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Table with 5 columns: APPLICATION NO., ISSUE DATE, PATENT NO., ATTORNEY DOCKET NO., CONFIRMATION NO.
Row 1: 13/621,294, 04/04/2017, 9614943, 04245.001000, 5130

5514 7590 03/15/2017
FITZPATRICK CELLA HARPER & SCINTO
1290 Avenue of the Americas
NEW YORK, NY 10104-3800

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

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 Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

- Sunil K. Rao, Palo Alto, CA;
Rekha K. Rao, Palo Alto, CA, Legal Representative;
Sanjay K. Rao, Palo Alto, CA;
Raman K. Rao, Palo Alto, CA, Deceased;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

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 1449/PTO  <b>INFORMATION DISCLOSURE                  STATEMENT BY APPLICANT</b> (Use as many sheets as necessary)		<b>Complete if Known</b>	
		Application Number	Not Yet Assigned
		Filing Date	09/17/2012
		First Named Inventor	Sunil K. Rao
		Art Unit	2476
		Examiner Name	Phirin Sam
		Attorney Docket Number	HMTR3
Sheet	1	of	1

U. S. PATENT DOCUMENTS					
Examiner Initials*	Cite No. <sup>1</sup>	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code <sup>2</sup> (if known)			
/P.S./  ↓ /P.S./	1	US- 5691974	11-25-1997	Zehavi	
	2	US- 4654867	03-31-1987	Labeledz	
	3	US- 6,108,314	08-22-2000	Jones et al.	
	4	US- 6,167,099	12-26-2000	Rader et al.	
	5	US- 6,570,871	05-27-2003	Schneider	
	6	US- 7,039,370	05-02-2006	Laroya et al.	
	7	US- 7,848,300	12-07-2010	Rao et al.	
	8	US- 2002/0126745	09-12-2002	Prysbly et al.	
	9	US- 2006/002366 6	02-02-2006	Jalali et al.	
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		US-			
		US-			

Change(s) applied  
 to document,  
 /D.D./  
 8/11/2016

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No. <sup>1</sup>	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T <sup>6</sup>
		Country Code <sup>3</sup> -Number <sup>4</sup> -Kind Code <sup>5</sup> (if known)				

Examiner Signature	/Phirin Sam/ (06/16/2014)	Date Considered	06/16/2014
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\*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. <sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> See Kinds Codes of USPTO Patent Documents at [www.uspto.gov](http://www.uspto.gov) or MPEP 901.04. <sup>3</sup> Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>4</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>5</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>6</sup> 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, 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 (1-800-786-9199) and select option 2.

Document Description: Issue Fee Payment (PTO-85B)

### Issue Fee Transmittal Form

Application Number	Filing Date	First Named Inventor	Atty. Docket No.	Confirmation No.
13621294	17-Sep-2012	Sunil Rao	04245.001000.	5130

**TITLE OF INVENTION :**

SYSTEM TO INTERFACE INTERNET PROTOCOL (IP) BASED WIRELESS DEVICES WITH SUBTASKS AND CHANNELS

Entity Status	Application Type	Art Unit	Class - Subclass	EXAMINER
Small	Utility under 35 USC 111(a)	2476	338000	PHIRIN SAM

Issue Fee Due	Publication Due	Total Fee(s) Due	Date Due	Prev. Paid Fee
\$480	\$0	\$480	06-Mar-2017	\$0

**1.Change of Correspondence Address and/or Indication Of Fee Address (37 CFR 1.33 & 1.363)**

Current Correspondence Address:	Current Indicated Fee Address :
5514 FITZPATRICK CELLA HARPER & SCINTO  1290 Avenue of the Americas  NEW YORK NY 10104-3800 UNITED STATES 212-218-2100	(Empty)
<input type="checkbox"/> Change of correspondence address requested, system generated AIA/122-EFS form attached	<input type="checkbox"/> Fee Address indication requested, system generated SB/47-EFS form attached

**2.Entity Status**

**Change in Entity Status**

- Applicant certifying micro entity status; system generated Micro Entity certification form attached. See 37 CFR 1.29.  
Note: Absent a valid certification of micro entity status, issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment. If this box is checked, you will be prompted to choose a micro entity status on the gross income basis (37 CFR 1.29(a)) or the institution of higher education basis (37 CFR 1.29(d)), and make the applicable certification online.
- Applicant asserting small entity status. See 37 CFR 1.27.  
Note: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
- Applicant changing to regular undiscounted fee status.  
Note: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

Document Description: Issue Fee Payment (PTO-85B)

**3.The Following Fee(s) Are Submitted:**

Issue Fee

I authorize USPTO to apply my previously paid issue fee to the current fees due

Publication Fee

The Director is hereby authorized to apply my previously paid issue fee to the current fee due and to charge deficient fees to Deposit Account Number \_\_\_\_\_

Advance Order - # of copies \_\_\_\_\_

If **in addition to** the payment of the issue fee amount submitted with this form, there are any discrepancies in any amount(s) due, the Director is authorized to charge any deficiency, or credit any overpayment, to Deposit Account Number 503939. **The issue fee must be submitted with this form. If payment of the issue fee does not accompany this form, checking this box and providing a deposit account number will NOT be effective to satisfy full payment of the fee(s) due.**

**4.Firm and/or Attorney Names To Be Printed**

**NOTE: If no name is listed, no name will be printed**

For printing on the patent front page, list to be displayed as entered

1.

2.

3.

**5.Assignee Name(s) and Residence Data To Be Printed**

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.

Name	City	State	Country	Category

**6.Signature**

I certify, in accordance with 37 CFR 1.4(d)(4) that I am an attorney or agent registered to practice before the Patent and Trademark Office who has filed and has been granted power of attorney in this application. I also certify that this Fee(s) Transmittal form is being transmitted to the USPTO via EFS-WEB on the date indicated below.

<b>Signature</b>	/Michael K. O'Neill/	<b>Date</b>	03-02-2017
<b>Name</b>	Michael K. O'Neill	<b>Registration Number</b>	32622

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	13621294			
<b>Filing Date:</b>	17-Sep-2012			
<b>Title of Invention:</b>	SYSTEM TO INTERFACE INTERNET PROTOCOL (IP) BASED WIRELESS DEVICES WITH SUBTASKS AND CHANNELS			
<b>First Named Inventor/Applicant Name:</b>	Sunil K. Rao			
<b>Filer:</b>	Michael K. O'Neill			
<b>Attorney Docket Number:</b>	04245.001000.			
Filed as Small Entity				
<b>Filing Fees for Utility under 35 USC 111(a)</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
UTILITY APPL ISSUE FEE	2501	1	480	480
PUBL. FEE- EARLY, VOLUNTARY, OR NORMAL	1504	1	0	0
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Post-Allowance-and-Post-Issuance:</b>				
<b>Extension-of-Time:</b>				
<b>Miscellaneous:</b>				
<b>Total in USD (\$)</b>				<b>480</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	28516669
<b>Application Number:</b>	13621294
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	5130
<b>Title of Invention:</b>	SYSTEM TO INTERFACE INTERNET PROTOCOL (IP) BASED WIRELESS DEVICES WITH SUBTASKS AND CHANNELS
<b>First Named Inventor/Applicant Name:</b>	Sunil K. Rao
<b>Customer Number:</b>	5514
<b>Filer:</b>	Michael K. O'Neill
<b>Filer Authorized By:</b>	
<b>Attorney Docket Number:</b>	04245.001000.
<b>Receipt Date:</b>	02-MAR-2017
<b>Filing Date:</b>	17-SEP-2012
<b>Time Stamp:</b>	15:10:36
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$480
RAM confirmation Number	030317INTEFSW15103500
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

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**File Listing:**

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	Web85b.pdf	45379	no	2
			f2a4aae426e5c569ad1777b07eaf36d13b9e7		

**Warnings:**

**Information:**

2	Fee Worksheet (SB06)	fee-info.pdf	32280	no	2
			511de6c3687387681e21e9fe74677e31375883a3		

**Warnings:**

**Information:**

<b>Total Files Size (in bytes):</b>	77659
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**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.**





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NOTICE OF ALLOWANCE AND FEE(S) DUE

5514 7590 12/05/2016
FITZPATRICK CELLA HARPER & SCINTO
1290 Avenue of the Americas
NEW YORK, NY 10104-3800

EXAMINER

SAM, PHIRIN

ART UNIT PAPER NUMBER

2476

DATE MAILED: 12/05/2016

Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.

13/621,294 09/17/2012 Sunil K. Rao 04245.001000. 5130

TITLE OF INVENTION: SYSTEM TO INTERFACE INTERNET PROTOCOL (IP) BASED WIRELESS DEVICES WITH SUBTASKS AND CHANNELS

Table with 7 columns: APPLN. TYPE, ENTITY STATUS, ISSUE FEE DUE, PUBLICATION FEE DUE, PREV. PAID ISSUE FEE, TOTAL FEE(S) DUE, DATE DUE

nonprovisional SMALL \$480 \$0 \$0 \$480 03/06/2017

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 DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). 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. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

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.

