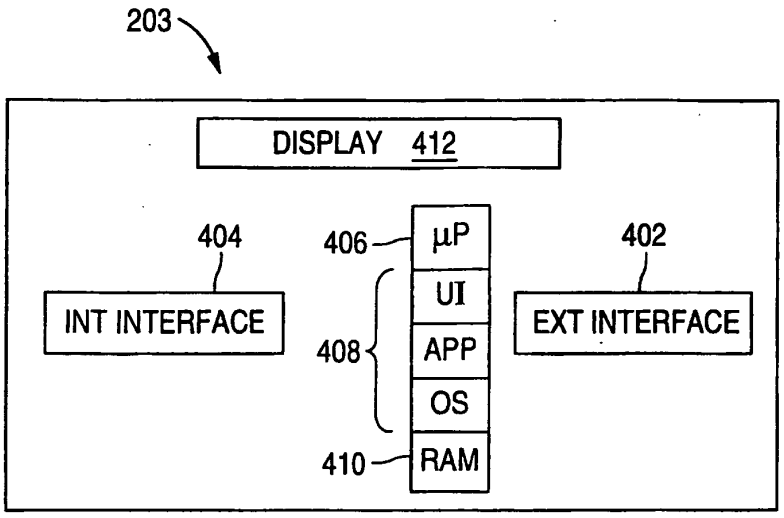


FIG. 3

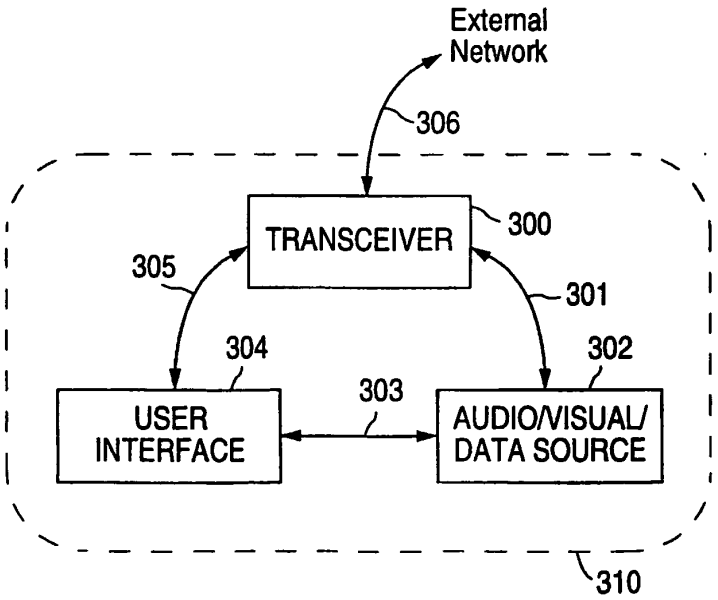


FIG. 4

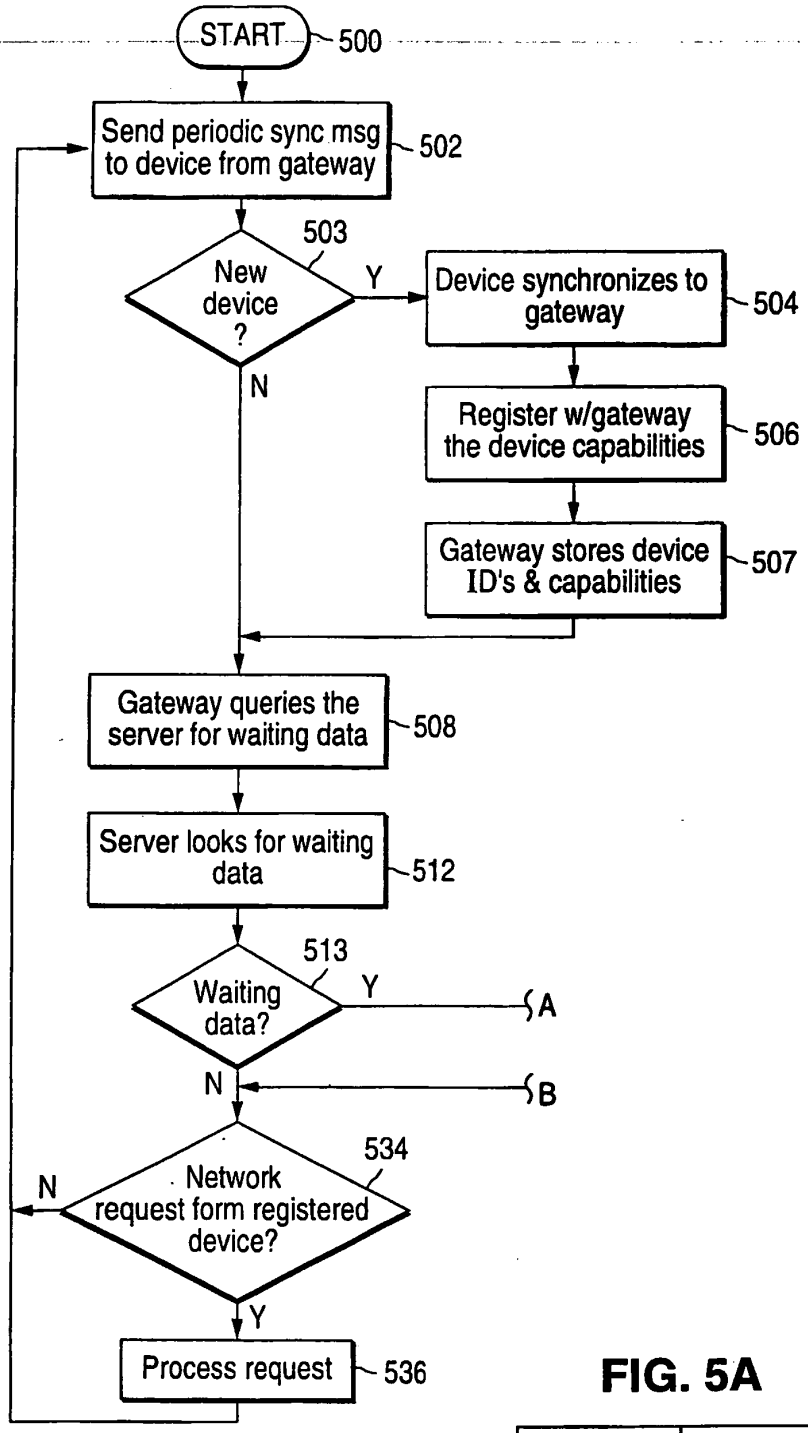


FIG. 5A

FIG. 5A	FIG. 5B

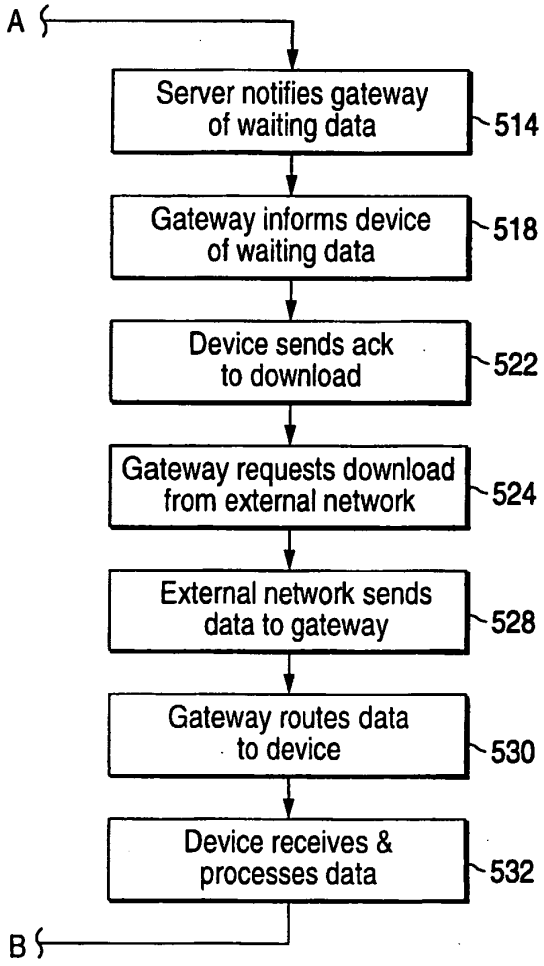

A
Server notifies gateway of waiting data
514
Gateway informs device of waiting data
518
Device sends ack to download
522
Gateway requests download from external network
524
External network sends data to gateway
528
Gateway routes data to device
530
Device receives & processes data
532
B