**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)

5514 7590 12/05/2016  
**FITZPATRICK CELLA HARPER & SCINTO**  
 1290 Avenue of the Americas  
 NEW YORK, NY 10104-3800

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.
13/621,294	09/17/2012	Sunil K. Rao	04245.001000.	5130

TITLE OF INVENTION: SYSTEM TO INTERFACE INTERNET PROTOCOL (IP) BASED WIRELESS DEVICES WITH SUBTASKS AND CHANNELS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$480	\$0	\$0	\$480	03/06/2017

EXAMINER	ART UNIT	CLASS-SUBCLASS
SAM, PHIRIN	2476	370-338000

<p>1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).</p> <p><input type="checkbox"/> Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.</p> <p><input type="checkbox"/> "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. <b>Use of a Customer Number is required.</b></p>	<p>2. For printing on the patent front page, list</p> <p>(1) The names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____</p> <p>(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. 2 _____</p> <p>3 _____</p>
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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

<p>4a. The following fee(s) are submitted:</p> <p><input type="checkbox"/> Issue Fee</p> <p><input type="checkbox"/> Publication Fee (No small entity discount permitted)</p> <p><input type="checkbox"/> Advance Order - # of Copies _____</p>	<p>4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)</p> <p><input type="checkbox"/> A check is enclosed.</p> <p><input type="checkbox"/> Payment by credit card. Form PTO-2038 is attached.</p> <p><input type="checkbox"/> The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).</p>
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5. **Change in Entity Status** (from status indicated above)

Applicant certifying micro entity status. See 37 CFR 1.29

Applicant asserting small entity status. See 37 CFR 1.27

Applicant changing to regular undiscounted fee status.

**NOTE:** Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

**NOTE:** If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

**NOTE:** Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____	Date _____
Typed or printed name _____	Registration No. _____



UNITED STATES PATENT AND TRADEMARK OFFICE

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Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
13/621,294 09/17/2012 Sunil K. Rao 04245.001000. 5130

5514 7590 12/05/2016
FITZPATRICK CELLA HARPER & SCINTO
1290 Avenue of the Americas
NEW YORK, NY 10104-3800

EXAMINER

SAM, PHIRIN

ART UNIT PAPER NUMBER

2476

DATE MAILED: 12/05/2016

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

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 1-(888)-786-0101 or (571)-272-4200.

## OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B 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.

### 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.

<b>Notice of Allowability</b>	<b>Application No.</b> 13/621,294	<b>Applicant(s)</b> RAO ET AL.	
	<b>Examiner</b> PHIRIN SAM	<b>Art Unit</b> 2476	<b>AIA (First Inventor to File) Status</b> No

**-- 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 11/01/2016.  
 A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on \_\_\_\_\_.
2.  An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_\_; the restriction requirement and election have been incorporated into this action.
3.  The allowed claim(s) is/are 2-21. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see [http://www.uspto.gov/patents/init\\_events/poh/index.jsp](http://www.uspto.gov/patents/init_events/poh/index.jsp) or send an inquiry to [PPHfeedback@uspto.gov](mailto:PPHfeedback@uspto.gov).
4.  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

- 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.**

5.  CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.  
 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. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 5. <input type="checkbox"/> Examiner's Amendment/Comment                             |
| 2. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),<br>Paper No./Mail Date _____    | 6. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| 3. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material | 7. <input type="checkbox"/> Other _____.   |
| 4. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____.                     |  |

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**DETAILED ACTION**

1. The present application is being examined under the pre-AIA first to invent provisions.

*Allowable Subject Matter*

2. The following is an examiner's statement of reasons for allowance:

**In regard claim 2**, the prior arts of record do not teach or suggest a wireless communication device comprising: a plurality of antennas; and a communication component coupled to the plurality of antennas, the communication component including a processor, a transmitter, and a receiver, wherein the communication component is configured to communicate via a first frequency band using a wireless communication protocol; and wherein one or more subtasks are assigned to one or more channels, and the one or more channels are sampled and clocked individually; and wherein the processor comprises multiple ones of the one or more channels and is further configured to process a first data stream and a second data stream in parallel.

**In regard claim 3**, the prior arts of record do not teach or suggest a wireless communication device comprising: a plurality of antennas; and a communication component coupled to the plurality of antennas, the communication component including a processor, a transmitter, and a receiver, wherein the communication component includes at least one additional transmitter; wherein the transmitter is configured to transmit on a first frequency and the at least one additional transmitter is configured to transmit on a second frequency; wherein

the transmitter is configured to transmit using a first communication protocol and the at least one additional transmitter is configured to transmit using a second communication protocol, wherein the first communication protocol is different than the second communication protocol; and wherein one or more subtasks are assigned to one or more channels, and the one or more channels are sampled and clocked individually; and wherein the processor comprises multiple ones of the one or more channels and is further configured to process a first data stream and a second data stream in parallel.

**In regard claim 4**, the prior arts of record do not teach or suggest a wireless communication device comprising: a plurality of antennas; and a communication component coupled to the plurality of antennas, the communication component including a processor, a transmitter, and a receiver, wherein the communication component includes at least one additional receiver; wherein the receiver is configured to receive using a first communication protocol and the at least one additional receiver is configured to receive using a second communication protocol, wherein the first communication protocol is different than the second communication protocol; and wherein one or more subtasks are assigned to one or more channels, and the one or more channels are sampled and clocked individually; and wherein the processor comprises multiple ones of the one or more channels and is further configured to process a first data stream and a second data stream in parallel.

**In regard claim 5**, the prior arts of record do not teach or suggest a wireless communication device comprising: a plurality of antennas; and a communication component

coupled to the plurality of antennas, the communication component including a processor, a transmitter, and a receiver, wherein a first set of antennas of the plurality of antennas is configured to operate in a first frequency band and a second set of antennas of the plurality of antennas is configured to operate in a second frequency band, wherein the first frequency band is different than the second frequency band; wherein the first set of antennas of the plurality of antennas is configured to operate using a first communication protocol and the second set of antennas of the plurality of antennas is configured to operate using a second communication protocol, wherein the first communication protocol is different than the second communication protocol; and wherein one or more subtasks are assigned to one or more channels, and the one or more channels are sampled and clocked individually; and wherein the processor comprises multiple ones of the one or more channels and is further configured to process a first data stream and a second data stream in parallel.

### *Conclusion*

3. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”
4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to PHIRIN SAM whose telephone number is (571)272-3082. The examiner can normally be reached on Flexible Work Schedule.



Application/Control Number: 13/621,294  
Art Unit: 2476

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ayaz R. Sheikh can be reached on (571) 272-3795. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Respectfully submitted,

Date: November 13, 2016

By:     /Phirin Sam/      
Primary Examiner  
Art Unit 2476

<b>Notice of References Cited</b>	Application/Control No. 13/621,294	Applicant(s)/Patent Under Reexamination RAO ET AL.	
	Examiner PHIRIN SAM	Art Unit 2476	Page 1 of 1

**U.S. PATENT DOCUMENTS**

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-6,184,829 B1	02-2001	Stilp; Louis A.	G01S5/02	342/174
	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	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

**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.

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	363166	antennas or (dual adj3 antenna\$1) or (plurality adj3 antenna\$1)	US; PGRUB; USPAT; USOOCR; FPFS; EPO; JPO; IBM_TDB	OR	OFF	2016/11/13 21:57
L2	4388039	processor\$1 or (process\$3 adj3 (device\$1 or component\$1 or unit\$1 or module\$1))	US; PGRUB; USPAT; USOOCR; FPFS; EPO; JPO; IBM_TDB	OR	OFF	2016/11/13 21:57
L3	1989583	transmitter\$1 or transceiver\$1 or ((transmit\$4 or transceiv\$3) adj3 (device\$1 or component\$1 or unit\$1 or module\$1))	US; PGRUB; USPAT; USOOCR; FPFS; EPO; JPO; IBM_TDB	OR	OFF	2016/11/13 21:57
L4	3092076	receiver\$1 or transceiver\$1 or ((receiv\$4 or transceiv\$3) adj3 (device\$1 or component\$1 or unit\$1 or module\$1))	US; PGRUB; USPAT; USOOCR; FPFS; EPO; JPO; IBM_TDB	OR	OFF	2016/11/13 21:57
L5	29732	first adj4 frequenc\$3 adj3 band\$1	US; PGRUB; USPAT; USOOCR; FPFS; EPO; JPO; IBM_TDB	OR	OFF	2016/11/13 21:57
L6	185645	L1 and L2	US; PGRUB; USPAT; USOOCR; FPFS; EPO; JPO; IBM_TDB	OR	OFF	2016/11/13 21:57
L7	146413	L6 and L3	US; PGRUB; USPAT; USOOCR; FPFS; EPO; JPO; IBM_TDB	OR	OFF	2016/11/13 21:57
L8	141930	L7 and L4	US; PGRUB; USPAT; USOOCR; FPFS; EPO; JPO; IBM_TDB	OR	OFF	2016/11/13 21:57
L9	4222	L8 and L5	US; PGRUB; USPAT; USOOCR; FPFS; EPO; JPO; IBM_TDB	OR	OFF	2016/11/13 21:57