FIG. 5B

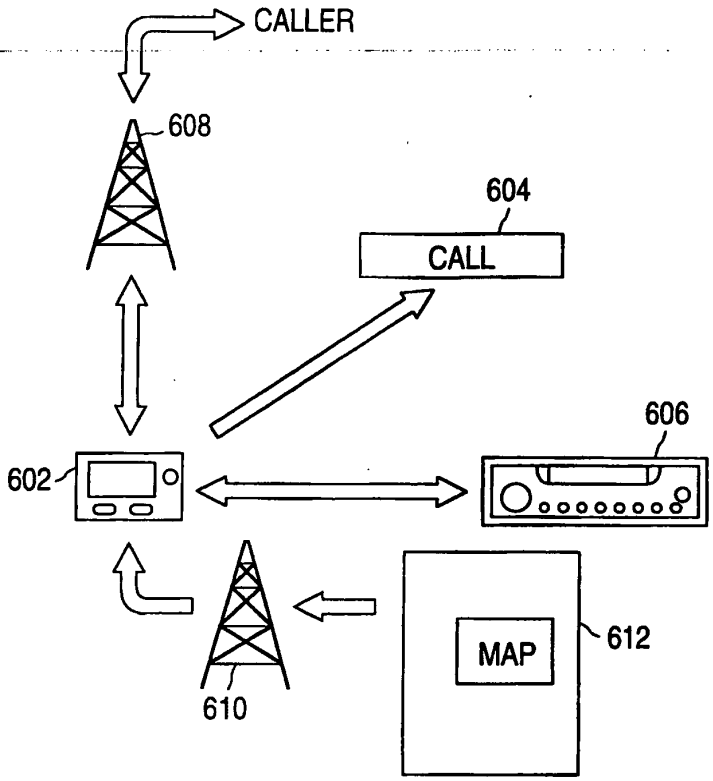

CALLER
608
604
CALL
606
602
MAP
612
610

FIG. 6

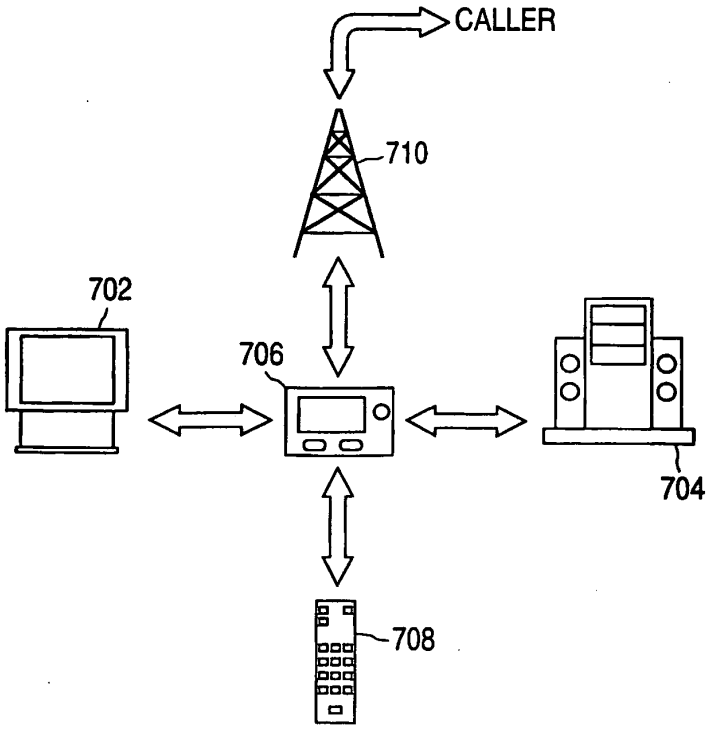

CALLER
710
702
706
704
708

FIG. 7

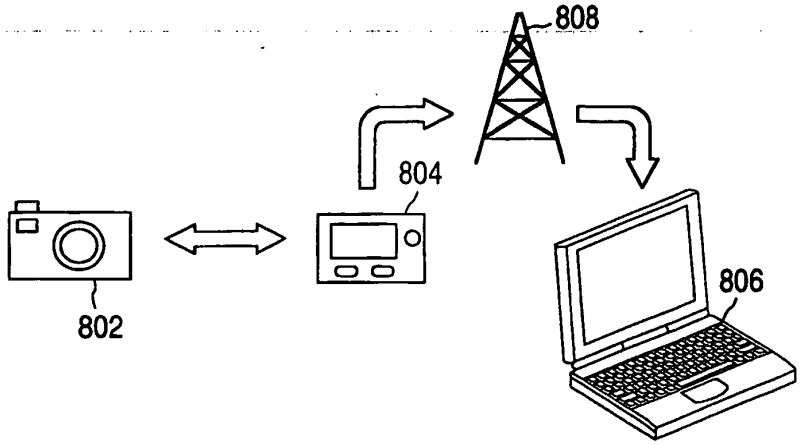


FIG. 8

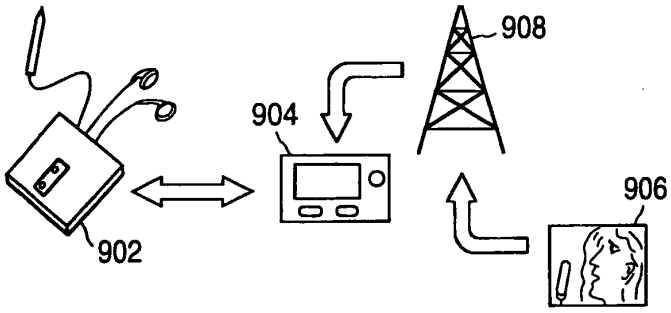


FIG. 9

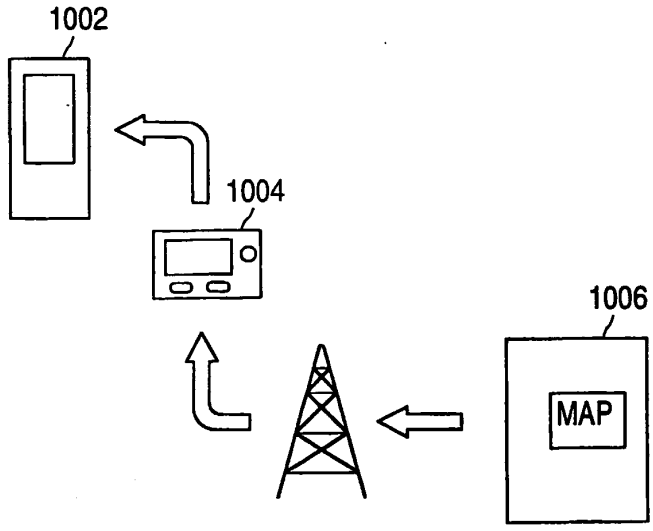


FIG. 10

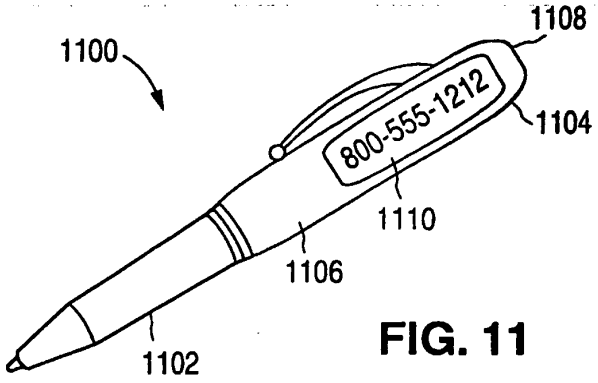


FIG. 11

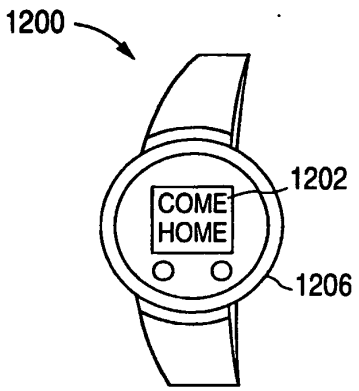


FIG. 12

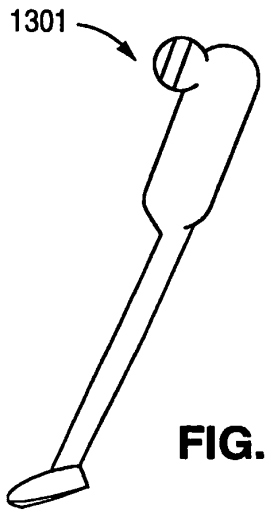


FIG. 13

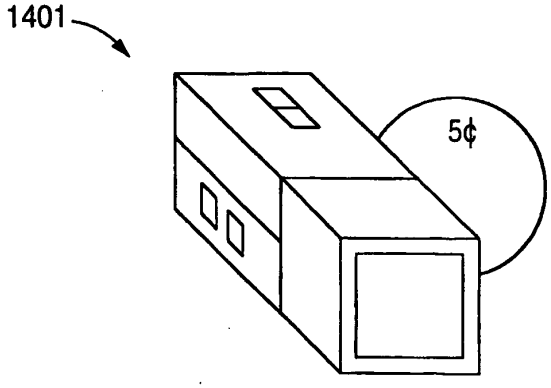


FIG. 14

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

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5 July 2001 (05.07.2001)

PCT

(10) International Publication Number
WO 01/048977 A3

(51) International Patent Classification[7]: H04L 12/28, 12/56, 12/66, 29/06

(21) International Application Number: PCT/US00/34184

(22) International Filing Date:
15 December 2000 (15.12.2000)

(25) Filing Language: English

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(30) Priority Data:
09/470,562 23 December 1999 (23.12.1999) US

(71) Applicant: **SONY ELECTRONICS INC.** [US/US]; 1 Sony Drive, Park Ridge, NJ 07656 (US).

(72) Inventors: **BARANOWSKI, Robert**; 14370 Bourgeois Way, San Diego, CA 92129 (US). **BERG, Roger, William**; 7066 Rockrose Terrace, Carlsbad, CA 92009 (US).

(74) Agents: **HEID, David, W.** et al.; Skjerven Morrill MacPherson LLP, 25 Metro Drive, Suite 700, San Jose, CA 95110 (US).

(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.

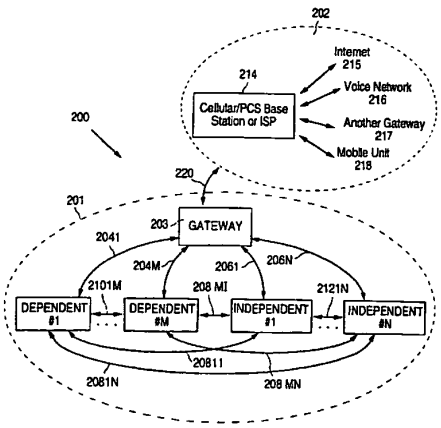
(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*

(88) Date of publication of the international search report:
12 September 2002

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

(54) Title: INFORMATION GATEWAY SYSTEM AND METHOD



(57) Abstract: Device and method for communicating between a plurality of devices. A communication device is partitioned into various units, each performing a function of the communication device. A subnet (201) is established for the units, the units including a master (203) device acting as the master of the subnet and performing an exclusive master function and a plurality of slave devices acting as the slaves of the subnet and performing other functions of the communication device. The master device negotiates with the slave devices and intelligently routes a message to the slave devices having capability to process the message. In one embodiment, the message is from an external network (202). In one embodiment, the message is from a slave device in the subnet. The same protocol is used for communicating with the master device. In one embodiment, the master device communicates with a slave device via a wireless communication path such as radio frequency and InfraRed. The external network is an established network, such as an internet (215), a mobile unit (218), a voice network (216), or another subnet (217).

WO 01/048977 A3

INTERNATIONAL SEARCH REPORT

Inte ›nal Application No
PC1/US 00/34184

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04L12/28 H04L12/56 H04L12/66 H04L29/06

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 H04Q

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)
WPI Data, PAJ, EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 99 29126 A (JOERESSEN OLAF J ;NOKIA MOBILE PHONES LTD (FI)) 10 June 1999 (1999-06-10) page 1, line 5 -page 3, line 4 page 4, line 4 -page 5, line 10 page 6, line 20 -page 9, line 11 page 10, line 8 - line 13 page 11, line 24 -page 12, line 7 figures 1,5	1,8-48, 51-115
Y		2-7,49, 50

-/--

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

[X] 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

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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.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
5 February 2002	12/02/2002

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	Vaskimo, K

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INTERNATIONAL SEARCH REPORT

Inter nal Application No
PC1/US 00/34184

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 5 699 409 A (KOJIMA SUSUMU) 16 December 1997 (1997-12-16) column 1, line 10 -column 4, line 19 column 4, line 46 -column 5, line 60 figure 3	1,8-48, 51-115
Y		2-7,49, 50
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Y		2-7,49, 50
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Y	US 5 949 776 A (BUNTE ALAN G ET AL) 7 September 1999 (1999-09-07) column 2, line 1 -column 6, line 49 column 10, line 58 -column 11, line 8 column 33, line 39 -column 34, line 49 column 35, line 29 - line 45 column 41, line 63 -column 42, line 22 column 51, line 41 -column 53, line 11 column 55, line 53 -column 60, line 14	3-7
A		1,52,111

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

ormation on patent family members

Inte onal Application No
PC , JS 00/34184

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Inte onal Application No
PC1/US 00/34184

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Form PCT/ISA/210 (patent family annex) (July 1992)

PATENT APPLICATION FEE DETERMINATION RECORD
Effective October 1, 2001

Application or Docket Number: 09850399

8/29/05

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS		
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	56 minus 58 =	*
INDEPENDENT CLAIMS	8 minus 8 =	*
MULTIPLE DEPENDENT CLAIM PRESENT		☐

* If the difference in column 1 is less than zero, enter "0" in column 2

SMALL ENTITY TYPE ☐		OR	OTHER THAN SMALL ENTITY	
RATE	FEE		RATE	FEE
BASIC FEE	370.00	OR	BASIC FEE	740.00
X$ 9=		OR	X$18=	
X42=		OR	X84=	
+140=		OR	+280=	
TOTAL		OR	TOTAL	

CLAIMS AS AMENDED - PART II

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X42=		OR	X84=	
+140=		OR	+280=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT B

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X42=		OR	X84=	
+140=		OR	+280=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT C

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X42=		OR	X84=	
+140=		OR	+280=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20."
***If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3."
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

FORM PTO-875 (Rev. 8/01) — Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE

☆U.S.GPO:2001 482-124 / 59197

pg 1

PATENT APPLICATION FEE DETERMINATION RECORD
Effective October 1, 2001

Application or Docket Number: 09850 399

CLAIMS AS FILED - PART I

5/7/2001

	(Column 1)	(Column 2)
TOTAL CLAIMS		
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	57 minus 20=	* 37
INDEPENDENT CLAIMS	5 minus 3 =	* 2
MULTIPLE DEPENDENT CLAIM PRESENT		☐

* If the difference in column 1 is less than zero, enter "0" in column 2

SMALL ENTITY TYPE ☐		OR	OTHER THAN SMALL ENTITY	
RATE	FEE		RATE	FEE
BASIC FEE	370.00	OR	BASIC FEE	740.00
X$ 9=	333	OR	X$18=	
X42=	80	OR	X84=	
+140=		OR	+280=	
TOTAL	718	OR	TOTAL	

CLAIMS AS AMENDED - PART II

10/14/2003

AMENDMENT A	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	* 57	Minus	** 57	=
Independent	* 7	Minus	*** 5	= 2
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X42=		OR	X84=	$22
+140=		OR	+280=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	$22

4/9/04

AMENDMENT B	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	* 58	Minus	** 57	= 1
Independent	* 8	Minus	*** 7	= 1
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	$18
X42=		OR	X84= 86	$86
+140=		OR	+280=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

1/10/05

AMENDMENT C	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	* 56	Minus	** 58	=
Independent	* 8	Minus	*** 8	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X42=		OR	X84=	
+140=		OR	+280=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20."
***If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3."
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

ELECTRONIC INFORMATION DISCLOSURE STATEMENT

Electronic Version v18

Stylesheet Version v18.0

Title of Invention	A SYSTEM, DEVICE AND COMPUTER READABLE MEDIUM FOR PROVIDING A MANAGED WIRELESS NETWORK USING SHORT-RANGE RADIO SIGNALS

Application Number : 09/850399

Confirmation Number: 2705

First Named Applicant: Amit Haller

Attorney Docket Number: IXIM-01000US0

Art Unit: 2666

Examiner: Frank Duong

Search string: (6198948 or 6690929 or 6430408 or 6763247 or 6405027 or 6871063 or 6192257 or 20030143992 or 20040192384 or 20020132610 or 20020065099 or 20020010008 or 20030022699 or 20040196812 or 20040066769 or 20020010683 or 20010047424).pn

US Patent Documents

Note: Applicant is not required to submit a paper copy of cited US Patent Documents

init	Cite.No.	Patent No.	Date	Patentee	Kind	Class	Subclass
	1	6198948	2001-03-06	Sudo et al.			
	2	6690929	2004-02-10	Yeh			
	3	6430408	2002-08-06	Dorenbosch			
	4	6763247	2004-07-13	Hollstrom et al.			
	5	6405027	2002-06-11	Bell			
	6	6871063	2005-03-22	Schiffer			
	7	6192257	2001-02-20	Ray			

US Published Applications

Note: Applicant is not required to submit a paper copy of cited US Published Applications

init	Cite.No.	Pub. No.	Date	Applicant	Kind	Class	Subclass
	1	20030143992	2003-07-31	Humphrey et al.			
	2	20040192384	2004-09-30	Anastasakos et al.			
	3	20020132610	2002-09-19	Chaplin et al.			
	4	20020065099	2002-05-30	Bjorndahl			
	5	20020010008	2002-01-24	Bork et al.			
	6	20030022699	2003-01-30	Lin			

	7	20040196812	2004-07-10	Barber			
	8	20040066769	2004-04-08	Ahmavaara et al.			
	9	20020010683	2002-01-24	Aune			
	10	20010047424	2001-11-29	Alastalo et al.			

Remarks

Note: Remarks are not for responding to an office action.

An Information Disclosure Statement containing 2 Foreign Patent Documents and 3 Non Patent Literature Documents is being filed concurrently, via US mail.

Signature

Examiner Name	Date

TRANSMITTAL

Electronic Version v1.1

Stylesheet Version v1.1.0

Title of Invention	A SYSTEM, DEVICE AND COMPUTER READABLE MEDIUM FOR PROVIDING A MANAGED WIRELESS NETWORK USING SHORT-RANGE RADIO SIGNALS

Application Number :	09/850399
Date :	2001-05-07
First Named Applicant:	Haller Amit
Confirmation Number:	2705
Attorney Docket Number:	IXIM-01000US0

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Submitted By:	Elec. Sign.	Sign. Capacity
Kirk J DeNiro Registered Number: 35854	/Kirk J. DeNiro/	Attorney

Documents being submitted:	Files
us-ids	1000.EIDS-004-usidst.xml us-ids.dtd us-ids.xsl
Comments	

ACKNOWLEDGEMENT RECEIPT

Electronic Version 1.1

Stylesheet Version v1.1.1

Title of Invention	A SYSTEM, DEVICE AND COMPUTER READABLE MEDIUM FOR PROVIDING A MANAGED WIRELESS NETWORK USING SHORT-RANGE RADIO SIGNALS

Submision Type : Information Disclosure Statement

Application Number: 09/850399

EFS ID: 91331

Server Response:

Confirmation Code	Message
ISVR1	Submission was successfully submitted - Even if Informational or Warning Messages appear below, please do not resubmit this application
ICON1	2705
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First Named Applicant: Amit Haller

Attorney Docket Number: IXIM-01000US0

Timestamp: 2005-08-25 15:26:13 EDT

From: us

File Listing:

Doc. Name	File Name	Size (Bytes)	Date Produced (yyyymmdd)
us-ids	1000.EIDS-004-usidst.xml	3693	2005-08-25
us-ids	us-ids.dtd	7763	2005-08-25
us-ids	us-ids.xsl	12026	2005-08-25
package-data	1000.EIDS-004-pkda.xml	1794	2005-08-25
package-data	package-data.dtd	27025	2005-08-25
package-data	us-package-data.xsl	19263	2005-08-25
	Total files size	71564	

Message Digest: 647118590e736b4be57fd957033aed224b61871f

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/850,399	05/07/2001	Amit Haller	IXIM-01000US0	2705

28554 7590 05/25/2005

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EXAMINER	
DUONG, FRANK	

ART UNIT	PAPER NUMBER
2666	

DATE MAILED: 05/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO 90C (Rev 10/03)

Office Action Summary	Application No.	Applicant(s)	
	09/850,399	HALLER ET AL.	
	Examiner	Art Unit	
	Frank Duong	2666	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 January 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-58* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-58* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *12/03,4&6/04,1/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is a response to communication dated 1/10/05. Claims 1-3, 5-31 and 33-58 are pending in the application.

Information Disclosure Statement

2. The information disclosure statements filed 12/24/03, 4/19/04, 6/09/04 and 1/07/07 comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609. They have been considered and placed in the application file.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 39 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 39 recites the limitation "wherein the personal network provides a service and includes ... from the services" in lines 1-4. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims XXXX are rejected under 35 U.S.C. 102(e) as being anticipated by Lord et al (USP 6,763,012) (hereinafter "Lord").

Regarding **claim 1**, in accordance with Lord reference entirety, Lord discloses a system (*Fig. 1*) for providing access to the Internet (*18*), comprising:

a first wireless device (Fig. 1 or Fig. 2; 12), in a short distance wireless network (11), having a software component (21, 25, 26 and 27) to access information from the internet (18) by communicating (13) with a cellular network (16-17) in response to a first short-range radio signal (15), wherein the first wireless device (12) communicates with the cellular network and receives the first short-range radio signal (Fig. 1 and col. 3, lines 29-62, Lord discloses Mobile Terminal 12 acts as a router or default gateway for hosts or devices in a wireless LAN visiting the packet data network (PDN) (PDN is the Internet as disclosed at col. 2, lines 16-17); and

a second wireless device (14), in the short distance wireless network (11), to provide the first short-range radio signal (15), wherein the software component includes a network address translator software component (27) to translate between a first Internet Protocol ("IP") address provided to the first wireless device (14) from the cellular network (16-17) and a second address for the second wireless device provided by the first wireless device (*see Abstract or col. 3, lines 43-62 and col. 4, lines 9-12,*

Lord discloses MT requests and receives a network IP address from the PDN and utilizes the DHCP server 27 to assign IP addresses included in the network address to the TE hosts 14).

Regarding **claim 2**, in addition to features recited in base claim 1 (*see rationales pertaining the rejection of base claim 1 discussed above*), Lord further discloses wherein the second wireless device (14) is selected from a group consisting of desktop computer, a laptop computer, a personal digital assistant, a headset, a pager, a printer, a watch, a digital camera and an equivalent thereof (*col. 1, line 23 and thereinafter*).

Regarding **claim 3**, in addition to features recited in base claim 1 (*see rationales pertaining the rejection of base claim 1 discussed above*), Lord further discloses wherein the first wireless device is a cellular telephone using a protocol selected from a group consisting of a Global System for Mobile Communication ("GSM") protocol, a Code Division Multiple Access ("CDMA") protocol, a CDMA2000 protocol, a Time Division Multiple Access ("TDMA") protocol (*col. 1, line 14 and thereinafter*).

Regarding **claim 5**, in addition to features recited in base claim 1 (*see rationales pertaining the rejection of base claim 1 discussed above*), Lord further discloses wherein the software component includes a domain name service ("DNS") software component (27) to translate between a human readable name and a second Internet Protocol ("IP") address (col. 3, lines 54-56 and thereinafter).

Regarding **claim 6**, in addition to features recited in base claim 1 (*see rationales pertaining the rejection of base claim 1 discussed above*), Lord further discloses wherein the software component includes a security software component to control

access between the cellular network and the first device (*not shown; inherent as disclosed at col. 5, lines 1-4 and thereinafter*).

Regarding **claim 7**, in addition to features recited in base claim 1 (*see rationales pertaining the rejection of base claim 1 discussed above*), Lord further discloses wherein the second wireless device (14) is a thin terminal (col. 1, lines 41-51).

Regarding **claim 8**, in addition to features recited in base claim 1 (*see rationales pertaining the rejection of base claim 1 discussed above*), Lord further discloses wherein the second wireless device (14) includes a Bluetooth Processor and a 2.4 Ghz transmitter (not shown; inherent as disclosed at col. 3, lines 34-38 and col. 1, lines 41-51).

Regarding **claim 9**, in addition to features recited in base claim 1 (*see rationales pertaining the rejection of base claim 1 discussed above*), Lord further discloses wherein the first wireless device (12) includes a Bluetooth Processor and a 2.4 Ghz transmitter (not shown; inherent as disclosed at col. 1, lines 41-51).

Regarding **claim 10**, in addition to features recited in base claim 1 (*see rationales applied in the rejection of base claim 1 discussed above*), Lord further discloses wherein the second wireless device (14) includes a 5.7 Ghz transmitter (not shown; inherent as disclosed at col. 1, lines 41-51).

Regarding **claim 11**, in addition to features recited in base claim 1 (*see rationales applied in the rejection of base claim 1 discussed above*), Lord further discloses wherein the first wireless device includes a 5.7 Ghz transmitter (not shown; inherent as disclosed at col. 1, lines 41-51).

Regarding **claim 12**, in addition to features recited in base claim 1, (*see rationales applied in the rejection of base claim 1 discussed above*), Lord further discloses wherein the software component includes a plug and play software component (not shown; inherent) to load and execute software for the second wireless terminal (14) (Plug and Play software is inherent in mobile device supporting GPRS).

Regarding **claim 13**, in addition to features recited in base claim 1, (*see rationales applied in the rejection of base claim 1 discussed above*), Lord further discloses wherein the software component includes a PIN number management software component (21) to obtain and provide PIN numbers *(not shown; inherent in a GSM system in order for mobile register with base station*).

Regarding **claim 14**, in addition to features recited in base claim 1, (*see rationales applied in the rejection of base claim 1 discussed above*), Lord further discloses wherein the software component includes a service repository software component (21) to obtain an availability of service from the wireless terminal *(col. 4, lines 1-4; service management).*

Regarding **claim 15**, in addition to features recited in base claim 1, (*see rationales applied in the rejection of base claim 1 discussed above*), Lord further discloses wherein the second wireless device includes an application software component capable of providing a service (*not shown; inherently there are applications in the laptop, i.e. web browser or telephony, in order for the laptop to access the Internet*); and, wherein the software component includes a management software component to access the service *(col. 4, lines 1-4; service management).*

Regarding **claim 16**, in accordance with Lord reference entirety, Lord discloses a system (*Fig. 1*) for providing access to the Internet (*18*), comprising:

a first wireless device (*12*), in a short distance wireless network (11), having a software component (*Fig. 2; 21, 25, 26 and 27*) to access information from the internet (18) by communicating (13) with a cellular network (16-17) in respond to a first short-range radio signal (15) (*col. 3, lines 29-62*);

a second wireless device (14), in a short distance wireless network (11), to provide the first short-range radio signal (*15*); and,

a third wireless device (14), in a short distance wireless network (11), to provide a second short-range signal (15), wherein the second wireless device (14) communicating with the third wireless devices (14) through the first wireless device (12) (*at col. 3, lines 52-60, Lord discloses MT 12 acts as router or gateway for hosts and devices. Moreover, MT 12 uses PPP over Ethernet to connect each TE 14 with a physical LAN, while maintaining separate logical connections with each individual TE 14. In other words, the TE 14 talks to each other using MT 12* due to the logical connections between them and the MT 12).

Regarding **claim 17,** in accordance with Lord reference entirety, Lord discloses a system (*Fig. 1*) for providing access to the Internet (*18*), comprising:

a first wireless device (*12*), in a short distance wireless network (11), having a software component (*Fig. 2; 21, 25, 26 and 27*) to access information from the internet (18) by communicating (13) with a cellular network (16-17) in respond to a first short-range radio signal (15) (*col. 3, lines 29-62*);

a second wireless device (14), in a short distance wireless network (11), to provide the first short-range radio signal (*15*); and,

a third wireless device (14), in a short distance wireless network (11), to provide a second short-range signal (15), wherein the first wireless device (12) provides access to the Internet for the second and third wireless devices (14) (*at col. 3, lines 16-19 and thereinafter*).

Regarding **claim 18**, in addition to features recited in base claim 1, (*see rationales applied in the rejection of base claim 1 discussed above*), Lord further discloses wherein the software component (*Fig. 2; 21, 25, 26 and 27*) operates with an operating system software component (Fig. 2; 21-27 and col. 3, line 63 to col. 4, line 12 and thereinafter).

Regarding **claims 23-25**, in addition to features recited in base claim 1, (*see rationales applied in the rejection of base claim 1 discussed above*), Lord further discloses radio side protocol stack 21 comprising RLC/MAC layer 22, LLC layer 23, and SNDCP layer 24 to include MM/SM. The claims call for necessary software component to make the mobile terminal (MT 12) not susceptible to malicious attack. Thus, it is inherent that Lord discloses the claimed limitations in a manner set forth as claimed.

Regarding **claim 26,** in accordance with Lord reference entirety, Lord discloses a system (*Fig. 1*) for providing access to the Internet (*18*), comprising:

a first wireless device (*12*), in a short distance wireless network (11), having a software component (*Fig. 2; 21, 25, 26 and 27*) to access information from the internet

(18) by communicating (13) with a cellular network (16-17) in respond to a first short-range radio signal (15) (*col. 3, lines 29-62*);

a second wireless device (14), in a short distance wireless network (11), to provide the first short-range radio signal (*15*) an the cellular network (16-17) to selectively transfer information, including Internet Protocol ("IP") data packets, between the first device (12) and the cellular network in response to a security software component (*col. 4, line 65 to col. 5, line 4*).

Regarding **claim 27**, in addition to features recited in base claim 26 (see rationales discussed above), Lord further discloses wherein the security software component is a firewall software component to control access to the cellular network (*not shown; inherent as disclosed at col. 5, lines 3-4 pertaining authentication, authorization, access control and charging*).

Regarding **claim 28**, in addition to features recited in base claim 26 (see rationales discussed above), Lord further discloses wherein the security software component is a virtual private network ("VPN") (*not shown; inherent as disclosed at col. 5, lines 3-4 pertaining authentication, authorization, access control and charging*).

Regarding **claim 29**, in addition to features recited in base claim 26 (see rationales discussed above), Lord further discloses wherein the security software component is a uniform resource locator ("URL") (*not shown; inherent as disclosed at col. 5, lines 3-4 pertaining authentication, authorization, access control and charging*).

Regarding **claim 30**, in addition to features recited in base claim 26 (see rationales discussed above), Lord further discloses wherein the first signal short-range

radio signal is selected from a group consisting of a HomeRF signal, and 802.11 signal and Bluetooth™ (col. 1, lines 42-51).

Regarding **claim 31**, in addition to features recited in base claim 26 (see rationales discussed above), Lord further discloses wherein the information is provided in the form of data packets (col. 4, lines 65-66 and thereinafter; PDP context).

Regarding **claim 33**, in addition to features recited in base claim 26 (see rationales discussed above), Lord further discloses wherein the second wireless device is coupled to the cellular network by either an Ethernet connection, DSL connection or a cable modem (col. 3, lines 37-38).

Regarding **claim 34**, in addition to features recited in base claim 26 (see rationales discussed above), Lord further discloses wherein the second wireless device is coupled to the cellular network by a landline network (col. 3, lines 37-38).

Regarding **claim 35**, in addition to features recited in base claim 26 (see rationales discussed above), Lord further discloses wherein the first wireless device provides execution space for executable software from the second wireless device (Fig. 2; 25).

Regarding **claim 36**, in accordance with Lord reference entirety, Lord discloses a handheld device (MT) for providing a short distance wireless network (*FIG. 1; 11*), comprising:

a storage device (12);

a processor (*not shown; inherent)*, coupled to the storage device (see connection depicted in FIG. 2);

the storage device (12) to store a software component (*21-27*); and, the processor operative with the software component to:

provide an Internet Protocol ("IP") data packet from a first handheld wireless device (MT) to a terminal (14) using short-range radio signals (col. 4, lines 65-66 and thereinafter; PDP context),

control access between the short distance wireless network (11) and a cellular network (16-17) (col. 3, lines 16-19),

translate between a first IP address provided to the handheld device and a second IP address for the terminal provided by the handheld device in the short distance wireless network (*see Abstract or col. 3, lines 43-62 and col. 4, lines 9-12, Lord discloses MT requests and receives a network IP address from the PDN and utilizes the DHCP server 27 to assign IP addresses included in the network address to the TE hosts 14*).

Regarding **claim 37**, in addition to features recited in base claim 36 (see rationales discussed above), Lord further discloses a Bluetooth™ transmitter (not shown; inherent as depicted in Fig. 2; block 802.X), coupled to the processor, to generate the short-range radio signals (col. 3, lines 36-38).

Regarding **claim 38,** in addition to features recited in base claim 36 (see rationales discussed above), Lord further discloses a GSM transmitter, coupled to the processor (*not shown; inherent as depicted in Fig. 1. MT 12 communicates (13) to the cellular network 16-17*).

Regarding **claim 39**, in addition to features recited in base claim 36, (*see rationales applied in the rejection of base claim 1 discussed above*), Lord further discloses wherein the software component (*21-27)* includes a network software component (25).

Regarding **claim 40**, in addition to features recited in base claim 36, (*see rationales applied in the rejection of base claim 1 discussed above*), Lord further discloses wherein the software component includes a plug and play software component (not shown; inherent) to load and execute software for the second wireless terminal (14) (Plug and Play software is inherent in mobile device supporting GPRS).

Regarding **claim 41**, in addition to features recited in base claim 36, (*see rationales applied in the rejection of base claim 1 discussed above*), Lord further discloses wherein the software component includes a PIN number management software component (21*)* to obtain and provide PIN numbers *(not shown; inherent in a GSM system in order for mobile register with base station*).

Regarding **claim 42**, in addition to features recited in base claim 36, (*see rationales applied in the rejection of base claim 1 discussed above*), Lord further discloses wherein the software component includes a service repository software component (21) to obtain an availability of service from the wireless terminal *(col. 4, lines 1-4; service management).*

Regarding **claim 43**, in addition to features recited in base claim 36, (*see rationales applied in the rejection of base claim 1 discussed above*), Lord further

discloses wherein the software component includes a management software component (21) *(Fig. 2)*.

Regarding **claim 44**, in accordance with Lord reference entirety, Lord discloses a handheld device (MT) for providing a short distance wireless network (*FIG. 1; 11*), comprising:

a storage device (12);

a processor (*not shown; inherent)*, coupled to the storage device (see connection depicted in FIG. 2);

the storage device (12) to store a software component (*21-27*); and, the processor operative with the software component to:

access the Internet through a cellular network (col. 3, lines 16-19),

provide a short-range radio signal to a second wireless handheld device and a second short-range radio signal to a third wireless handheld device (Fig. 1; elements 14 in a WLAN wirelessly communicate with MT 12),

control access between the Internet and the first, second and third wireless handheld devices (MT 12),

translate between a first IP address provided to the handheld device and a second address for the second wireless handheld device provided by the first wireless handheld device, and a third address for the third wireless handheld device provided by the first wireless device (*see Abstract or col. 3, lines 43-62 and col. 4, lines 9-12, Lord discloses MT requests and receives a network IP address from the PDN and utilizes the*

DHCP server 27 to assign IP addresses included in the network address to the TE hosts 14).

Regarding **claim 45**, in addition to features recited in base claim 44 (see rationales discussed above), Lord further discloses wherein the first wireless handheld device is selected from a group consisting of a desktop computer, a laptop computer, a personal digital assistant, a headset, a pager, a watch, a thin terminal, a digital camera and an equivalent thereof (*col. 1, lines 42-51*).

Regarding **claim 46**, in addition to features recited in base claim 44 (see rationales discussed above), Lord further discloses wherein the wireless device is a thin terminal (*col. 1, lines 42-51*).