L10	769192	{(first or differen\$3) adj4 (frequenc\$3 or band\$1)} or sub\$1band\$1	US; PGRUB; USPAT; USOOCR; FFRS; EPO; JPO; BM TDB	OR	OFF	2016/11/13 22:00
L11	57220	L8 and L10	US; PGRUB; USPAT; USOOCR; FFRS; EPO; JPO; BM TDB	OR	OFF	2016/11/13 22:00
L12	7013	{sub\$1task\$3 or (sub adj2 task\$3) or task\$3} same assign\$6 same (channel\$1 or slot\$1 or (time adj2 slot\$1) or time\$1slot\$1)	US; PGRUB; USPAT; USOOCR; FFRS; EPO; JPO; BM TDB	OR	OFF	2016/11/13 22:02
L13	578	I1 and I12	US; PGRUB; USPAT; USOOCR; FFRS; EPO; JPO; BM TDB	OR	OFF	2016/11/13 22:02
L14	50513	{parallel\$4 or concurren\$4} near4 process\$3 near4 (data or stream\$4)	US; PGRUB; USPAT; USOOCR; FFRS; EPO; JPO; BM TDB	OR	OFF	2016/11/13 22:04
L15	320	I3 and I14	US; PGRUB; USPAT; USOOCR; FFRS; EPO; JPO; BM TDB	OR	OFF	2016/11/13 22:04
L16	19	I5 AND ( (H04L12/2867 OR H04L69/16 OR H04L12/00 OR H04L45/00 OR H04L5/0007 OR H04L5/0023 OR H04L5/0026 OR H04L5/0041 OR H04L5/0048 OR H04L5/0082 OR H04L5/08 OR H04W88/06 OR H04W16/26 OR H04W36/22 OR H04W40/02 OR H04W80/04 OR H04W84/04 OR H04W84/12 OR H04W88/10 OR H04W92/02 OR H04W4/00 OR H04W36/0088 OR H04W48/16 OR H04W52/028 OR H04W60/005 OR H04W68/02 OR H04W72/0453 OR H04W12/06 OR H04W72/044 OR H04B7/15 OR H04B1/3816 OR H04B1/0057 OR H04B7/04 OR H04B7/0413).CPC. )	US; PGRUB; USPAT; USOOCR; FFRS; EPO; JPO; BM TDB	OR	OFF	2016/11/13 22:06
L17	332942	{parallel\$4 or concurren\$4} near4 process\$3	US; PGRUB; USPAT; USOOCR; FFRS; EPO; JPO; BM TDB	OR	OFF	2016/11/13 22:22
L18	133	I3 and I17	US; PGRUB; USPAT; USOOCR; FFRS; EPO; JPO; BM TDB	OR	OFF	2016/11/13 22:22
L19	116	I8 and ((mobile or wireless) adj4 (device\$1 or station\$1 or terminal\$1 or unit\$1 or apparatus))	US; PGRUB; USPAT; USOOCR; FFRS; EPO; JPO; BM TDB	OR	OFF	2016/11/13 22:23
L20	30	{sub\$1task\$3 same assign\$5 same channel\$4}.dm. and (channel\$4 same samp\$4).dm.	US; PGRUB; USPAT; USOOCR; FFRS; EPO; JPO; BM TDB	OR	OFF	2016/11/13 22:32

S22	107	19 AND ( (H04W88/06 OR H04W64/00 OR H04W4/22 OR H04W76/007 OR H04W72/1215 OR H04W84/12 OR H04W76/04 OR H04W8/005 OR H04W16/26 OR H04W36/22 OR H04W40/02 OR H04W80/04 OR H04W84/04 OR H04W88/10 OR H04W82/02 OR H04W16/14 OR H04W24/00 OR H04W28/10 OR H04W4/00 OR H04W32/16 OR H04W52/325 OR H04W36/0088 OR H04W48/12 OR H04W48/16 OR H04W52/028 OR H04W52/267 OR H04W52/286 OR H04W52/46 OR H04W60/005 OR H04W68/02 OR H04W72/0453 OR H04W76/025 OR H04W12/06 OR G01S1/026 OR G01S5/02 OR G01S5/021 OR G01S5/06 OR G01S5/0215 OR G01S5/0221 OR G01S5/0284 OR G01S2205/006 OR G01S2205/008 OR G01S19/47 OR G01S1/24 OR G01S5/0263 OR G01S5/0252 OR G01S5/0268 OR G01S5/10 OR G01S19/10 OR G01S19/18 OR G01S1/042 OR G01S19/46 OR G01S5/0081 OR G01S5/14). CPC. )	US; PGRUB; USPAT; USOOCR; FPFS; EPO; JPO; BM, TDB	OR	OFF	2016/11/13 22:40
S23	154985	H04W16/26; H04W64/00; H04W64/003; H04W88/00; H04W88/02; H04W88/022; H04W88/04; H04W88/06; H04L12/2867; G01S1/02; G01S1/026; G01S1/024; H04B7/0404; G01S5/02; G01S5/0221; G01S5/0226). CPC.	US; PGRUB; USPAT; USOOCR; FPFS; EPO; JPO; BM, TDB	OR	OFF	2016/11/13 22:44
S24	81	S23 and I19	US; PGRUB; USPAT; USOOCR; FPFS; EPO; JPO; BM, TDB	OR	OFF	2016/11/13 22:45
S25	8	"8824434".pn. or "7846300".pn. or "7286502".pn. or "6169789".pn.	US; PGRUB; USPAT; USOOCR; FPFS; EPO; JPO; BM, TDB	OR	OFF	2016/11/13 19:33
S26	363166	antennas or (dual adj3 antenna\$1) or (plurality adj3 antenna\$1)	US; PGRUB; USPAT; USOOCR; FPFS; EPO; JPO; BM, TDB	OR	OFF	2016/11/13 20:14
S27	4388039	processor\$1 or (process\$3 adj3 (device\$1 or component\$1 or unit\$1 or module\$1))	US; PGRUB; USPAT; USOOCR; FPFS; EPO; JPO; BM, TDB	OR	OFF	2016/11/13 20:23
S28	1988583	transmitter\$1 or transceiver\$1 or ((transmit\$4 or transceiv\$3) adj3 (device\$1 or component\$1 or unit\$1 or module\$1))	US; PGRUB; USPAT; USOOCR; FPFS; EPO; JPO; BM, TDB	OR	OFF	2016/11/13 20:25
S29	3092076	receiver\$1 or transceiver\$1 or ((receiv\$4 or transceiv\$3) adj3 (device\$1 or component\$1 or unit\$1 or module\$1))	US; PGRUB; USPAT; USOOCR; FPFS; EPO; JPO; BM, TDB	OR	OFF	2016/11/13 20:30
S30	29732	first adj4 frequenc\$3 adj3 band\$1	US; PGRUB; USPAT; USOOCR; FPFS; EPO; JPO; BM, TDB	OR	OFF	2016/11/13 20:31
S31	185645	S26 and S27	US; PGRUB; USPAT; USOOCR; FPFS; EPO; JPO; BM, TDB	OR	OFF	2016/11/13 20:31
S32	146413	S31 and S28	US; PGRUB; USPAT; USOOCR; FPFS; EPO; JPO; BM, TDB	OR	OFF	2016/11/13 20:31

S33	141930	S32 and S29	US: PGRUB; USPAT; USOOCR; PPRS; EPO; JPO; BM, TDB	OR	OFF	2016/11/13 20:31
S34	4222	S33 and S30	US: PGRUB; USPAT; USOOCR; PPRS; EPO; JPO; BM, TDB	OR	OFF	2016/11/13 20:32
S35	10	S34 and sub\$1task\$3	US: PGRUB; USPAT; USOOCR; PPRS; EPO; JPO; BM, TDB	OR	OFF	2016/11/13 20:32
S36	47	sub\$1task\$3 same assign\$6 same channel\$1	US: PGRUB; USPAT; USOOCR; PPRS; EPO; JPO; BM, TDB	OR	OFF	2016/11/13 20:38

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L21	30	sub\$1task\$3 same assign\$6 same channel\$4).dm. and (channel\$4 same samp\$4).dm.	US:PGRUB, USPAT	OR	OFF	2016/11/13 22:32


11/13/2016 10:53:24 PM

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<b>Issue Classification</b> 	<b>Application/Control No.</b> 13621294	<b>Applicant(s)/Patent Under Reexamination</b> RAO ET AL.
	<b>Examiner</b> PHIRIN SAM	<b>Art Unit</b> 2476

<input type="checkbox"/> Claims renumbered in the same order as presented by applicant																<input checked="" type="checkbox"/> CPA		<input type="checkbox"/> T.D.		<input type="checkbox"/> R.1.47	
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original						
	1	16	17																		
1	2	17	18																		
5	3	18	19																		
8	4	19	20																		
12	5	20	21																		
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11	13																				
13	14																				
14	15																				
15	16																				