Regarding **claims 47**, in addition to features recited in base claim 44 (see rationales discussed above), Lord further discloses wherein the wireless device includes a 2.4 Ghz transmitter not shown; inherent as depicted in Fig. 2; block 802.X).

Regarding **claims 48**, in addition to features recited in base claim 44 (see rationales discussed above), Lord further discloses wherein the wireless device includes a 5.7 Ghz transmitter (not shown; inherent as depicted in Fig. 2; block 802.X).

Regarding **claims 49**, in addition to features recited in base claim 44 (see rationales discussed above), Lord further discloses wherein the software component (21-27) includes an application software component (21) to provide a service to the second wireless handheld device (14) *(col. 4, lines 1-4; service management).*

Regarding **claim 50**, in accordance with Lord reference entirety, Lord discloses an article of manufacture (Fig. 2), including a computer readable medium, comprising:

a short-range radio software component (802.X) for communicating with a device (14) in a short distance wireless network (11) by using a short-range radio signal (Bluetooth) (col. 1, lines 42-51);

a cellular software component (Fig. 2; 21) to communicate with a cellular network (16-17) by using a cellular signal (13) (col. 1, lines 16-28 and thereinafter); and,

a network software component (21) to selectively transfer an Internet Protocol ("IP") data packet between the device (14) and the cellular network (16-17) (col. 1, lines 16-19 and thereinafter).

Regarding **claim 55**, in addition to features recited in base claim 50 (*see rationales discussed above*), Lord further discloses wherein the article of manufacture is a memory storage device (not shown; inherent) in a cellular telephone (*FIG. 2*).

Regarding **claim 56**, in addition to features recited in base claim 50 (*see rationales discussed above*), Lord further discloses wherein the short-range radio software component is a Bluetooth component (*Fig. 2; block 802.X and col. 1, lines 42-52*).

Regarding **claim 57**, in addition to features recited in base claim 50 (*see rationales discussed above*), Lord further discloses wherein the cellular software component is a GSM component (*see Fig. 1; MT 12 or Fig. 2; block 21*).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 19-22 and 51-54 are rejected under 35 U.S.C. 103(a) as being unpatentable Lord in view of Parekh (OPERATING SYSTEMS ON WIRELESS HANDHELD DEVICES, pages 1-8, September 28, 2000).

Regarding **claims 19-22**, in addition to features recited in base claim 18 (*see rationales pertaining the rejection of base claim 18 discussed above*), Lord fails to explicitly further disclose the operating system is a Linux, EPOC, PocketPC or Stinger. However, the limitation lacks thereof from Lord reference is well known and disclosed by Parekh.

In accordance with Parekh reference entirety, Parekh discloses the operating system such as Linux, EPOC, PocketPC and Stinger is the primary user interface that serves as the software intermediary between the applications and the handheld devices (see Parekh reference, page 3 and thereinafter). The operating systems differ in features such as size distribution, homogeneity, asset specificity and demand stability (*see Parekh reference, page 5*).

It would have been obvious to those skilled in the art at the time of the invention was made to replace Lord's operating system with Linux, EPOC, PocketPC or Stinger

disclosed by Parekh to arrive the claimed invention with a motivation to provide the end user with variable capabilities or to take advantage of different operating system (*see Parekh reference, page 5*).

Regarding **claims 51-54**, in addition to features recited in base claim 50 (*see rationales pertaining the rejection of base claim 50 discussed above*), Lord fails to explicitly further disclose the operating system is a Linux, EPOC, PocketPC or Stinger. However, the limitation lacks thereof from Lord reference is well known and disclosed by Parekh.

In accordance with Parekh reference entirety, Parekh discloses the operating system such as Linux, EPOC, PocketPC and Stinger is the primary user interface that serves as the software intermediary between the applications and the handheld devices (see Parekh reference, page 3 and thereinafter). The operating systems differ in features such as size distribution, homogeneity, asset specificity and demand stability (*see Parekh reference, page 5*).

It would have been obvious to those skilled in the art at the time of the invention was made to replace Lord's operating system with Linux, EPOC, PocketPC or Stinger disclosed by Parekh to arrive the claimed invention with a motivation to provide the end user with variable capabilities or to take advantage of different operating system (*see Parekh reference, page 5*).

6. Claims 19-22 and 51-54 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Lord in view of DELL (WHITE PAPER, HANDHELD DEVICES: COMPARING THE MAJOR PLATFOMRS, pages 1-7) (hereinafter "DELL").

Regarding **claims 19-22**, in addition to features recited in base claim 18 (*see rationales pertaining the rejection of base claim 18 discussed above*), Lord fails to explicitly further disclose the operating system is a Linux, EPOC, PocketPC or Stinger. However, the limitation lacks thereof from Lord reference is well known and disclosed by DELL.

In accordance with Dell reference entirety, Dell compares the four major handheld platforms to include Linux, EPOC, PocketPC and Stinger. The platforms differ in features such as size, weight, functionality and applications, battery life, display characteristics, cost, and expansion and connectivity (*see Dell, page 1, left column, first paragraph*).

It would have been obvious to those skilled in the art at the time of the invention was made to replace Lord's operating system with Linux, EPOC, PocketPC or Stinger disclosed by DELL to arrive the claimed invention with a motivation to provide the end user with variable capabilities or to take advantage of different operating system (*see Dell, page 1, left column, first paragraph*).

Regarding **claims 51-54**, in addition to features recited in base claim 50 (*see rationales pertaining the rejection of base claim 50 discussed above*), Lord fails to explicitly further disclose the operating system is a Linux, EPOC, PocketPC or Stinger. However, the limitation lacks thereof from Lord reference is well known and disclosed by DELL.

In accordance with Dell reference entirety, Dell compares the four major handheld platforms to include Linux, EPOC, PocketPC and Stinger. The platforms differ in features such as size, weight, functionality and applications, battery life, display characteristics, cost, and expansion and connectivity (*see Dell, page 1, left column, first paragraph*).

It would have been obvious to those skilled in the art at the time of the invention was made to replace Lord's operating system with Linux, EPOC, PocketPC or Stinger disclosed by DELL to arrive the claimed invention with a motivation to provide the end user with variable capabilities or to take advantage of different operating system (*see Dell, page 1, left column, first paragraph*).

Response to Arguments

7. Applicant's arguments with respect to claims 1-58 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Frank Duong whose telephone number is 571-272-3164. The examiner can normally be reached on 7:00AM-3:30PM, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema S. Rao can be reached on 571-272-3174. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

May 23, 2005

FRANK DUONG
PRIMARY EXAMINER

ELECTRONIC INFORMATION DISCLOSURE STATEMENT

Electronic Version v18
Stylesheet Version v18.0

Title of Invention	A SYSTEM, DEVICE, AND COMPUTER READABLE MEDIUM FOR PROVIDING A MANAGED WIRELESS NETWORK USING SHORT-RANGE RADIO SIGNALS

Application Number: 09/850399
Confirmation Number: 2705
First Named Applicant: Amit Haller
Attorney Docket Number: IXIM-01000US0
Art Unit: 2666
Examiner: Frank Duong
Search string: (6064734 or 6630925 or 20020102974 or 20030017810 or 20030091917).pn.

US Patent Documents

Note: Applicant is not required to submit a paper copy of cited US Patent Documents

init	Cite.No.	Patent No.	Date	Patentee	Kind	Class	Subclass
FM	1	6064734	2000-05-16	Hasegawa et al.			
FM	2	6630925	2003-10-01	Osterg.ang.rd et al.			

US Published Applications

Note: Applicant is not required to submit a paper copy of cited US Published Applications

init	Cite.No.	Pub. No.	Date	Applicant	Kind	Class	Subclass
FM	1	20020102974	2002-08-01	Raith			
FM	2	20030017810	2003-01-23	Janninck et al.			
FM	3	20030091917	2003-05-15	Davenport et al.			

Signature

Examiner Name	Date
[signature]	5/23/05

ELECTRONIC INFORMATION DISCLOSURE STATEMENT

Electronic Version v18

Stylesheet Version v18.0

Title of Invention	A SYSTEM, DEVICE AND COMPUTER READABLE MEDIUM FOR PROVIDING A MANAGED WIRELESS NETWORK USING SHORT-RANGE RADIO SIGNALS

Application Number : 09/850399

Confirmation Number: 2705

First Named Applicant: Amit Haller

Attorney Docket Number: IXIM-01000US0

Art Unit: 2666

Examiner: Frank Duong

Search string: (6654616 or 6463078 or 6243581 or 5805166 or 20040001467 or 20030054765 or 20020063472 or 20030114105).pn

US Patent Documents

Note: Applicant is not required to submit a paper copy of cited US Patent Documents

init	Cite.No.	Patent No.	Date	Patentee	Kind	Class	Subclass
FD	1	6654616	2003-11-25	Pope et al.	—	—	—
FD	2	6463078	2002-10-08	Engstrom et al.	—	—	—
FD	3	6243581	2001-06-05	Jawanda	—	—	—
FD	4	5805166	1998-09-08	Hall et al.	—	—	—

US Published Applications

Note: Applicant is not required to submit a paper copy of cited US Published Applications

init	Cite.No.	Pub. No.	Date	Applicant	Kind	Class	Subclass
FD	1	20040001467	2004-01-01	Cromer et al.	—	—	—
FD	2	20030054765	2003-03-20	Botteck	—	—	—
FD	3	20020063472	2002-05-30	Irvin	—	—	—
FD	4	20030114105	2003-06-19	Haller et al.	—	—	—

Signature

Examiner Name	Date
/Frank Duong/	5/23/05

ELECTRONIC INFORMATION DISCLOSURE STATEMENT

Electronic Version v18
Stylesheet Version v18.0

Title of Invention	SYSTEM, DEVICE AND COMPUTER READABLE MEDIUM FOR PROVIDING A MANAGED WIRELESS NETWORK USING SHORT-RANGE RADIO SIGNALS

Application Number: 09/850399
Confirmation Number: 2705
First Named Applicant: Amit Haller
Attorney Docket Number: IXIM-01000US0
Art Unit: 2666
Examiner: Frank Duong
Search string: (6665549 or 6636489 or 6600734 or 6434537 or 6298443 or 20020068559 or 20020155830 or 20020055333 or 20020069037 or 20020068600 or 20030027563 or 20030078036 or 20020143952 or 20040048671 or 20020091633 or 20020065817 or 20030153280 or 20030224773 or 20030115351 or 20030214940 or 20030232616 or 20030122856 or 20030187807).pn.

US Patent Documents

Note: Applicant is not required to submit a paper copy of cited US Patent Documents

init	Cite.No.	Patent No.	Date	Patentee	Kind	Class	Subclass
FD	1	6665549	2003-12-16	Reed			
FD	2	6636489	2003-10-21	Fingerhut			
FD	3	6600734	2003-07-29	Gernet			
FD	4	6434537	2002-08-13	Grimes			
FD	5	6298443	2001-10-02	Colligan et al.			

US Published Applications

Note: Applicant is not required to submit a paper copy of cited US Published Applications

init	Cite.No.	Pub. No.	Date	Applicant	Kind	Class	Subclass

	1	20020068559	2002-06-06	Sharma et al.
	2	20020155830	2002-10-24	Iyer
	3	20020055333	2002-05-09	Davies et al.
	4	20020069037	2002-06-06	Hendrickson et al.
	5	20020068600	2002-06-06	Chihara et al.
	6	20030027563	2003-02-06	Herle et al.
	7	20030078036	2003-04-24	Chang et al.
	8	20020143952	2002-10-03	Sugiarto et al.
	9	20040048671	2004-03-11	Rowe
	10	20020091633	2002-07-11	Proctor
	11	20020065817	2002-05-30	Ito et al.
	12	20030153280	2003-08-14	Kopp et al.
	13	20030224773	2003-12-04	Deeds
	14	20030115351	2003-06-19	Giobbi
	15	20030214940	2003-11-20	Takken
	16	20030232616	2003-12-18	Gidron et al.
	17	20030122856	2003-07-03	Hubbard
	18	20030187807	2003-10-02	Matsubara et al.

Signature

Examiner Name	Date
[signature]	5/23/03

ELECTRONIC INFORMATION DISCLOSURE STATEMENT

Electronic Version v18
Stylesheet Version v18.0

Title of Invention	SYSTEM, DEVICE AND COMPUTER READABLE MEDIUM FOR PROVIDING A MANAGED WIRELESS NETWORK USING SHORT-RANGE RADIO SIGNALS

Application Number: 09/850399
Confirmation Number: 2705
First Named Applicant: Amit Haller
Attorney Docket Number: IXIM-01000US0
Art Unit: 2666
Examiner: Frank Duong
Search string: (05929848 or 06078789 or 06130602 or 05742237 or 05457737 or 06151628 or 06600428 or 06532366 or 6633759 or 20030050058 or 20020128051 or 20020058502 or 20030032417 or 20030060189 or 20030013438 or 20030060188 or 20020142762 or 20020082054).pn.

US Patent Documents

Note: Applicant is not required to submit a paper copy of cited US Patent Documents

init	Cite.No.	Patent No.	Date	Patentee	Kind	Class	Subclass
TP	1	05929848	1999-07-27	Albukerk et al.			
TP	2	06078789	2000-06-20	Bodenmann et al.			
TP	3	06130602	2000-10-10	O'Toole et al.			
TP	4	05742237	1998-04-21	Bledsoe			
TP	5	05457737	1995-10-10	Wen			
TP	6	06151628	2000-11-21	Xu et al.			
TP	7	06600428	2003-07-29	O'Toole et al.			
TP	8	06532366	2003-03-11	Chung et al.			
TP	9	6633759	2003-10-14	Kobayashi			

US Published Applications

Note: Applicant is not required to submit a paper copy of cited US Published Applications

init	Cite.No.	Pub. No.	Date	Applicant	Kind	Class	Subclass
TD	1	20030050058	2003-03-13	Walsh et al.			
TD	2	20020128051	2002-09-12	Liebenow			
TD	3	20020058502	2002-05-16	Stanforth			
TD	4	20030032417	2003-02-13	Minear et al.			
TD	5	20030060189	2003-03-27	Minear et al.			
TD	6	20030013438	2003-01-16	Darby			
TD	7	20030060188	2003-03-27	Gidron			
TD	8	20020142762	2002-10-03	Chmaytelli et al.			
TD	9	20020082054	2002-06-27	Keinonen et al.			

Signature

Examiner Name	Date
[signature]	5/23/05

Notice of References Cited	Application/Control No. 09/850,399	Applicant(s)/Patent Under Reexamination HALLER ET AL.	
	Examiner Frank Duong	Art Unit 2666	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	A	US-6,763,012	07-2004	Lord et al.	370/338
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
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	P					
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	S					
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NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Patent Assignment Abstract of Title

Total Assignments: 1

Application #: 09850399 **Filing Dt:** 05/07/2001 **Patent #:** NONE **Issue Dt:**

PCT #: NONE **Publication #:** US20020163895 **Pub Dt:** 11/07/2002

Inventors: Amit Haller, Peter Fornell, Avraham Itzchak, Amir Glick, Ziv Haparnas

Title: System, device and computer readable medium for providing a managed wireless network using short-range radio signals

Assignment: 1

Reel/Frame:	Received:	Recorded:	Mailed:	Pages:
013273/0484	09/13/2002	09/13/2002	12/02/2002	7

Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

Assignors:

HALLER, AMIT	**Exec Dt:** 01/07/2002
FORNELL, PETER	**Exec Dt:** 01/07/2002
ITZCHAK, AVRAHAM	**Exec Dt:** 06/05/2002
GLICK, AMIR	**Exec Dt:** 03/06/2002
HAPARNAS, ZIV	**Exec Dt:** 01/07/2002

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RA'ANANA, ISRAEL 43654

Correspondent: VIERRA MAGEN MARCUS ET AL.
KIRK J. DENIRO
685 MARKET STREET, SUITE 540
SAN FRANCISCO, CA 94105

Search Results as of: 5/23/2005 1:56:17 P.M.

If you have any comments or questions concerning the data displayed, contact OPR / Assignments at 703-308-9723
Web interface last modified: Oct. 5, 2002

Search Notes	Application/Control No.	Applicant(s)/Patent under Reexamination
	09/850,399	HALLER ET AL.
	Examiner	Art Unit
	Frank Duong	2666

SEARCHED			
Class	Subclass	Date	Examiner

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
Updated EAST Search	5/23/2005	FD
Updated Inventorship Search	5/23/2005	FD
Updated IEEE/Internet Search	5/23/2005	FD

Index of Claims

Application/Control No.	Applicant(s)/Patent under Reexamination
09/850,399	HALLER ET AL.
Examiner	**Art Unit**
Frank Duong	2666

√	Rejected	–	(Through numeral) Cancelled	N	Non-Elected	A	Appeal
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Claim		Date								
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Bib Data Sheet

CONFIRMATION NO. 2705

SERIAL NUMBER	FILING DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
09/850,399	05/07/2001 RULE	370	2666	IXIM-01000US0

APPLICANTS

Amit Haller, Belmont, CA;

Peter Fornell, Lake Oswego, OR;
Avraham Itzchak, Ra'anana, ISRAEL;Amir Glick, Tel Aviv, ISRAEL;
Ziv Haparnas, Tel Aviv, ISRAEL;

** CONTINUING DATA **********

FD none

** FOREIGN APPLICATIONS **********

FD none

IF REQUIRED, FOREIGN FILING LICENSE GRANTED
** 07/02/2001

Foreign Priority claimed ☐ yes ☑ no 35 USC 119 (a-d) conditions met ☐ yes ☑ no ☐ Met after Allowance Verified and Acknowledged Examiner's Signature Initials	STATE OR COUNTRY CA	SHEETS DRAWING 9	TOTAL CLAIMS 57	INDEPENDENT CLAIMS 5

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TITLE
System, device and computer readable medium for providing a managed wireless network using short-range radio signals

FILING FEE	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	21	haller-amit$.in.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2005/05/23 13:58
L2	16	fornell-peter$.in.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2005/05/23 13:58
L3	13	itzchak-avraham$.in.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2005/05/23 13:58
L4	22	haparnas-ziv$.in.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2005/05/23 13:58

Day : Monday
Date: 5/23/2005

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Time: 13:56:26

Continuity Information for 09/850399

Parent Data
No Parent Data

Child Data
10165150 **is a continuation of** 09850399
PCT/US02/14354 **is a continuation of** 09850399

Appln Info | Contents | Petition Info | Atty/Agent Info | **Continuity Data** | Foreign Data | Invent

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Day : Monday
Date: 5/23/2005

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Time: 13:56:54

Inventor Information for 09/850399

Inventor Name	City	State/Country
HALLER, AMIT	BELMONT	CALIFORNIA
FORNELL, PETER	LAKE OSWEGO	OREGON
ITZCHAK, AVRAHAM	RA'ANANA	ISRAEL
GLICK, AMIR	TEL AVIV	ISRAEL
HAPARNAS, ZIV	TEL AVIV	ISRAEL

Appln Info | Contents | Petition Info | Atty/Agent Info | Continuity Data | Foreign Data

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Inventor Name Search Result

Your Search was:

Last Name = HALLER
First Name = AMIT

Application#	Patent#	Status	Date Filed	Title	Inventor Name 21
60083442	Not Issued	159	04/29/1998	INTEGRATED FDD TRANSCEIVER BASED ON SINGLE SYNTHESIZED OSCILLATOR	HALLER, AMIT
11097644	Not Issued	020	04/01/2005	EFFICIENT SERVER POLLING SYSTEM AND METHOD	HALLER, AMIT
11036589	Not Issued	019	01/14/2005	DEVICE, SYSTEM, METHOD AND COMPUTER READABLE MEDIUM FOR PAIRING OF DEVICES IN A SHORT DISTANCE WIRELESS NETWORK	HALLER, AMIT
10809663	Not Issued	030	03/25/2004	DEVICE, SYSTEM, METHOD AND COMPUTER READABLE MEDIUM OBTAINING A NETWORK ATTRIBUTE, SUCH AS A DNS ADDRESS, FOR A SHORT DISTANCE WIRELESS NETWORK	HALLER, AMIT
10666776	Not Issued	020	09/18/2003	DEVICE, SYSTEM, METHOD AND COMPUTER READABLE MEDIUM FOR ATTACHING TO A DEVICE IDENTIFITED BY AN ACCESS POINT NAME IN A WIDE AREA NETWORK PROVIDING PARTICULAR SERVICES	HALLER, AMIT
10619857	Not Issued	030	07/14/2003	DEVICE, SYSTEM, METHOD AND COMPUTER READABLE MEDIUM FOR SELECTIVELY ATTACHING TO A CELLULAR DATA SERVICE	HALLER, AMIT
10454967	Not Issued	030	06/04/2003	WIRELESS DEVICE HAVING DUAL BUS ARCHETICURE	HALLER, AMIT

				FOR INTERFACING WITH CELLULAR SIGNALS AND SHORT-RANGE RADIO SIGNALS	
10435098	Not Issued	071	05/09/2003	DEVICE, SYSTEM, METHOD AND COMPUTER READABLE MEDIUM FOR FAST RECOVERY OF IP ADDRESS CHANGE	HALLER, AMIT
10358693	Not Issued	041	02/05/2003	METHOD, SYSTEM AND COMPUTER READABLE MEDIUM FOR ADJUSTING OUTPUT SIGNALS FOR A PLURALITY OF DEVICES IN A SHORT DISTANCE WIRELESS NETWORK RESPONSIVE TO A SELECTED ENVIRONMENT	HALLER, AMIT
10298753	Not Issued	089	11/18/2002	METHOD, SYSTEM AND COMPUTER READABLE MEDIUM FOR DOWNLOADING A SOFTWARE COMPONENT TO A DEVICE IN A SHORT DISTANCE WIRELESS NETWORK	HALLER, AMIT
10266007	Not Issued	061	10/07/2002	SYSTEM, METHOD AND PROCESSOR READABLE MEDIUM FOR DOWNLOADING INFORMATION WITHIN A PREDETEMINED PERIOD OF TIME TO A DEVICE IN A NETWORK RESPONSIVE TO PRICE SELECTION	HALLER, AMIT
10224749	Not Issued	094	08/20/2002	METHOD, SYSTEM AND COMPUTER READABLE MEDIUM FOR PROVIDING AN OUTPUT SIGNAL HAVING A THEME TO A DEVICE IN A SHORT DISTANCE WIRELESS NETWORK	HALLER, AMIT
10165150	Not Issued	030	06/06/2002	WIRELESS DEVICE HAVING A SINGLE PROCESSOR IN A SHORT-RANGE RADIO NETWORK	HALLER, AMIT
10023525	Not Issued	092	12/18/2001	METHOD, SYSTEM AND COMPUTER READABLE MEDIUM FOR MAKING A	HALLER, AMIT

				BUSINESS DECISION IN RESPONSE TO INFORMATION FROM A SHORT DISTANCE WIRELESS NETWORK	
10014721	Not Issued	071	10/26/2001	DEVICE, SYSTEM, COMPUTER READABLE MEDIUM AND METHOD FOR PROVIDING STATUS INFORMATION OF DEVICES IN A SHORT DISTANCE WIRELESS NETWORK	HALLER, AMIT
09990424	6845097	150	11/21/2001	DEVICE, SYSTEM, METHOD AND COMPUTER READABLE MEDIUM FOR PAIRING OF DEVICES IN A SHORT DISTANCE WIRELESS NETWORK	HALLER, AMIT
09932180	Not Issued	071	08/17/2001	SYSTEM, DEVICE AND COMPUTER READABLE MEDIUM FOR PROVIDING NETWORKING SERVICES ON A MOBILE DEVICE	HALLER, AMIT
09850399	Not Issued	071	05/07/2001	SYSTEM, DEVICE AND COMPUTER READABLE MEDIUM FOR PROVIDING A MANAGED WIRELESS NETWORK USING SHORT-RANGE RADIO SIGNALS	HALLER, AMIT
07974346	5296845	150	11/10/1992	COMPUTER KEYBOARD FOR USE WITH SOFTWARE FOR PLAYING GAMES OR SOLVING PUZZLES	HALLER, AMIT
07697698	Not Issued	166	05/09/1991	A COMPUTER KEYBOARD FOR USE WITH SOFTWARE FOR PLAYING GAMES OR SOLVING PUZZLES	HALLER, AMIT

Inventor Search Completed: No Records to Display.

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2666

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application		) PATENT APPLICATION	
Inventors:	Amit Haller, et al.	)	
		) Art Unit:	2666
Appl. No.:	09/850,399	)	
		) Examiner:	Duong,F.
Filed:	May 7, 2001	)	
Title:	A SYSTEM, DEVICE AND COMPUTER READABLE MEDIUM FOR PROVIDING A MANAGED WIRELESS NETWORK USING SHORT-RANGE RADIO SIGNALS	) **Customer No. 28554**	

CERTIFICATE OF MAILING UNDER 37 C.F.R. § 1.8

I hereby certify that this correspondence is being deposited in the United States Postal Service with sufficient postage as first class mail in an envelope addressed to **Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**, on January 7, 2005.

Kirk J. DeNiro, Reg. No. 35,854
Signature Date: January 7, 2005

RESPONSE C TO OFFICE ACTION UNDER 37 C.F.R. § 1.111

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This RESPONSE is in reply to the outstanding Office Action.

AMENDMENTS to the CLAIMS begin on Page 2 of this paper.

REMARKS begin on Page 12 of this paper.

Attorney Docket No.: IXIM-01000US0
ixim/1000/1000.response-C

AMENDMENTS TO THE CLAIMS

This listing of claim will replace all prior versions and listings of claim in the application.

1) (currently amended) A system for providing access to the Internet, comprising:

a first wireless device, in a short distance wireless network ~~coupled to a cellular network~~, having a software component ~~capable of accessing~~ to access information from the Internet by communicating with ~~the~~ a cellular network in response ~~responsive~~ to a first short-range radio signal, wherein the first wireless device ~~is capable of communicating~~ communicates with the cellular network and receives ~~receiving~~ the first short-range radio signal; and,

a second wireless device, in the short distance wireless network ~~coupled to the first wireless device~~, to provide ~~capable of providing~~ the first short-range radio signal,

wherein the software component includes a network address translator software component to translate between a first Internet Protocol ("IP") address provided to the first wireless device from the cellular network and a second address for the second wireless device provided by the first wireless device.

2) (currently amended) The system of Claim 1, wherein the second wireless device is selected from a group consisting of a desktop computer, a laptop computer, a personal digital assistant, a headset, a pager, a printer, a watch, and a digital camera ~~and an equivalent thereof~~.

3) (currently amended) The system of Claim 1, wherein the first wireless device is a cellular telephone using a protocol selected from a group consisting of a Global System for Mobile Communications ("GSM") protocol, a Code Division Multiple Access ("CDMA") protocol, a cellular telephone using a CDMA 2000 protocol, and a Time Division Multiple Access ("TDMA") protocol ~~and an equivalent thereof~~.

4) (cancelled)

5) (currently amended) The system of Claim 1, wherein the software component includes a domain naming service ("DNS") software component ~~capable of translating~~ to translate between a human readable name and ~~an~~ a second Internet Protocol ("IP") address.

6) (currently amended) The system of Claim 1, wherein the software component includes a security software component ~~capable of controlling~~ to control access between the cellular network and the first wireless device.

7) (previously presented) The system of Claim 1, wherein the second wireless device is a thin terminal.

8) (previously presented) The system of Claim 1, wherein the second wireless device includes a Bluetooth™ processor and a 2.4 GHZ transmitter.

9) (previously presented) The system of Claim 1, wherein the first wireless device includes a Bluetooth™ processor and a 2.4 GHZ transmitter.

10) (previously presented) The system of Claim 1, wherein the second wireless device includes a Bluetooth™ processor and a 5.7 GHZ transmitter.

11) (previously presented) The system of Claim 1, wherein the first wireless device includes a Bluetooth™ processor and a 5.7 GHZ transmitter.

12) (currently amended) The system of Claim 1, wherein the software component includes a plug and play software component ~~capable of loading and executing~~ to load and execute software for the second wireless device.

13) (currently amended) The system of Claim 1, wherein the software component includes a PIN number management software component ~~capable of obtaining and providing~~ to obtain and provide PIN numbers.

14) (currently amended) The system of Claim 1, wherein the software component includes a service repository software component ~~capable of obtaining~~ to obtain an availability of a service from the second wireless device.

15) (currently amended) The system of Claim 1, wherein the second wireless device includes an application software component ~~capable of providing~~ to provide a service; and, wherein the software component includes a management software component ~~capable of accessing~~ to access the service.

16) (currently amended) A system for providing access to the Internet, comprising:

a first wireless device, in a short distance wireless network ~~coupled to a cellular network~~, having a software component ~~capable of accessing~~ to access information from the Internet by communicating with a ~~the~~ cellular network in response ~~responsive~~ to a first short-range radio signal;

a second wireless device, in the short distance wireless network ~~coupled to the first wireless device~~, ~~capable of providing~~ to provide the first short-range radio signal; and,

a third wireless device, in the short distance wireless network ~~coupled to the first wireless device~~, ~~capable of providing~~ to provide a second short-range signal, wherein the second wireless device communicates with the third wireless device through the first wireless device.

17) (currently amended) A system for providing access to the Internet, comprising:

a first wireless device, in a short distance wireless network ~~coupled to a cellular network~~, having a software component ~~capable of accessing~~ to access information from the Internet by communicating with a ~~the~~ cellular network ~~responsive~~ in response to a first short-range radio signal;

a second wireless device, in a short distance wireless network ~~coupled to the first wireless device~~, ~~capable of providing~~ to provide the first short-range radio signal; and,

a third wireless device, in a short distance wireless network ~~coupled to the first wireless device~~, ~~capable of providing~~ to provide a second short-range signal, wherein the first wireless device provides access to the Internet for the second and third wireless devices.