NONE		<b>Total Claims Allowed:</b>	
		20	
(Assistant Examiner)	(Date)		
/PHIRIN SAM/ Primary Examiner.Art Unit 2476	11/13/2016	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	10

<b>Search Notes</b>  	<b>Application/Control No.</b>  13621294	<b>Applicant(s)/Patent Under Reexamination</b>  RAO ET AL.
	<b>Examiner</b>  PHIRIN SAM	<b>Art Unit</b>  2476

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
370/328,329,336,338,339,340,341,342,347,351-354,356,436,437,442 (Text search - See search history printout).	06/16/2014; 04/04/2015	PS
H04B/02; H04B7/024; H04B7/026; H04B7/0404; H04B7/0408; H04B7/0413; H04B7/0452; H04B7/06; H04B7/08; H04W72/042; H04W72/0413; H04W72/0446 (See text search history).	04/04/2015	PS
h04w36/18;h04w16/24;h04w88/04;h04w88/06;h04w88/022;h04w88/16;h041/0002;h04127/12 (see text search history).	12/26/2015	PS
H04W64/026;H04W64/003;H04W64/006;H04W4/00;H04W4/003;H04W8/18;H04M1/026;H04B7/0404 (See text search history).	07/25/2016	PS
H04W16/26;H04W64/00;H04W64/003;H04W88/00;H04W88/02;H04W88/022;H04W88/04;H04W88/06;H04L12/2867;G01S1/02;G01S1/026;G01S1/024;H04B7/0404;G01S5/02;G01S5/0221;G01S5/0226 (See text search history).	11/13/2016	PS


INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
	See text search history for interference.	07/25/2016	PS

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**INTERFERENCE SEARCH**

<b>US Class/ CPC Symbol</b>	<b>US Subclass / CPC Group</b>	<b>Date</b>	<b>Examiner</b>
	See text search history for interference.	11/13/2016	PS

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<b><i>Index of Claims</i></b> 	<b>Application/Control No.</b> 13621294	<b>Applicant(s)/Patent Under Reexamination</b> RAO ET AL.
	<b>Examiner</b> PHIRIN SAM	<b>Art Unit</b> 2476

✓	<b>Rejected</b>	-	<b>Cancelled</b>	N	<b>Non-Elected</b>	A	<b>Appeal</b>
=	<b>Allowed</b>	÷	<b>Restricted</b>	I	<b>Interference</b>	O	<b>Objected</b>

Claims renumbered in the same order as presented by applicant
  CPA
  T.D.
  R.1.47

CLAIM		DATE							
Final	Original	06/16/2014	12/26/2015	07/25/2016	11/13/2016				
	1	-	-	-	-				
	2	✓	✓	=	=				
	3	✓	✓	=	=				
	4	✓	✓	=	=				
	5	✓	✓	=	=				
	6		✓	=	=				
	7		✓	=	=				
	8		✓	=	=				
	9		✓	=	=				
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	19		✓	=	=				
	20		✓	=	=				
	21		✓	=	=				



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Table with 7 columns: APPLICATION NUMBER, FILING or 371(c) DATE, GRP ART UNIT, FIL FEE REC'D, ATTY DOCKET NO, TOT CLAIMS, IND CLAIMS. Row 1: 13/621,294, 09/17/2012, 2476, 740, 04245.001000, 4, 4

CONFIRMATION NO. 5130
CORRECTED FILING RECEIPT

5514
FITZPATRICK CELLA HARPER & SCINTO
1290 Avenue of the Americas
NEW YORK, NY 10104-3800



Date Mailed: 11/09/2016

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections

Inventor(s)
Sunil K. Rao, Palo Alto, CA;
Sanjay K. Rao, Palo Alto, CA;
Raman K. Rao, Palo Alto, CA, Deceased;

Applicant(s)
Rekha K. Rao, Palo Alto, CA, Legal Representative;

Assignment For Published Patent Application
IP HOLDINGS, INC., Palo Alto, CA

Power of Attorney: The patent practitioners associated with Customer Number 05514

Domestic Priority data as claimed by applicant
This application is a CON of 12/912,607 10/26/2010 PAT 8824434
which is a CON of 10/940,428 09/13/2004 PAT 7848300
which is a CON of 09/617,608 07/17/2000 PAT 7286502
which is a CIP of 09/281,739 06/04/1999 PAT 6169789

Foreign Applications for which priority is claimed (You may be eligible to benefit from the Patent Prosecution Highway program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: No

Permission to Access Search Results: No

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

**If Required, Foreign Filing License Granted:** 10/03/2012

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 13/621,294**

**Projected Publication Date:** Request for Non-Publication Acknowledged

**Non-Publication Request:** Yes

**Early Publication Request:** No

**\*\* SMALL ENTITY \*\***

**Title**

SYSTEM TO INTERFACE INTERNET PROTOCOL (IP) BASED WIRELESS DEVICES WITH  
SUBTASKS AND CHANNELS

**Preliminary Class**

370

**Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications:** No

## **PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES**

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

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For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific

countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

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**Title 35, United States Code, Section 184**  
**Title 37, Code of Federal Regulations, 5.11 & 5.15**

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Doc code: RCEX

Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (07-09)

Approved for use through 07/31/2012. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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### REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL (Submitted Only via EFS-Web)

Application Number	13/621,294	Filing Date	2012-09-17	Docket Number (if applicable)	04245.001000.	Art Unit	2476
First Named Inventor	Sunil K. Rao			Examiner Name	Phirin Sam		

**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. The Instruction Sheet for this form is located at WWW.USPTO.GOV

#### 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).

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.

Consider the arguments in the Appeal Brief or Reply Brief previously filed on \_\_\_\_\_

Other \_\_\_\_\_

Enclosed

Amendment/Reply

Information Disclosure Statement (IDS)

Affidavit(s)/ Declaration(s)

Other \_\_\_\_\_

#### MISCELLANEOUS

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)

Other

#### FEES

**The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**

The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No

#### SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

Patent Practitioner Signature

Applicant Signature

Applicant Signature			
Applicant 1			<input type="button" value="Remove"/>
Signature	/Rekha K. Rao/	Date (YYYY-MM-DD)	2016-11-01
Name	Rekha Rao Legal Representative Raman KaliputnamRao		
Applicant 2			<input type="button" value="Remove"/>
Signature	/Sunil K. Rao/	Date (YYYY-MM-DD)	2016-11-01
Name	Sunil K. Rao		
Applicant 3			<input type="button" value="Remove"/>
Signature	/Sanjay K. Rao/	Date (YYYY-MM-DD)	2016-11-01
Name	Sanjay K. Rao		
Applicant 4			<input type="button" value="Remove"/>
Signature	/Rekha K. Rao/	Date (YYYY-MM-DD)	2016-11-01
Name	Rekha K. Rao c/o Assignee IP Holdings, Inc.		
Click ADD for additional Applicant Signature			<input type="button" value="Add"/>

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.

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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 inspections 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.

04245.001000.

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application No.: 13/621,294	)	
	:	Examiner: Phirin Sam
First Named Inventor:	)	
	:	Group Art Unit: 2476
SUNIL K. RAO, ET AL.	)	
	:	Confirmation No.: 5130
Filed: September 17, 2012	)	
	:	
For: SYSTEM TO INTERFACE	)	
INTERNET PROTOCOL (IP)	:	
BASED WIRELESS DEVICES	)	
WITH SUBTASKS AND	:	
CHANNELS (As Amended)	)	November 01, 2016

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

REQUEST FOR CONTINUED EXAMINATION (RCE)

Commissioner:

This is in response to the Notice of Allowance and Fee (s) Due dated March 12, 2012. A Requested for Continued Examination (RCE) is filed herewith. Accordingly, this response is timely filed.

**Amendments to the title** begin on page 2 of this paper.

**Amendments to the Specification** begin on page 3 of this paper.

**Claims** are listed beginning on page 4 of this paper.

**Remarks** begin on page 10 of this paper.

CERTIFICATE OF EFS-WEB TRANSMISSION  
I hereby certify that this correspondence is being filed electronically by  
EFS-Web transmission to the United States Patent Office on  
November 01, 2016  
\_\_\_\_\_  
(Date of Deposit)

Rekha K. Rao  
\_\_\_\_\_  
(Name of Assignee, IP Holdings, Inc. )

_____ /Rekha K. Rao/ Signature	_____ November 1, 2016 Date of Signature
--------------------------------------	--

IN THE TITLE:

Please amend the title as follows. Changes to the title are shown relative to the original version of the title (see 37 C.F.R. § 1.122):

-- SYSTEM TO INTERFACE INTERNET PROTOCOL (IP) BASED  
WIRELESS DEVICES WITH SUBTASKS AND CHANNELS ~~OPTICAL AND OTHER~~  
~~NETWORKS FOR IMPROVED FLEXIBILITY, PERFORMANCE, AND DATA~~  
~~TRANSFER~~ --

IN THE SPECIFICATION:

Please amend paragraph [0001] of the specification as follows. Changes to paragraph [0001] are shown relative to the specification as originally filed:

[0001] The present application is a continuation and claims the priority benefit of co-pending U.S. Patent Application No. 12/912,607, filed October 26, 2010, now U.S. Patent No. 8,824,434, which is a continuation of Patent Application No. 10/940,428, filed September 13, 2004, now Patent No. 7,848,300, which is a continuation of Patent Application No. 09/617,608, filed on July 17,2000 now Patent No. 7,286,502, which is a continuation-in-part of Patent Application No. 09/281,739, now Patent No. 6,169,789, filed June 4, 1999, ~~which is a continuation in part application of a now abandoned Patent Application No. 08/764,903 filed December 16, 1996.~~ The present application claims priority to the above referenced applications and patents.

IN THE CLAIMS:

1. (Cancelled).

2. (Previously Presented) A wireless communication device comprising:  
a plurality of antennas; and

a communication component coupled to the plurality of antennas, the communication component including a processor, a transmitter, and a receiver, wherein the communication component is configured to communicate via a first frequency band using a wireless communication protocol; and

wherein one or more subtasks are assigned to one or more channels, and the one or more channels are sampled and clocked individually; and

wherein the processor comprises multiple ones of the one or more channels and is further configured to process a first data stream and a second data stream in parallel.

3. (Previously Presented) A wireless communication device comprising:  
a plurality of antennas; and

a communication component coupled to the plurality of antennas, the communication component including a processor, a transmitter, and a receiver,

wherein the communication component includes at least one additional transmitter;

wherein the transmitter is configured to transmit on a first frequency and the at least one additional transmitter is configured to transmit on a second frequency;

wherein the transmitter is configured to transmit using a first communication protocol and the at least one additional transmitter is configured to

transmit using a second communication protocol, wherein the first communication protocol is different than the second communication protocol; and

wherein one or more subtasks are assigned to one or more channels, and the one or more channels are sampled and clocked individually; and

wherein the processor comprises multiple ones of the one or more channels and is further configured to process a first data stream and a second data stream in parallel.

4. (Previously Presented) A wireless communication device comprising:

a plurality of antennas; and

a communication component coupled to the plurality of antennas, the communication component including a processor, a transmitter, and a receiver,

wherein the communication component includes at least one additional receiver;

wherein the receiver is configured to receive using a first communication protocol and the at least one additional receiver is configured to receive using a second communication protocol, wherein the first communication protocol is different than the second communication protocol; and

wherein one or more subtasks are assigned to one or more channels, and the one or more channels are sampled and clocked individually; and

wherein the processor comprises multiple ones of the one or more channels and is further configured to process a first data stream and a second data stream in parallel.

5. (Previously Presented) A wireless communication device comprising:

a plurality of antennas; and



a communication component coupled to the plurality of antennas, the communication component including a processor, a transmitter, and a receiver, wherein a first set of antennas of the plurality of antennas is configured to operate in a first frequency band and a second set of antennas of the plurality of antennas is configured to operate in a second frequency band, wherein the first frequency band is different than the second frequency band;

wherein the first set of antennas of the plurality of antennas is configured to operate using a first communication protocol and the second set of antennas of the plurality of antennas is configured to operate using a second communication protocol, wherein the first communication protocol is different than the second communication protocol; and

wherein one or more subtasks are assigned to one or more channels, and the one or more channels are sampled and clocked individually; and

wherein the processor comprises multiple ones of the one or more channels and is further configured to process a first data stream and a second data stream in parallel.

6. (Previously Presented) The device of Claim 2, wherein the device is enabled to multiplex incoming and outgoing wireless signals and further configured with enhanced capabilities to differentiate between various signals or to combine multiple paths into a single communication channel.

7. (Previously Presented) The device of Claim 2, further in communication with a network switch box configured with a plurality of ports and configured to connect to a plurality of networks to forward packets between different networks and join a virtual network.

8. (Previously Presented) The device of Claim 7, further in communication with a second network switch box, wherein the first network switch box is configured to transmit and receive a plurality of data packets from and to the second network switch box over at least one network path.

9. (Previously Presented) The device of Claim 3, in communication with a server configured with a controller in communication with a plurality of network devices wherein the server supervises the connection of a plurality of wireless devices.

10. (Previously Presented) The device of Claim 9, wherein the device operates with a plurality of streams including a first stream and a second stream and multipath communication.

11. (Previously Presented) The device of Claim 4, wherein the device is enabled to operate on a plurality of frequencies including a higher frequency and lower frequencies.

12. (Previously Presented) The device of Claim 11, wherein the device is enabled to communicate with a network device server, said server comprising a plurality of antennas sequentially or simultaneously.

13. (Previously Presented) The device of Claim 12, wherein the device is a cellular telephone with multiple processors and further multiplex incoming and outgoing wireless signals.

14. (Previously Presented) The device of Claim 5, wherein the device is enabled for internet protocol based data communication.

15. (Previously Presented) The device of Claim 14, wherein the device is enabled to send and receive a plurality of streams using multipath communication.

16. (Previously Presented) The device of Claim 5, wherein the device is enabled to modulate power levels, frequency and the signal strength as determined by one or more of the power, line of sight, or interference or combinations thereof.

17. (Previously Presented) The device of Claim 16, wherein the device is a network box and wherein a signal stream is split into a plurality of signal streams.

18. (Previously Presented) The device of Claim 17, wherein the device is enabled to be in communication with a mobile device and a network switch box.

19. (Previously Presented) The device of Claim 5, in communication with a second wireless device, wherein in a given assigned frequency band, the data speed is fixed but the power is varied, and wherein data be transmitted over a wireless network is

also determined by the ability to encode and decode the signal at the transmit and receive ends using the electronics and computing power resident at each end.

20. (Previously Presented) The device of Claim 19, wherein the device is enabled with multiple inputs and configured for sending data across multiple outputs.

21. (Previously Presented) The device of Claim 5, wherein data transferred to a mobile device over a wireless network is encoded and decoded at the mobile device after the data is received by a receiver.

### REMARKS

The application has received a Notice of Allowance. Claims 2 to 21 are in the application, of which all have been allowed. Claims 2 to 5 are independent and Claims 6 to 21 are dependent. No changes to the Claims have been made. No new matter has been added.

Applicants have revised their claim to domestic priority. As filed, the application claimed priority through a chain of applications back to December 16, 1996. At this time, the claim to priority has been truncated to June 4, 1999. An Application Data Sheet accompanies this Amendment, to reflect this change.

A new title is provided. The new title is reflected on the accompanying Application Data Sheet.

Applicants thank the Examiner for his indication that all of Claims 2 to 21 are allowed. The changes made herein are not believed to affect allowability. In particular it is noted that in his search strategy and search history, the Examiner has apparently already used a search date of July 17, 2000, and not the originally-claimed priority date of June 4, 1999, of December 16, 1996 such that the above truncation of the domestic priority claim should not affect allowability. See, for example, the Level 13 search ("L13") in the search history of 12/28/2015, which includes the search string of @ad< "20000717", which is understood to signify a search for documents having an application filing date before July 17, 2000.

No other matters being raised, it is believed the entire application is fully in condition for allowance, and such action is courteously solicited.

Any fees due in connection with this paper are being charged concurrently to a credit card, and no additional fees are believed due.

However, should it be determined that processing of this paper requires additional fees under 37 C.F.R. 1.16 or 1.17, the Director is hereby authorized to charge such fees to Deposit Account 506155.

All correspondence should continue to be directed to our below listed address.