18) (previously presented) The system of Claim 1, wherein the software component operates with an operating system software component.

19) (previously presented) The system of Claim 18, wherein the operating system software component is a Linux operating system.

20) (previously presented) The system of Claim 18, wherein the operating system software component is a EPOC operating system.

21) (previously presented) The system of Claim 18, wherein the operating system software component is a PocketPCoperating system.

22) (previously presented) The system of Claim 18, wherein the operating system software component is a Stinger operating system.

23) (currently amended) The system of Claim 1, wherein the first wireless device further includes 1) an application software component ~~capable of providing~~ to provide a service and 2) a server software component ~~coupled to the software component~~.

24) (previously presented) The system of Claim 1, wherein the first wireless device further includes a firewall software component.

25) (previously presented) The system of Claim 1, wherein the first wireless device further includes a virtual private network ("VPN") software component.

26) (currently amended) A system for providing access to information on a cellular network, comprising:

a first wireless device, in a short distance wireless network, ~~capable of providing~~ to provide a first short-range radio signal; and,

a second wireless device, in the short distance wireless network ~~coupled to the first~~

~~wireless device~~ and the cellular network, ~~capable of~~ to selectively ~~transferring~~ transfer information, including Internet Protocol ("IP") data packets, between the first wireless device and the cellular network ~~responsive~~ in response to a security software component.

27) (currently amended) The system of claim 26, wherein the security software component is a firewall software component ~~capable of controlling~~ to control access to the cellular network.

28) (currently amended) The system of claim 26, wherein the security software component is a virtual private network ("VPN") ~~capable of controlling~~ to control access to the cellular network-.

29) (currently amended) The system of claim 26, wherein the security software component is a uniform resource locator ("URL") filter ~~capable of controlling~~ to control access to the cellular network.

30) (currently amended) The system of claim 26, wherein the first short-range radio signal is selected from a group consisting of a HomeRF signal, an 802.11 signal and Bluetooth™ ~~an equivalent thereof~~.

31) (previously presented) The system of claim 26, wherein the information is provided in the form of data packets.

32) (cancelled)

33) (previously presented) The system of claim 26, wherein the second wireless device is coupled to the cellular network by either an Ethernet connection, DSL connection or a cable modem.

34) (previously presented) The system of claim 26, wherein the second wireless device is coupled to the cellular network by a landline network.

35) (previously presented) The system of claim 26, wherein the first wireless device provides execution space for executable software from the second wireless device.

36) (currently amended) A handheld device for providing a short distance wireless network ~~personal network~~, comprising:

a storage device;

a processor, coupled to the storage device; and,

the storage device to store ~~storing~~ a software component ~~for controlling the processor~~;

and, the processor operative with the software component to:

provide an Internet Protocol ("IP") data packet from the handheld device to a terminal using short-range radio signals,

control access between the short distance wireless network ~~personal network~~ and a cellular network,

translate between a first IP address provided to the handheld device and a second IP address ~~supplied by the handheld device~~ for the terminal provided by the handheld device in the short distance wireless network ~~personal network~~.

37) (currently amended) The device of Claim 36, further comprising:

a Bluetooth™ transmitter, coupled to the processor, ~~capable of generating~~ to generate the short-range radio signals.

38) (previously presented) The device of Claim 36, further comprising:

a GSM transmitter, coupled to the processor.

39) (previously presented) The device of Claim 36, wherein the personal network provides a service and includes an application software component and, wherein the software

component includes a network software component to disconnect the application software component from the service.

40) (previously presented) The device of Claim 36, wherein the software component includes a plug and play software component to identify the terminal in the personal network and obtain an application software component for the terminal.

41) (previously presented) The device of Claim 36, wherein the software component includes a PIN number management software component to provide a PIN number used in pairing the handheld device to the terminal in the personal network.

42) (previously presented) The device of Claim 36, wherein the software component includes a service repository software component to provide services available in the personal network.

43) (previously presented) The device of Claim 36, wherein the software component includes a management software component.

44) (currently amended) A first wireless handheld device, comprising:

a storage device;

a processor, coupled to the storage device; and,

the storage device ~~storing~~ to store a software component ~~for controlling the processor~~; and, the processor operative with the software component to:

access the Internet through a cellular network,

provide a first short-range radio signal to a second wireless handheld device and a second short-range radio signal to a third wireless handheld device,

control access between the Internet and the first, second and third wireless handheld devices,

translate between a first Internet Protocol ("IP") address provided to the first wireless handheld device from the cellular network and a second ~~IP~~ address ~~supplied by the first wireless~~

~~handheld device~~ for the second wireless handheld device provided by the first wireless handheld device, and a third ~~IP~~ address ~~supplied by the first wireless device~~ for the third wireless handheld device provided by the first wireless device.

45) (currently amended) The first wireless handheld device of Claim 44, wherein the second wireless handheld device is selected from a group consisting of a desktop computer, a laptop computer, a personal digital assistant, a headset, a pager, a watch, and a thin terminal a digital camera ~~and an equivalent thereof~~.

46) (previously presented) The first wireless handheld device of Claim 44, wherein the second wireless handheld device is a thin terminal.

47) (previously presented) The first wireless handheld device of Claim 44, wherein the first wireless handheld device includes a 2.4 GHZ transmitter coupled to the processor.

48) (previously presented) The first wireless handheld device of Claim 44, wherein the first wireless handheld device includes a 5.7 GHZ transmitter coupled to the processor.

49) (currently amended) The first wireless handheld device of Claim 44, wherein the software component includes an application software component ~~capable of providing~~ to provide a service to the second wireless handheld device.

50) (currently amended) An article of manufacture, including a computer readable medium, comprising:

a short-range radio software component ~~for communicating~~ to communicate with a device in a short distance wireless network by using a short-range radio signal;

a cellular software component ~~for communicating~~ to communicate with a cellular network by using a cellular signal; and,

a network software component ~~for~~ to selectively ~~transferring a~~ transfer an Internet Protocol ("IP") data packet between the device and the cellular network.

51) (previously presented) The article of manufacture of Claim 50, further comprising security software component to control access between the short distance wireless network and the cellular network.

52) (previously presented) The article of manufacture of Claim 50, further comprising a network address translator software component to translate between a first Internet Protocol ("IP") address and a second IP address.

53) (currently amended) The article of manufacture of Claim 50 further comprising a domain naming service ("DNS") software component ~~capable of translating~~ to translate between a human readable name and an Internet Protocol ("IP") address.

54) (previously presented) The article of manufacture of Claim 50, further comprising a plug and play software component to identify the terminal in the short distance wireless network and obtain an application software component for the terminal.

55) (previously presented) The article of manufacture of Claim 50, wherein the article of manufacture is a memory storage device in a cellular telephone.

56) (previously presented) The article of manufacture of Claim 50, wherein the short-range radio software component is a Bluetooth™ component.

57) (previously presented) The article of manufacture of Claim 50, wherein the cellular software component is a GSM component.

58) (currently amended) A handheld device for providing a short distance wireless network, comprising:

a storage device;

means for selectively providing a plurality of services to a plurality of application software components in the short distance wireless network; and

means for selectively transferring ~~a~~ an Internet Protocol ("IP") data packet between a cellular network and a selected application software component in the plurality of application software components ~~terminal~~ in the short distance wireless network.

REMARKS

The above Amendments and these Remarks are in reply to the outstanding Office action. Claims 1-3, 5-31 and 33-58 are presented herewith for consideration. Claims 1-3, 5-6, 12-17, 23, 26-30, 36-37, 44-45, 49-50, 53 and 58 have been amended. Claims 4 and 32 have been cancelled.

The Applicants' attorney filed Electronic Information Disclosure Statements on December 24, 2003, April 19, 2004 and June 9, 2004. The Examiner is respectfully requested to review the cited art and return initialed copies of the Statements.

Also filed concurrently herewith is an Electronic Information Disclosure Statement. The Examiner is respectfully requested to review the cited art and return an initialed copy of the Statement.

I. Rejection of Claims 3 and 30 Under 35 U.S.C. §112

Claims 3 and 30 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. As suggested by the Examiner, claims 3 and 30 have been amended to remove "an equivalent thereof." Claims 2 and 45 have been likewise amended. Also, the claims have been amended to remove "the capable of" language.

Accordingly, it is respectfully requested the Examiner withdraw the rejection of claims 3 and 30 under 35 U.S.C. §112, second paragraph.

II. Rejection of Claims 1-58 Under 35 U.S.C. §102(a)

Claims 1-58 are rejected under 35 U.S.C. §102(a) as being anticipated by *Karagiannis* ("Mobility support for ubiquitous Internet access").

As with the previously filed Declaration of Amit Haller Pursuant to 37 C.F.R. §1.131 "swearing behind" the *Dorenbosch et al.* reference, the applicants can swear behind the *Karagiannis* reference and reserve the right to do so. However, *Karagiannis* clearly does not teach or suggest the amended claims as described below. Therefore, a Declaration is not believed necessary and is not provided at this time.

Karagiannis "investigate[s] a network architecture...[that] at the moment [is] not able of providing a complete solution" Page 3, first paragraph. The designer admits that the disclosed

network architecture is not currently operable and lists numerous "open issues" that first must be "solved in the future" in order for the investigated network architecture to operate. Pages 3, 64 and 65. In direct contrast, the present application and claims teach a system that operates without waiting for open issues to be solved in the future. In fact, the assignee of the present application is providing products to the marketplace today that are currently being used and enjoyed by consumers based on the teachings of the present application without waiting for open issues to be solved in the future.

A. Claim 1

Nevertheless, the amended claims are distinguished from *Karagiannis.*

First, claim 1 calls for "a first wireless device...having a software component to access information from the Internet by communicating with a cellular network in response to a first short-range radio signal..." *Karagiannis* teaches a "host X" that access two subnetworks: a UMTS(UTRAN) or cellular network and a Bluetooth network or short distance wireless network. Figure 2-9. Host X in the UMTS network accesses the IP network by way of a UMTS base station (Node B). Also, Host X in the Bluetooth network accesses the IP network by way of a network access point (NAP) or Bluetooth base station. However, *Karagiannis* does not teach Host X accessing a UMTS network "in response to a first short-range radio signal..." from "a second wireless device, in the short distance wireless network" or a Bluetooth terminal. Emphasis added.

Second, claim 1 calls for "a first wireless device, in a short distance wireless network, having ...a network address translator software component to translate between a first Internet Protocol ("IP") address provided to the first wireless device [in the short distance wireless network] from the cellular network and a second address for the second wireless device [in the short distance wireless network] provided by the first wireless device."

In the Office Action, the Examiner stated that "Figure 3-4; Translation functions" teaches the "network address translator software component to translate..." However, Figure 3-4 teaches "QoS management functions for UMTS" and not "a short distance wireless network." Section 3.3 of *Karagiannis* teaches a Bluetooth network; while section 3.2 teaches the UMTS network.

Third, there is no teaching that "translation functions" translate "between a first Internet Protocol ("IP") address provided to the first wireless device from the cellular network and a

second address for the second wireless device..." *Karagiannis* teaches "translat[ing] external signaling to internal signaling" and not addresses. Page 21.

Fourth, there is no teaching in *Karagiannis* that "a second address for the second wireless device [or a Bluetooth terminal] [is] provided by the first wireless device [or Host X]."

B. Claims 2-3, 5-15 and 18-25

Claims 2-3, 5-15 and 18-25 depend from claim 1 and therefore are patentable for at least similar reasons described above.

Further, claim 5 calls for a first wireless device, in a short distance wireless network, having "a domain naming service ("DNS") software component to translate between a human readable name and a second Internet Protocol ("IP") address." In rejecting claim 5, the Examiner cited Figures 3-3 and 3-4 and stated that the DNS software component is "inherent." However, as described above Figures 3-3 and 3-4 refer to a UMTS network; while *Karagiannis* teaches a Bluetooth network in section 3.3 that does not have a DNS software component.

C. Claims 16-18

Claims 16 and 17 call for "access[ing] information from the Internet by communicating with a cellular network in response to a first short-range radio signal..." and therefore are patentable for at least the reasons stated above in regard to claim 1.

D. Claims 26-35

Claim 26 calls for "a second wireless device, in the short distance wireless network and the cellular network, to selectively transfer information ... between the first wireless device and the cellular network in response to a security software component." In rejecting claims 26-28, the Examiner stated that "ADD" at page 14, Figure 3-1 and section 3-1 of *Karagiannis* teach "a second wireless device...to selectively transfer information, including Internet Protocol ("IP") data packets, between the first wireless device and the cellular network in response to a security software component." However, *Karagiannis* states ADD is a "functional entity that could be added in the future." Emphasis added. "Such functional entities could be the authentication and accounting management functional entities." Page 16 of *Karagiannis*. This future functional

entity is not "a security software component" "to selectively transfer information, including Internet Protocol ("IP") data packets, between the first wireless device and the cellular network..." There is no teaching that *Karagiannis'* authentication and accounting management functional entities "selectively transfer information..." Also, ADD is used by a "Technology Selector" entity or TS in the Host X in which the designer admits "the development of the Technology Selector [is] an open issue." Page 16 of *Karagiannis*. In sum, the Examiner is using a future functional entity that requires another functional entity that needs to be developed as anticipating claim 26.

Second, *Karagiannis* teaches "security management" in an "IGSN" which is in the "IP network" and not Host X. *Karagiannis*, page 12, IGSN description.

Third, *Karagiannis* does not teach "selectively transfer... Internet Protocol ("IP") data packets ..." The Examiner stated on page 10 of the Office Action in regard to claim 32 that *Karagiannis* teaches this limitation at page 12, "packet data protocol context." However, page 12 does not teach transferring "Internet Protocol ("IP") data packets" between a "Mobile phone" and "Bluetooth Terminal." *Karagiannis* teaches away from this limitation by describing an "IP network" that does not include the Bluetooth and UMTS networks as shown in Figure 2-9.

The Examiner has rejected claims 27 and 28 similar to the rejection of claim 26. Therefore, claims 27 and 28 are patentable for at least the reasons stated above in regard to claim 26.

Claims 29-31 and 33-35 depend from claim 26 and therefore are patentable for at least similar reasons described above in regard to claim 26.

E. Claims 36-49

In rejecting claim 36, the Examiner used the TS as teaching the "processor" of claim 36. However, as described above, *Karagiannis* teaches a TS that needs to be developed and therefore TS does not anticipate claim 36.

In rejecting claim 36, the Examiner states "page 2, left column, second paragraph, IP program router" teaches "provide an Internet Protocol (IP) data packet from the Mobile phone to the Bluetooth Terminal." However, page 2 of *Karagiannis* is the table of context. Clarification is respectfully requested.