Respectfully submitted,

/Sanjay K. Rao/  
Joint Inventor

/Sunil K. Rao/  
Joint Inventor

/Rekha K. Rao/  
Legal Representative for Joint Inventor,  
Raman K. Rao

/Rekha K. Rao/  
On behalf of Assignee

/Sanjay K. Rao/  
On behalf of Assignee

Correspondence Address:

3087 Alexis Drive  
Palo Alto, CA 94304

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<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	04245.001000.
		Application Number	
Title of Invention	SYSTEM TO INTERFACE INTERNET PROTOCOL (IP) BASED WIRELESS DEVICES WITH SUBTASKS AND CHANNELS		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

## Secrecy Order 37 CFR 5.2

<input type="checkbox"/>	Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2. (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)
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## Inventor Information:

Inventor	1				Remove	
Legal Name						
Prefix	Given Name	Middle Name	Family Name	Suffix		
	Sunil	K.	Rao			
Residence Information (Select One) <input checked="" type="radio"/> US Residency <input type="radio"/> Non US Residency <input type="radio"/> Active US Military Service						
City	Palo Alto	State/Province	CA	Country of Residence	US	
Mailing Address of Inventor:						
Address 1	3087 Alexis Drive					
Address 2						
City	Palo Alto	State/Province	CA			
Postal Code	94304	Country i	US			
Inventor	2				Remove	
Legal Name						
Prefix	Given Name	Middle Name	Family Name	Suffix		
	Sanjay	K.	Rao			
Residence Information (Select One) <input checked="" type="radio"/> US Residency <input type="radio"/> Non US Residency <input type="radio"/> Active US Military Service						
City	Palo Alto	State/Province	CA	Country of Residence	US	
Mailing Address of Inventor:						
Address 1	3087 Alexis Drive					
Address 2						
City	Palo Alto	State/Province	CA			
Postal Code	94304	Country i				
Inventor	3				Remove	
Legal Name						
Prefix	Given Name	Middle Name	Family Name	Suffix		
	Raman	K.	Rao			
Residence Information (Select One) <input checked="" type="radio"/> US Residency <input type="radio"/> Non US Residency <input type="radio"/> Active US Military Service						

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<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	04245.001000.	
		Application Number		
Title of Invention	SYSTEM TO INTERFACE INTERNET PROTOCOL (IP) BASED WIRELESS DEVICES WITH SUBTASKS AND CHANNELS			

City	Palo Alto	State/Province	CA	Country of Residence	US
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**Mailing Address of Inventor:**

Address 1	3087 Alexis Drive				
Address 2					
City	Palo Alto	State/Province	CA		
Postal Code	94304	Country i	US		

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button.

**Correspondence Information:**

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An Address is being provided for the correspondence information of this application.

Customer Number	105481		
Email Address	patent@ipholdings.com	<input type="button" value="Add Email"/>	<input type="button" value="Remove Email"/>

**Application Information:**

Title of the Invention	SYSTEM TO INTERFACE INTERNET PROTOCOL (IP) BASED WIRELESS DEVICES WITH SUBTASKS AND CHANNELS		
Attorney Docket Number	04245.001000.	Small Entity Status Claimed	<input checked="" type="checkbox"/>
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		Sub Class (if any)	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	5	Suggested Figure for Publication (if any)	

**Publication Information:**

Request Early Publication (Fee required at time of Request 37 CFR 1.219)

**Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

**Representative Information:**

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.



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.

<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	04245.001000.
		Application Number	
Title of Invention	SYSTEM TO INTERFACE INTERNET PROTOCOL (IP) BASED WIRELESS DEVICES WITH SUBTASKS AND CHANNELS		
Please Select One:			
<input checked="" type="radio"/> Customer Number		<input type="radio"/> US Patent Practitioner	<input type="radio"/> Limited Recognition (37 CFR 11.9)
Customer Number	105481		

**Domestic Benefit/National Stage Information:**

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

Prior Application Status	Patented					Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)	
13/621294	Continuation of	12/912607	2010-10-26	8824434	2014-09-02	
Prior Application Status	Patented					Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)	
12/912607	Continuation of	10/940428	2004-09-13	7848300	2010-12-07	
Prior Application Status	Patented					Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)	
10/940428	Continuation of	09/617608	2000-07-17	7286502	2007-10-23	
Prior Application Status	Patented					Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)	
09/617608	Continuation in part of	09/281739	1999-06-04	6169789	2001-01-02	
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.						Add

**Foreign Priority Information:**

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(a).

Remove			
Application Number	Country <sup>1</sup>	Filing Date (YYYY-MM-DD)	Priority Claimed
			Yes No
Additional Foreign Priority Data may be generated within this form by selecting the Add button.			
Add			

**Authorization to Permit Access:**

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.

<b>Application Data Sheet 37 CFR 1.76</b>	Attorney Docket Number	04245.001000.
	Application Number	
Title of Invention	SYSTEM TO INTERFACE INTERNET PROTOCOL (IP) BASED WIRELESS DEVICES WITH SUBTASKS AND CHANNELS	

#### Authorization to Permit Access to the Instant Application by the Participating Offices

If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing this Authorization.

### Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

<b>Applicant</b>	1	<input type="button" value="Remove"/>
<p>If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.</p>		
<input type="button" value="Clear"/>		
<input checked="" type="radio"/> Assignee	<input type="radio"/> Legal Representative under 35 U.S.C. 117	<input type="radio"/> Joint Inventor
Person to whom the inventor is obligated to assign.		Person who shows sufficient proprietary interest
If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:		
<div style="border: 1px solid black; height: 20px; width: 100%;"></div>		
Name of the Deceased or Legally Incapacitated Inventor : <input style="width: 400px;" type="text"/>		
If the Applicant is an Organization check here. <input checked="" type="checkbox"/>		
Organization Name	P Holdings, Inc.	

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.

<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	04245.001000.
		Application Number	
Title of Invention	SYSTEM TO INTERFACE INTERNET PROTOCOL (IP) BASED WIRELESS DEVICES WITH SUBTASKS AND CHANNELS		

<b>Mailing Address Information:</b>			
Address 1	3087 Alexis Drive		
Address 2			
City	Palo Alto	State/Province	CA
Country	US	Postal Code	94304
Phone Number		Fax Number	
Email Address			
Additional Applicant Data may be generated within this form by selecting the Add button.			<input type="button" value="Add"/>

**Non-Applicant Assignee Information:**

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

<b>Assignee</b>	1			
Complete this section only if non-applicant assignee information is desired to be included on the patent application publication in accordance with 37 CFR 1.215(b). Do not include in this section an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest), as the patent application publication will include the name of the applicant(s).				
				<input type="button" value="Remove"/>
If the Assignee is an Organization check here. <input type="checkbox"/>				
Prefix	Given Name	Middle Name	Family Name	Suffix
<b>Mailing Address Information:</b>				
Address 1				
Address 2				
City		State/Province		
Country		Postal Code		
Phone Number		Fax Number		
Email Address				
Additional Assignee Data may be generated within this form by selecting the Add button.				<input type="button" value="Add"/>

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.

<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	04245.001000.	
		Application Number		
Title of Invention	SYSTEM TO INTERFACE INTERNET PROTOCOL (IP) BASED WIRELESS DEVICES WITH SUBTASKS AND CHANNELS			

**Signature:**

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications

<b>Signature</b>	/Rekha K. Rao/			Date (YYYY-MM-DD)	2016-11-01
First Name	Rekha	Last Name	Rao	Registration Number	
Additional Signature may be generated within this form by selecting the Add button.					<input type="button" value="Add"/>

**Signature:**

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications

<b>Signature</b>	/Rekha K. Rao/			Date (YYYY-MM-DD)	2016-11-01
First Name	Rekha	Last Name	Rao (c/o Joint Inventor Ram)	Registration Number	
Additional Signature may be generated within this form by selecting the Add button.					<input type="button" value="Add"/>

**Signature:**

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications

<b>Signature</b>	/Sunil K. Rao/			Date (YYYY-MM-DD)	2016-11-01
First Name	Sunil	Last Name	Rao	Registration Number	
Additional Signature may be generated within this form by selecting the Add button.					<input type="button" value="Add"/>

**Signature:**

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications

<b>Signature</b>	/Sanjay K. Rao/			Date (YYYY-MM-DD)	2016-11-01
First Name	Sanjay	Last Name	Rao	Registration Number	
Additional Signature may be generated within this form by selecting the Add button.					<input type="button" value="Add"/>

This collection of information is required by 37 CFR 1.76. 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 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet 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.**

## 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 the Freedom of Information Act requires disclosure of these records.
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 inspections 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.

**Application Data Sheet**  
 (With markings pursuant to 37 C.F.R. § 1.76(c))

**Section Heading: Application Information:**

Title of the Invention	SYSTEM TO INTERFACE INTERNET PROTOCOL (IP) BASED WIRELESS DEVICES WITH <u>SUBTASKS AND CHANNELS</u> OPTICAL AND OTHER NETWORKS FOR <u>IMPROVED FLEXIBILITY, PERFORMANCE, AND DATA TRANSFER</u>		
Attorney Docket Number	04245.001000.	Small Entity Status Claimed	YES
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	5	Suggested Figure for Publication (if any)	

**Section Heading: Secrecy Order 37 CFR 5.2:**

NO portion or portions of the application associated with this Application Data Sheet falls under a Secrecy Order pursuant to 37 CFR 5.2

**Section Heading: Domestic Benefit/National Stage Information:**

Prior Application Status	<u>Patented</u> Pending				
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
This application 13/621,294	Continuation of	12/912607	2010-10-26	<u>8824434</u>	<u>2014-09-02</u>

Prior Application Status	Patented				
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
12/912607	Continuation of	10/940428	2004-09-13	7848300	2010-12-07

Prior Application Status	Patented				
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
10/940428	Continuation of	09/617608	2000-07-17	7286502	2007-10-23

Prior Application Status	Patented				
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Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
09/617608	Continuation in part of	09/281739	1999-06-04	6169789	2001-01-02

<del>Prior Application Status</del>	<del>Abandoned</del>	
-------------------------------------	----------------------	--

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
<del>09/281739</del>	<del>Continuation in part of</del>	<del>08/764,903</del>	<del>1996-12-16</del>

**Section Heading: Signature:**

Signature	/Rekha K. Rao/			Date (YYYY-MM-DD)	2016-11-01
First Name	Rekha K.	Last Name	Rao	Registration Number	

Signature	/Rekha K. Rao/			Date (YYYY-MM-DD)	2016-11-01
First Name	Rekha K.	Last Name	Rao	Registration Number	

Signature	/Sanjay K. Rao/			Date (YYYY-MM-DD)	2016-11-01
First Name	Sanjay K.	Last Name	Rao	Registration Number	

Signature	/Sunil K. Rao/			Date (YYYY-MM-DD)	2016-11-01
First Name	Sunil K.	Last Name	Rao	Registration Number	

04245.001000.

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application No.: 13/621,294	)	
	:	Examiner: Phirin Sam
First Named Inventor:	)	
	:	Group Art Unit: 2476
SUNIL K. RAO, ET AL.	)	
	:	Confirmation No.: 5130
Filed: September 17, 2012	)	
	:	
For: SYSTEM TO INTERFACE	)	
INTERNET PROTOCOL (IP)	:	
BASED WIRELESS DEVICES	)	
WITH SUBTASKS AND	:	
CHANNELS (As Amended)	)	November 01, 2016

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

REQUEST FOR UPDATED FILING RECEIPT

Commissioner:

Applicant hereby requests that a Corrected Filing Receipt be issued in the above captioned patent application. A new ADS and a supplementary ADS with markups was filed November 01, 2016 to identify that the claim to priority has been truncated to June 4, 1999.



**Priority Claimed:**

Prior Application Status		<u>Patented Pending</u>			
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
This application 13/621,294	Continuation of	12/912607	2010-10-26	<u>8824434</u>	<u>2014-09-02</u>

Prior Application Status		Patented			
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
12/912607	Continuation of	10/940428	2004-09-13	7848300	2010-12-07

Prior Application Status		Patented			
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
10/940428	Continuation of	09/617608	2000-07-17	7286502	2007-10-23

Prior Application Status		Patented			
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
09/617608	Continuation in part of	09/281739	1999-06-04	6169789	2001-01-02

Prior Application Status		Abandoned			
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)		
09/281739	Continuation in part of	08/764,903	1996-12-16		



## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	13621294			
<b>Filing Date:</b>	17-Sep-2012			
<b>Title of Invention:</b>	SYSTEM TO INTERFACE INTERNET PROTOCOL (IP) BASED WIRELESS DEVICES WITH OPTICAL AND OTHER NETWORKS FOR IMPROVED FLEXIBILITY, PERFORMANCE, AND DATA TRANSFER			
<b>First Named Inventor/Applicant Name:</b>	Sunil K. Rao			
<b>Filer:</b>	Rekha Kaliputnam Rao			
<b>Attorney Docket Number:</b>	04245.001000.			
Filed as Small Entity				
<b>Filing Fees for Utility under 35 USC 111(a)</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
<b>Extension-of-Time:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Miscellaneous:</b>				
RCE- 2ND AND SUBSEQUENT REQUEST	2820	1	850	850
<b>Total in USD (\$)</b>				<b>850</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	27391001
<b>Application Number:</b>	13621294
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	5130
<b>Title of Invention:</b>	SYSTEM TO INTERFACE INTERNET PROTOCOL (IP) BASED WIRELESS DEVICES WITH OPTICAL AND OTHER NETWORKS FOR IMPROVED FLEXIBILITY, PERFORMANCE, AND DATA TRANSFER
<b>First Named Inventor/Applicant Name:</b>	Sunil K. Rao
<b>Customer Number:</b>	5514
<b>Filer:</b>	Rekha Kaliputnam Rao
<b>Filer Authorized By:</b>	
<b>Attorney Docket Number:</b>	04245.001000.
<b>Receipt Date:</b>	01-NOV-2016
<b>Filing Date:</b>	17-SEP-2012
<b>Time Stamp:</b>	20:53:21
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$850
RAM confirmation Number	110216INTEFSW20561500
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

<b>File Listing:</b>					
<b>Document Number</b>	<b>Document Description</b>	<b>File Name</b>	<b>File Size(Bytes)/ Message Digest</b>	<b>Multi Part /.zip</b>	<b>Pages (if appl.)</b>
1	Request for Continued Examination (RCE)	RCE_Transmittal.pdf	697859	no	3
			c570e8173aa2043ee90ece345e7777a52f31cb92		
<b>Warnings:</b>					
<b>Information:</b>					
2	Amendment Submitted/Entered with Filing of CPA/RCE	RCE.pdf	383476	no	11
			a5a6e45d8a99981f050d2371aa8e63765b4c0e99		
<b>Warnings:</b>					
<b>Information:</b>					
3	Application Data Sheet	SupplementalADS.pdf	1433418	no	7
			a90db7b1c2f19764a9497feff5d281691aed0041		
<b>Warnings:</b>					
<b>Information:</b>					
4	Application Data Sheet	ADS.pdf	318837	no	2
			532dd5ee24b2064edececb85ba1f5fd34e4b85c5a		
<b>Warnings:</b>					
<b>Information:</b>					
This is not an USPTO supplied ADS fillable form					
5	Miscellaneous Incoming Letter	RequestUpdatedFilingReceipt.pdf	336160	no	3
			9460aab4c7e72c577bd0d3fa5b4ce2ea217eb333		
<b>Warnings:</b>					
<b>Information:</b>					
6	Fee Worksheet (SB06)	fee-info.pdf	30892	no	2
			758f3d2f4fe804ff07f9411d00a5e139f1c5c9db		
<b>Warnings:</b>					

<b>Information:</b>	
<b>Total Files Size (in bytes):</b>	3200642
<p><b>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.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b>  <b>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.</b></p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b>  <b>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.</b></p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b>  <b>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.</b></p>	

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.

<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875			Application or Docket Number <b>13/621,294</b>	Filing Date <b>09/17/2012</b>	<input type="checkbox"/> To be Mailed		
ENTITY: <input type="checkbox"/> LARGE <input checked="" type="checkbox"/> SMALL <input type="checkbox"/> MICRO							
<b>APPLICATION AS FILED – PART I</b>							
(Column 1)		(Column 2)					
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)			
<input type="checkbox"/> BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>	N/A	N/A	N/A				
<input type="checkbox"/> SEARCH FEE <small>(37 CFR 1.16(k), (l), or (m))</small>	N/A	N/A	N/A				
<input type="checkbox"/> EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>	N/A	N/A	N/A				
TOTAL CLAIMS <small>(37 CFR 1.16(j))</small>	minus 20 =	*	X \$ =				
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>	minus 3 =	*	X \$ =				
<input type="checkbox"/> APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small>	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 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).						
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small>							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL				
<b>APPLICATION AS AMENDED – PART II</b>							
(Column 1)		(Column 2)	(Column 3)				
AMENDMENT	<b>11/01/2016</b>	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 20	Minus	** 20	= 0	X \$40 = 0	
	Independent (37 CFR 1.16(h))	* 4	Minus	*** 4	= 0	X \$210 = 0	
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))						
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	<b>0</b>	
(Column 1)		(Column 2)	(Column 3)				
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =	
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))						
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE		
<p>* 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.</p>							

LIE  
NICOLE NICHOLSON

This collection of information is required by 37 CFR 1.16. 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, 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.





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

Table with 7 columns: APPLICATION NUMBER, FILING or 371(c) DATE, GRP ART UNIT, FIL FEE REC'D, ATTY DOCKET NO, TOT CLAIMS, IND CLAIMS. Row 1: 13/621,294, 09/17/2012, 2476, 740, 04245.001000, 4, 4

CONFIRMATION NO. 5130
CORRECTED FILING RECEIPT

5514
FITZPATRICK CELLA HARPER & SCINTO
1290 Avenue of the Americas
NEW YORK, NY 10104-3800



Date Mailed: 08/16/2016

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections

Inventor(s)
Sunil K. Rao, Palo Alto, CA;
Sanjay K. Rao, Palo Alto, CA;
Raman K. Rao, Palo Alto, CA, Deceased;

Applicant(s)
Rekha K. Rao, Palo Alto, CA, Legal Representative;

Assignment For Published Patent Application
IP HOLDINGS, INC., Palo Alto, CA

Power of Attorney: The patent practitioners associated with Customer Number 05514

Domestic Priority data as claimed by applicant
This application is a CON of 12/912,607 10/26/2010 PAT 8824434
which is a CON of 10/940,428 09/13/2004 PAT 7848300
which is a CON of 09/617,608 07/17/2000 PAT 7286502
which is a CIP of 09/281,739 06/04/1999 PAT 6169789
which is a CIP of 08/764,903 12/16/1996 ABN

Foreign Applications for which priority is claimed (You may be eligible to benefit from the Patent Prosecution Highway program at the USPTO. Please see http://www.uspto.gov for more information.) - None. Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: No

Permission to Access Search Results: No

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

**If Required, Foreign Filing License Granted:** 10/03/2012

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 13/621,294**

**Projected Publication Date:** Request for Non-Publication Acknowledged

**Non-Publication Request:** Yes

**Early Publication Request:** No

**\*\* SMALL ENTITY \*\***

**Title**

SYSTEM TO INTERFACE INTERNET PROTOCOL (IP) BASED WIRELESS DEVICES WITH OPTICAL AND OTHER NETWORKS FOR IMPROVED FLEXIBILITY, PERFORMANCE, AND DATA TRANSFER

**Preliminary Class**

370

**Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications:** No

## **PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES**

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative,

page 2 of 4

this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

**LICENSE FOR FOREIGN FILING UNDER  
Title 35, United States Code, Section 184  
Title 37, Code of Federal Regulations, 5.11 & 5.15**

**GRANTED**

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

**NOT GRANTED**

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

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The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop

technology, manufacture products, deliver services, and grow your business, visit <http://www.SelectUSA.gov> or call +1-202-482-6800.