Also, similar to claim 1, claim 36 calls for "translat[ing] between a first IP address provided to the handheld device and a second IP address for the terminal provided by the handheld device in the short distance wireless network." *Karagiannis,* and in particular page 20, does not teach "a second IP address for the terminal provided by the handheld device in the short distance wireless network." Page 20 teaches a UMTS architecture and not "a short distance wireless network" in which "Internet Protocol ("IP") data packets" are provided "from the handheld device to a terminal using short-range radio signals..."

Claims 37-42 depend from claim 36 and therefore are patentable for at least similar reasons described above in regard to claim 36.

Claim 44 is patentable for similar reasons stated above in regard to claim 36.

Claims 45-49 depend from claim 44 and therefore are patentable for at least similar reasons described above in regard to claim 36.

F. Claims 50-57

Claim 50 calls for "a network software component to selectively transfer an Internet Protocol ("IP") data packet between the device [in the short distance wireless network] and the cellular network" that is not taught by *Karagiannis.* Claim 50, similar to claim 26 described above, calls for "selectively transfer[ing] an Internet Protocol ("IP") data packet" in a short distance wireless network that is not taught by *Karagiannis.*

Further, at page 15 of the Office Action, the Examiner stated "ADD" and "TS" among other components teach the "network software component..." As described above, TS is a component that needs to be developed and ADD uses TS and therefore does not anticipate claim 50.

G. Claim 58

Claim 58 calls for "means for selectively transferring an Internet Protocol ("IP") data packet between a cellular network and a selected application software component in the plurality of application software components in the short distance wireless network."

In rejecting claim 58, the Examiner uses TS that is not yet developed as described above and therefore does not anticipate claim 58.

Further, TS "select[s] a certain underlying radio technology" such as UMTS or Bluetooth.

Karagiannis, Page 16. Therefore, TS does not "selectively transfer an Internet Protocol ("IP") data packet between a cellular network and a selected application software packet..." Emphasis added.

Accordingly, it is respectfully requested the Examiner withdraw the rejection of claims 1-3, 5-31 and 33-58 under 35 U.S.C. §102(a).

III. Rejection of Claims 19-22 Under 35 U.S.C. §103(a)

Claims 19-22 are rejected under 35 U.S.C. §103(a) as being unpatentable over *Karagiannis* in view of *Parekh* ("OPERATING SYTEMS ON WIRELESS HANDHELD DEVICES").

Claims 19-22 ultimately depend from claim 1 and therefore are patentable for at least similar reasons described above in regard to claim 1.

Accordingly, it is respectfully requested the Examiner withdraw the rejection of claims 19-22 under 35 U.S.C. §103(a).

IV. Rejection of Claims 19-22 Under 35 U.S.C. §103(a)

Claims 19-22 are rejected under 35 U.S.C. §103(a) as being unpatentable over *Karagiannis* in view of *Dell* ("WHITE PAPER, HANDHELD DEVICES: COMPARING THE MAJOR PLATFORMS").

Claims 19-22 ultimately depend from claim 1 and therefore are patentable for at least similar reasons described above in regard to claim 1.

Accordingly, it is respectfully requested the Examiner withdraw the rejection of claims 19-22 under 35 U.S.C. §103(a).

V. Art Made of Record and Not Relied Upon

Applicant's attorney has reviewed the art made of record and not relied upon -- U.S. Patent No.6,452,910 -- and believes the art made of record and not relied upon is no more relevant than the relied upon art.

VI. Conclusion

Based on the above amendments and these remarks, reconsideration of claims 1-3, 5-31 and 33-58 is respectfully requested.

The Commissioner is authorized to charge any underpayment or credit any overpayment to Deposit Account No. 501826 for any matter in connection with this response, including any fee for extension of time, which may be required.

Respectfully submitted,

Date: January 7, 2005

By: _____
Kirk J. DeNiro
Reg. No. 35,854

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U.S. Patent and Trademark Office; U.S. DEPARMENT OF COMMERCE

PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a) **FY 2005** ***(Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).)***	Docket Number (Optional) IXIM-01000US0
Application Number 09/850,399	Filed May 7, 2001
For A System, Device And Computer Readable Medium For Providing A Managed Wireless Network Using Short-Range Radio Signals	
Art Unit 2666	Examiner Duong, F.

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

	Fee	Small Entity Fee	
☐ One month (37 CFR 1.17(a)(1))	$120	$60	$
☐ Two months (37 CFR 1.17(a)(2))	$450	$225	$
☑ Three months (37 CFR 1.17(a)(3))	$1020	$510	$ 1020
☐ Four months (37 CFR 1.17(a)(4))	$1590	$795	$
☐ Five months (37 CFR 1.17(a)(5))	$2160	$1080	$

☐ Applicant claims small entity status. See 37 CFR 1.27.

01/11/2005 MWOLDGE1 00000022 09850399
01 FC:1253 1020.00 OP

☑ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☑ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number 501826. I have enclosed a duplicate copy of this sheet.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the

☐ applicant/inventor.

☐ assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed (Form PTO/SB/96).

☑ attorney or agent of record. Registration Number 35,854

☐ attorney or agent under 37 CFR 1.34. Registration number if acting under 37 CFR 1.34 _____

Signature 1/7/05	January 7, 2005 Date
Kirk J. DeNiro Typed or printed name	415-369-9660 Telephone Number

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.

☐ Total of _____ forms are submitted.

PTO/SB/21 (09-04)
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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission

Application Number	09/850,399
Filing Date	May 7, 2001
First Named Inventor	Haller
Art Unit	2666
Examiner Name	Duong, F.
Attorney Docket Number	IXIM-01000US0

ENCLOSURES *(Check all that apply)*

- [x] Fee Transmittal Form
- [x] Fee Attached
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  - [ ] Affidavits/declaration(s)
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- [ ] Reply to Missing Parts/ Incomplete Application
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- [ ] CD, Number of CD(s) _____
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Date	January 7, 2005	Reg. No.	35,854

CERTIFICATE OF TRANSMISSION/MAILING

I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below:

Signature			
Typed or printed name	Kirk J. DeNiro	Date	January 7, 2005

PTO/SB/17 (12-04)
Approved for use through 07/31/2006. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Effective on 12/08/2004.
Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).

FEE TRANSMITTAL
For FY 2005

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT	($) 1,020.00

Complete if Known	
Application Number	09/850,399
Filing Date	May 7, 2001
First Named Inventor	Haller
Examiner Name	Duong, F.
Art Unit	2666
Attorney Docket No.	IXIM-01000US0

METHOD OF PAYMENT (check all that apply)

☑ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): _____

☑ Deposit Account Deposit Account Number: 501826 Deposit Account Name: Vierra Magen Marcus Harmon & DeNiro LLP

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☐ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, **except for the filing fee**

☑ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17 ☑ Credit any overpayments

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FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

Application Type	FILING FEES Fee ($)	FILING FEES Small Entity Fee ($)	SEARCH FEES Fee ($)	SEARCH FEES Small Entity Fee ($)	EXAMINATION FEES Fee ($)	EXAMINATION FEES Small Entity Fee ($)	Fees Paid ($)
Utility	300	150	500	250	200	100	
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description	Fee ($)	Small Entity Fee ($)
Each claim over 20 or, for Reissues, each claim over 20 and more than in the original patent	50	25
Each independent claim over 3 or, for Reissues, each independent claim more than in the original patent	200	100
Multiple dependent claims	360	180

Total Claims	Extra Claims	Fee ($)	Fee Paid ($)
_____ - 20 or HP =	_____ x	_____ =	0

HP = highest number of total claims paid for, if greater than 20

Indep. Claims	Extra Claims	Fee ($)	Fee Paid ($)
_____ - 3 or HP =	_____ x	_____ =	0

HP = highest number of independent claims paid for, if greater than 3

Multiple Dependent Claims Fee ($)	Fee Paid ($)
_____	_____

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee ($)	Fee Paid ($)
_____ - 100 =	_____ / 50 =	_____ (round up to a whole number) x	_____ =	0

4. OTHER FEE(S)

	Fees Paid ($)
Non-English Specification, $130 fee (no small entity discount)	
Other: Extension Fee	1,020.00

SUBMITTED BY

Signature		Registration No. (Attorney/Agent) 35,854	Telephone 415-369-9660
Name (Print/Type)	Kirk J. DeNiro	1/7/05	Date January 7, 2005

ELECTRONIC INFORMATION DISCLOSURE STATEMENT

Electronic Version v18

Stylesheet Version v18.0

Title of Invention	A SYSTEM, DEVICE AND COMPUTER READABLE MEDIUM FOR PROVIDING A MANAGED WIRELESS NETWORK USING SHORT-RANGE RADIO SIGNALS

Application Number : 09/850399

Confirmation Number: 2705

First Named Applicant: Amit Haller

Attorney Docket Number: IXIM-01000US0

Art Unit: 2666

Examiner: Frank Duong

Search string: (6654616 or 6463078 or 6243581 or 5805166 or 20040001467 or 20030054765 or 20020063472 or 20030114105).pn

US Patent Documents

Note: Applicant is not required to submit a paper copy of cited US Patent Documents

init	Cite.No.	Patent No.	Date	Patentee	Kind	Class	Subclass
	1	6654616	2003-11-25	Pope et al.			
	2	6463078	2002-10-08	Engstrom et al.			
	3	6243581	2001-06-05	Jawanda			
	4	5805166	1998-09-08	Hall et al.			

US Published Applications

Note: Applicant is not required to submit a paper copy of cited US Published Applications

init	Cite.No.	Pub. No.	Date	Applicant	Kind	Class	Subclass
	1	20040001467	2004-01-01	Cromer et al.			
	2	20030054765	2003-03-20	Botteck			
	3	20020063472	2002-05-30	Irvin			
	4	20030114105	2003-06-19	Haller et al.			

Signature

Examiner Name	Date

TRANSMITTAL

Electronic Version v1.1

Stylesheet Version v1.1.0

Title of Invention	A SYSTEM, DEVICE AND COMPUTER READABLE MEDIUM FOR PROVIDING A MANAGED WIRELESS NETWORK USING SHORT-RANGE RADIO SIGNALS

Application Number :	09/850399
Date :	2001-05-07
First Named Applicant:	Haller Amit
Confirmation Number:	2705
Attorney Docket Number:	IXIM-01000US0

I hereby certify that the use of this system is for OFFICIAL correspondence between patent applicants or their representatives and the USPTO. Fraudulent or other use besides the filing of official correspondence by authorized parties is strictly prohibited, and subject to a fine and/or imprisonment under applicable law.

I , the undersigned, certify that I have viewed a display of document(s) being electronically submitted to the United States Patent and Trademark Office, using either the USPTO provided style sheet or software, and that this is the document(s) I intend for initiation or further prosecution of a patent application noted in the submission. This document(s) will become part of the official electronic record at the USPTO.

Submitted By:	Elec. Sign.	Sign. Capacity
Kirk J DeNiro Registered Number: 35854	/Kirk J. DeNiro/	Attorney

Documents being submitted:	Files
us-fee-sheet	1000.EIDS-003-usfees.xml us-fee-sheet.xsl us-fee-sheet.dtd
us-ids	1000.EIDS-003-usidst.xml us-ids.dtd us-ids.xsl
Comments	

FEE TRANSMITTAL

Electronic Version v10

Stylesheet Version v10

Title of Invention	A SYSTEM, DEVICE AND COMPUTER READABLE MEDIUM FOR PROVIDING A MANAGED WIRELESS NETWORK USING SHORT-RANGE RADIO SIGNALS

Application Number :	09/850399
Date :	2001-05-07
First Named Applicant:	Amit Haller
Attorney Docket Number:	IXIM-01000US0
Art Unit:	2666
Examiner :	Frank Duong

TOTAL FEE AUTHORIZED $ 180

Patent fees are subject to annual revisions on or about October 1st of each year.

Fee Description	Fee Code	Amount $	Fee Paid $
Submission Of Information Disclosure Stmt Fee	1806	180	180

AUTHORIZED BILLING INFORMATION

The commissioner is hereby authorized to charge indicated fees and credit any overpayments to:

Deposit account number:	501826
Access Code	****
Deposit name:	Vierra Magen Marcus Harmon DeNiro LLP
Deposit authorized name:	Kirk J DeNiro
Signature:	/Kirk J. DeNiro/
Date (YYYYMMDD):	2005-01-07

Charge Any Additional Fee Required Under 37 C.F.R. Sections 1.16 and 1.17.

ACKNOWLEDGEMENT RECEIPT

Electronic Version 1.1

Stylesheet Version v1.1.1

Title of Invention	A SYSTEM, DEVICE AND COMPUTER READABLE MEDIUM FOR PROVIDING A MANAGED WIRELESS NETWORK USING SHORT-RANGE RADIO SIGNALS

Submision Type : Information Disclosure Statement

Application Number: 09/850399

EFS ID: 75533

Server Response:

Confirmation Code	Message
ISVR1	Submission was successfully submitted - Even if Informational or Warning Messages appear below, please do not resubmit this application
ICON1	2705
USPTOEFSNotice	For assistance with e-filing a patent application, contact the Patent Electronic Business Center: Toll-Free Number:1(866) 217-9197 Website: http://www.uspto.gov/ebc/

First Named Applicant: Amit Haller

Attorney Docket Number: IXIM-01000US0

Timestamp: 2005-01-07 13:13:02 EDT

From: us

File Listing:

Doc. Name	File Name	Size (Bytes)	Date Produced (yyyymmdd)
us-fee-sheet	1000.EIDS-003-usfees.xml	1638	2005-01-07
us-fee-sheet	us-fee-sheet.xsl	25930	2005-01-07
us-fee-sheet	us-fee-sheet.dtd	11968	2005-01-07
us-ids	1000.EIDS-003-usidst.xml	2135	2005-01-07
us-ids	us-ids.dtd	7763	2005-01-07
us-ids	us-ids.xsl	12026	2005-01-07
package-data	1000.EIDS-003-pkda.xml	2268	2005-01-07
package-data	package-data.dtd	27025	2005-01-07
package-data	us-package-data.xsl	19263	2005-01-07
	Total files size	110016	

Message Digest: 2286bd7f28c425355a149173566cfb836667f87d

Digital Certificate Holder Name: cn=Kirk James DeNiro,ou=Registered Attorneys,ou=Patent and Trademark Office,ou=Department of Commerce,o=U.S. Government,c=US

09850399

PATENT APPLICATION FEE DETERMINATION RECORD
Effective October 1, 2000

Application or Docket Number: IXIM-01000USO

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS	57	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	57 minus 20=	* 37
INDEPENDENT CLAIMS	5 minus 3 =	* 2
MULTIPLE DEPENDENT CLAIM PRESENT		☐

* If the difference in column 1 is less than zero, enter "0" in column 2

SMALL ENTITY TYPE ☐		OR	OTHER THAN SMALL ENTITY	
RATE	FEE		RATE	FEE
BASIC FEE	355.00	OR	BASIC FEE	710.00
X$ 9=	333	OR	X$18=	
X40=	80	OR	X80=	
+135=		OR	+270=	
TOTAL	768	OR	TOTAL	

10/14/03

CLAIMS AS AMENDED - PART II

AMENDMENT A

	(Column 1)		(Column 2)	(Column 3)
	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total	* 57	Minus	**	=
Independent	* 3	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X40=		OR	X80=	
+135=		OR	+270=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT B

	(Column 1)		(Column 2)	(Column 3)
	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X40=		OR	X80=	
+135=		OR	+270=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT C

	(Column 1)		(Column 2)	(Column 3)
	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X40=		OR	X80=	
+135=		OR	+270=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20."
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3."
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

FORM PTO-875
(Rev. 8/00)

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/850,399	05/07/2001	Amit Haller	IXIM-01000US0	2705

28554 7590 07/07/2004

VIERRA MAGEN MARCUS HARMON & DENIRO LLP
685 MARKET STREET, SUITE 540
SAN FRANCISCO, CA 94105

EXAMINER	
DUONG, FRANK	

ART UNIT	PAPER NUMBER
2666	19

DATE MAILED: 07/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/850,399	Applicant(s) HALLER ET AL.	
	Examiner Frank Duong	Art Unit 2666	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-58* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-58* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *11*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is a response to the Preliminary Amendment dated 04/09/04. Claims 1-58 are pending in the application.

Information Disclosure Statement

2. The information disclosure statement filed 12/24/03 complies with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609. It has been considered and placed in the application file.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 3 and 30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As per claim 3, line 5, the term "an equivalent thereof" is indefinite because it is unclear what the term refers to and it does not clearly set forth the metes and bounds of the patent protection desired.

As per claim 30, lines 2-3, the term "an equivalent thereof" is indefinite because it is unclear what the term refers to and it does not clearly set forth the metes and bounds of the patent protection desired.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

4. Claims 1-58 are rejected under 35 U.S.C. 102(a) as being anticipated by Karagiannis (Mobility support for ubiquitous Internet access, ERICSSON Open report, pages 1-70, December 21, 2000).

(*note: The term "capable of" does not provide a fixed, physical or definite functionality to the claimed elements. All devices in the system of the applied reference are "capable of" performing the claimed limitations*)

Regarding **claim 1**, in accordance with Karagiannis reference entirety, Karagiannis discloses a system (*Figures 2-8, 2-9 and 3-1*) for providing access to the Internet (*IP network*), comprising:

a first wireless device (*page 11; Figure 2-8 and page 13; Host X*), coupled to the cellular network (*UTRAN*), having a software component (*Figure 3-1; Application Client*) capable of accessing information from the internet (IP network) (*page 11, first paragraph; Host X is capable of being connected to UMTS and Bluetooth*), wherein the first wireless device (Host X) is capable of communicating with the cellular network (UMTS) and receiving the first short-range radio signal (*page 11, Figure 2-8 and the description in first paragraph and thereinafter*);

a second wireless device (page 11, Figure 2-8; Bluetooth Terminal (BT)), coupled to (Bluetooth link) the first wireless device (*Mobile phone*) capable of providing the first short-range radio signal (*Bluetooth signal as depicted Bluetooth link*).

Regarding **claim 2**, in addition to features recited in base claim 1 (*see rationales pertaining the rejection of base claim 1 discussed above*), Karagiannis further discloses wherein the second wireless device (BT) is selected from a group consisting of desktop computer, a laptop computer, a personal digital assistant, a headset, a pager, a printer, a watch, a digital camera and an equivalent thereof (*page 11, Figure 2-8 and its description*).

Regarding **claim 3**, in addition to features recited in base claim 1 (*see rationales pertaining the rejection of base claim 1 discussed above*), Karagiannis further discloses wherein the first wireless device is a cellular telephone using a protocol selected from a group consisting of a Global System for Mobile Communication ("GSM") protocol, a Code Division Multiple Access ("CDMA") protocol, a CDMA2000 protocol, a Time Division Multiple Access ("TDMA") protocol and an equivalent thereof (*the listed limitations are equivalent to disclosed UMTS or UTRAN on page 12*).

Regarding **claim 4**, in addition to features recited in base claim 1 (*see rationales pertaining the rejection of base claim 1 discussed above*), Karagiannis further discloses wherein the software component includes a network address translator software component (*Figure 3-4; Translation functions*) capable of transmitting between a first Internet Protocol ("IP") address provided to the first wireless device and a second IP

address supplied by the first wireless device for the second wireless device (*see pages 20-21*).

Regarding **claim 5**, in addition to features recited in base claim 1 (*see rationales pertaining the rejection of base claim 1 discussed above*), Karagiannis further discloses wherein the software component includes a domain naming service ("DNS") software component capable of translating between a human readable name and an Internet Protocol ("IP") address (*not shown; inherent as depicted in Figures 3-3 and 3-4*).

Regarding **claim 6**, in addition to features recited in base claim 1 (*see rationales pertaining the rejection of base claim 1 discussed above*), Karagiannis further discloses wherein the software component includes a security software component (*Figure 3-4; Adm/Cap*) capable of controlling access between the cellular network and the first wireless device (*page 21*).

Regarding **claim 7**, in addition to features recited in base claim 1 (*see rationales pertaining the rejection of base claim 1 discussed above*), Karagiannis further discloses wherein the second wireless device (BT) is a thin terminal (*page 11; Figure 2-8; e.g. laptop, pda*)

Regarding **claim 8**, in addition to features recited in base claim 1 (*see rationales pertaining the rejection of base claim 1 discussed above*), Karagiannis further discloses wherein the second wireless device (BT) includes a Bluetooth Processor and a 2.4 Ghz transmitter (*not shown; inherent as depicted in Figure 2-8 or other Figures depicted thereinafter*).

Regarding **claim 9**, in addition to features recited in base claim 1 (*see rationales pertaining the rejection of base claim 1 discussed above*), Karagiannis further discloses wherein the first wireless device (Mobile Phone) includes a Bluetooth Processor and a 2.4 Ghz transmitter (*not shown; inherent as depicted in Figure 2-8*).

Regarding **claim 10**, in addition to features recited in base claim 1 (*see rationales applied in the rejection of base claim 1 discussed above*), Karagiannis further discloses wherein the second wireless device includes a 5.7 Ghz transmitter (*not shown; inherent as depicted in Figure 2-8*).

Regarding **claim 11**, in addition to features recited in base claim 1 (*see rationales applied in the rejection of base claim 1 discussed above*), Karagiannis further discloses wherein the first wireless device (*Mobile phone of Figure 2-8*) includes a 5.7 Ghz transmitter (*not shown; inherent as depicted in Figure 2-8*).

Regarding **claims 12-15**, in addition to features recited in base claim 1 (*see rationales applied in the rejection of base claim 1 discussed above*), Karagiannis further discloses the claimed software components in a manner set forth as claimed (*see Figures 3-3 to 3-5 and pages 20-22*)

Regarding **claim 16**, in accordance with Karagiannis reference entirety, Karagiannis discloses a system (*Figures 1-3*) for providing access to the Internet (*216*), comprising:

a first wireless device (*Host X*), coupled to (Figure 2-9) the cellular network (*UTRAN*), having a software component capable of accessing information from the

internet (IP network) by communicating with the cellular network (UTRAN) responsive to a first short-range radio signal (Bluetooth link) (*page 11 and Figure 2-8*);

a second wireless device (Bluetooth Terminal), coupled to (Bluetooth link) the first wireless device (*Mobile phone*) capable of providing the first short-range radio signal (*page 11*); and,

a third wireless device (*BT' not shown; inherent as depicted in Figure 2-8 and page 10, section 2.3*), coupled to (Bluetooth link) the first wireless device (Mobile phone) capable of providing a second short-range signal wherein the second wireless device (BT) communicating with the third wireless devices (BT') through the first wireless device (Mobile Phone) (*page 10, Figure 2-5 depicted the piconet or scatternet environment that is corresponding to the claimed environment*).

Regarding **claim 17** in accordance with Karagiannis reference entirety, Karagiannis discloses a system (*Figures 2-5 to 2-9*) for providing access to the Internet (*IP network*), comprising:

a first wireless device (*Host X of Figure 2-9 implemented in according to Figure 2-8*), coupled to the cellular network (*UTRAN*), having a software component (*not shown; inherent as disclosed on page 11 that Host X is capable of being connected simultaneously to UMTS and Bluetooth*) capable of accessing information from the internet (IP network) by communicating with the cellular network (UMTS) responsive to a first short-range radio signal (Bluetooth link) (Figure 2-8);

a second wireless device (BT), coupled to (Bluetooth link) the first wireless device (*Mobile Phone*) capable of providing the first short-range radio signal (*Figure 2-8*); and,

a third wireless device (*BT'; not shown, inherent as depicted Figure 2-8 and implemented in accordance to Figure 2-5 and disclosed on page 10*)), coupled to (Bluetooth link) the first wireless device (100) capable of providing a second short-range signal (Bluetooth link), wherein the first wireless device (Mobile phone) provides access to the Internet (IP network) for the second (BT) and third wireless devices (BT') (*Figures 2-5 to 2-9 and pages 10-12*).

Regarding **claim 18**, in addition to features recited in base claim 1, (*see rationales applied in the rejection of base claim 1 discussed above*), Karagiannis further discloses wherein the software component operates with an operating system software component (*Figures 2-5 to 2-9 and pages 10-12*).

Regarding **claims 19-22**, in addition to features recited in base claim 1, (*see rationales applied in the rejection of base claim 1 discussed above*), the claims call for operating system software components supporting the communications between the Mobile Phone and a PDA. In accordance with Figure 2-8, Karagiannis discloses the Mobile phone is capable of communicating with a Bluetooth Terminal including laptop, PDA. Thus, it is inherent there are operating system software components in the Mobile phone in order for it to successfully communicate with the PDA via Bluetooth link. *note that: Should the Applicants contest Examiner's position in the rejection of the claims, please refer to the rejection under 103(a) will be discussed below*).

Regarding **claims 23-25**, in addition to features recited in base claim 1, (*see rationales applied in the rejection of base claim 1 discussed above*), Karagiannis further discloses the services and applicable software to support the PDA depicted in Figures 3-1 and 3-2 and described on pages 14-17. The recitation thereat anticipates the claimed limitations in a manner as recited.

Regarding **claim 26** in accordance with Karagiannis reference entirety, Karagiannis discloses a system (*Figures 2-5 to 2-9*) for providing access information on a cellular network (*UTRAN*), comprising:

a first wireless device (Bluetooth Terminal) (BT) capable of providing the first short-range radio signal (*Figures 2-8 and 2-9*); and,

a second wireless device (Mobile phone), coupled to the first wireless device (BT) and the cellular network (UMTS), capable of selectively transferring information between the first wireless device and the cellular network responsive to a security software component (*page 14, Figure 3-1 and section 3-1 or page 16; ADD*).

Regarding **claim 27**, in addition to features recited in base claim 26 (see rationales discussed above), Karagiannis further discloses wherein the security software component is a firewall software component capable of controlling access to the cellular network (UTRAN) (*Figure 3-1, ADD*).

Regarding **claim 28**, in addition to features recited in base claim 26 (see rationales discussed above), Karagiannis further discloses wherein the security software component is a virtual private network ("VPN") capable of controlling access to the cellular network (UTRAN) (*Figure 3-1, ADD*).

Regarding **claim 29**, in addition to features recited in base claim 26 (see rationales discussed above), Karagiannis further discloses wherein the security software component is a uniform resource locator ("URL") capable of controlling access to the cellular network (UTRAN) (*Figure 3-1, ADD*).

Regarding **claim 30**, in addition to features recited in base claim 26 (see rationales discussed above), Karagiannis further discloses wherein the first signal short-range radio signal is selected from a group consisting of a Home RF signal, an 802.11 signal and an equivalent thereof (Bluetooth link).

Regarding **claim 31**, in addition to features recited in base claim 26 (see rationales discussed above), Karagiannis further discloses wherein the information is provided in the form of data packets (page 12, "packet data protocol context").

Regarding **claim 32**, in addition to features recited in base claim 26 (see rationales discussed above), Karagiannis further discloses wherein the information is provided in the form of IP packets (page 12, "packet data protocol context").

Regarding **claim 33**, in addition to features recited in base claim 26 (see rationales discussed above), Karagiannis further discloses wherein the second wireless device is coupled to the cellular network by either an Ethernet connection, DSL connection or a cable modem (page 1, right column, first paragraph).

Regarding **claim 34**, in addition to features recited in base claim 26 (see rationales discussed above), Karagiannis further discloses wherein the second wireless device is coupled to the cellular network by a landline network ((page 1, right column, first paragraph).

Regarding **claim 35**, in addition to features recited in base claim 26 (see rationales discussed above), Karagiannis further discloses wherein the first wireless device provides execution space for executable software from the second wireless device (Figure 2-9).

Regarding **claim 36**, in accordance with Karagiannis reference entirety, Karagiannis discloses a handheld device (Figure 2-9 to Figure 3-2; Host X) for providing a personal network, comprising:

a storage device (QoS API);

a processor (*TS*), coupled to the storage device (see connection depicted in Figure 3-1);

the storage device (QoS API) storing a software component (*Functional entities; page 15, section 3.1.2*) for controlling the processor (TS); and, the processor (TS) operative with the software component to:

provide an Internet Protocol ("IP") data packet (page 2, left column, second paragraph; IP program router 114) from the handheld wireless device (Mobile phone) to a terminal (Bluetooth Terminal) using short-range radio signals (Bluetooth link);

control access between the personal network and a cellular network (UTRAN) (Figure 2-9);

translate between a first IP address provided to the handheld device and a second IP address supplied by the handheld device for the terminal in the personal network (page 20).

Regarding **claim 37**, in addition to features recited in base claim 36 (see rationales discussed above), Karagiannis further discloses a Bluetooth transmitter, coupled to the processor capable of producing short-range radio signals (Figure 3-2).

Regarding **claim 38,** in addition to features recited in base claim 36 (see rationales discussed above), Karagiannis further discloses a GSM transmitter (Other), coupled to the processor (Figure 3-2).

Regarding **claim 39**, in addition to features recited in base claim 36, (*see rationales applied in the rejection of base claim 1 discussed above*), Karagiannis further discloses wherein the personal network provide a service and includes an application software component (Application Client) and the software component (*Functional entities))* includes a network software component (RC) to disconnect the application software component from the service (Figure 3-1 or 3-1).

Regarding **claim 40**, in addition to features recited in base claim 36, (*see rationales applied in the rejection of base claim 1 discussed above*), Karagiannis further discloses wherein the software component (Functional entities) includes a plug and play software component (ADD or MC) to identify the terminal in the personal network and obtain an application software component for the terminal (Figure 3-1 or 3-2).

Regarding **claim 41**, in addition to features recited in base claim 36, (*see rationales applied in the rejection of base claim 1 discussed above*), Karagiannis further discloses wherein the software component (Functional entities) includes a PIN number management software component to provide a PIN number used in pairing the