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

NOTICE OF ALLOWANCE AND FEE(S) DUE

5514 7590 08/01/2016
FITZPATRICK CELLA HARPER & SCINTO
1290 Avenue of the Americas
NEW YORK, NY 10104-3800

EXAMINER

SAM, PHIRIN

ART UNIT PAPER NUMBER

2476

DATE MAILED: 08/01/2016

Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.

13/621,294 09/17/2012 Sunil K. Rao 04245.001000. 5130

TITLE OF INVENTION: SYSTEM TO INTERFACE INTERNET PROTOCOL (IP) BASED WIRELESS DEVICES WITH OPTICAL AND OTHER NETWORKS FOR IMPROVED FLEXIBILITY, PERFORMANCE, AND DATA TRANSFER

Table with 7 columns: APPLN. TYPE, ENTITY STATUS, ISSUE FEE DUE, PUBLICATION FEE DUE, PREV. PAID ISSUE FEE, TOTAL FEE(S) DUE, DATE DUE

nonprovisional SMALL \$480 \$0 \$0 \$480 11/01/2016

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 DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). 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. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

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.

**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)

5514 7590 08/01/2016  
**FITZPATRICK CELLA HARPER & SCINTO**  
 1290 Avenue of the Americas  
 NEW YORK, NY 10104-3800

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.
13/621,294	09/17/2012	Sunil K. Rao	04245.001000.	5130

TITLE OF INVENTION; SYSTEM TO INTERFACE INTERNET PROTOCOL (IP) BASED WIRELESS DEVICES WITH OPTICAL AND OTHER NETWORKS FOR IMPROVED FLEXIBILITY, PERFORMANCE, AND DATA TRANSFER

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$480	\$0	\$0	\$480	11/01/2016

EXAMINER	ART UNIT	CLASS-SUBCLASS
SAM, PHIRIN	2476	370-338000

<p>1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).</p> <p><input type="checkbox"/> Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.</p> <p><input type="checkbox"/> "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. <b>Use of a Customer Number is required.</b></p>	<p>2. For printing on the patent front page, list</p> <p>(1) The names of up to 3 registered patent attorneys or agents OR, alternatively, _____ 1</p> <p>(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. _____ 2</p> <p>_____ 3</p>
---	---

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

<p>4a. The following fee(s) are submitted:</p> <p><input type="checkbox"/> Issue Fee</p> <p><input type="checkbox"/> Publication Fee (No small entity discount permitted)</p> <p><input type="checkbox"/> Advance Order - # of Copies _____</p>	<p>4b. Payment of Fee(s): (<b>Please first reapply any previously paid issue fee shown above</b>)</p> <p><input type="checkbox"/> A check is enclosed.</p> <p><input type="checkbox"/> Payment by credit card. Form PTO-2038 is attached.</p> <p><input type="checkbox"/> The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).</p>
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5. **Change in Entity Status** (from status indicated above)

Applicant certifying micro entity status. See 37 CFR 1.29

Applicant asserting small entity status. See 37 CFR 1.27

Applicant changing to regular undiscounted fee status.

**NOTE:** Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

**NOTE:** If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

**NOTE:** Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____	Date _____
Typed or printed name _____	Registration No. _____



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
13/621,294 09/17/2012 Sunil K. Rao 04245.001000. 5130

5514 7590 08/01/2016
FITZPATRICK CELLA HARPER & SCINTO
1290 Avenue of the Americas
NEW YORK, NY 10104-3800

EXAMINER

SAM, PHIRIN

ART UNIT PAPER NUMBER

2476

DATE MAILED: 08/01/2016

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

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 1-(888)-786-0101 or (571)-272-4200.

## OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B 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.

### 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.



<b>Notice of Allowability</b>	<b>Application No.</b> 13/621,294	<b>Applicant(s)</b> RAO ET AL.	
	<b>Examiner</b> PHIRIN SAM	<b>Art Unit</b> 2476	<b>AIA (First Inventor to File) Status</b> No

**-- 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 05/27/2016.  
 A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on \_\_\_\_\_.
2.  An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_\_; the restriction requirement and election have been incorporated into this action.
3.  The allowed claim(s) is/are 2-21. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see [http://www.uspto.gov/patents/init\\_events/poh/index.jsp](http://www.uspto.gov/patents/init_events/poh/index.jsp) or send an inquiry to [PPHfeedback@uspto.gov](mailto:PPHfeedback@uspto.gov).
4.  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

- 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.**

5.  CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.  
 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)**

- |  |   |
|--|---|
| <ol style="list-style-type: none"> <li>1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)</li> <li>2. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),<br/>Paper No./Mail Date _____</li> <li>3. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br/>of Biological Material</li> <li>4. <input type="checkbox"/> Interview Summary (PTO-413),<br/>Paper No./Mail Date _____</li> </ol> | <ol style="list-style-type: none"> <li>5. <input type="checkbox"/> Examiner's Amendment/Comment</li> <li>6. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance</li> <li>7. <input type="checkbox"/> Other _____</li> </ol> |
|--|---|

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**DETAILED ACTION**

1. The present application is being examined under the pre-AIA first to invent provisions.

*Allowable Subject Matter*

2. The following is an examiner's statement of reasons for allowance:

**In regard amended claim 2**, the prior arts of record do not teach or suggest a wireless communication device comprising: a plurality of antennas; and a communication component coupled to the plurality of antennas, the communication component including a processor, a transmitter, and a receiver, wherein the communication component is configured to communicate via a first frequency band using a wireless communication protocol; and wherein one or more subtasks are assigned to one or more channels, and the one or more channels are sampled and clocked individually; and wherein the processor comprises multiple ones of the one or more channels and is further configured to process a first data stream and a second data stream in parallel.

**In regard amended claim 3**, the prior arts of record do not teach or suggest a wireless communication device comprising: a plurality of antennas; and a communication component coupled to the plurality of antennas, the communication component including a processor, a transmitter, and a receiver, wherein the communication component includes at least one additional transmitter; wherein the transmitter is configured to transmit on a first frequency and the at least one additional transmitter is configured to transmit on a second frequency; wherein

the transmitter is configured to transmit using a first communication protocol and the at least one additional transmitter is configured to transmit using a second communication protocol, wherein the first communication protocol is different than the second communication protocol; and wherein one or more subtasks are assigned to one or more channels, and the one or more channels are sampled and clocked individually; and wherein the processor comprises multiple ones of the one or more channels and is further configured to process a first data stream and a second data stream in parallel.

**In regard amended claim 4**, the prior arts of record do not teach or suggest a wireless communication device comprising: a plurality of antennas; and a communication component coupled to the plurality of antennas, the communication component including a processor, a transmitter, and a receiver, wherein the communication component includes at least one additional receiver; wherein the receiver is configured to receive using a first communication protocol and the at least one additional receiver is configured to receive using a second communication protocol, wherein the first communication protocol is different than the second communication protocol; and wherein one or more subtasks are assigned to one or more channels, and the one or more channels are sampled and clocked individually; and wherein the processor comprises multiple ones of the one or more channels and is further configured to process a first data stream and a second data stream in parallel.

**In regard amended claim 5**, the prior arts of record do not teach or suggest a wireless communication device comprising: a plurality of antennas; and a communication component

coupled to the plurality of antennas, the communication component including a processor, a transmitter, and a receiver, wherein a first set of antennas of the plurality of antennas is configured to operate in a first frequency band and a second set of antennas of the plurality of antennas is configured to operate in a second frequency band, wherein the first frequency band is different than the second frequency band; wherein the first set of antennas of the plurality of antennas is configured to operate using a first communication protocol and the second set of antennas of the plurality of antennas is configured to operate using a second communication protocol, wherein the first communication protocol is different than the second communication protocol; and wherein one or more subtasks are assigned to one or more channels, and the one or more channels are sampled and clocked individually; and wherein the processor comprises multiple ones of the one or more channels and is further configured to process a first data stream and a second data stream in parallel.

### *Conclusion*

3. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."
4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to PHIRIN SAM whose telephone number is (571)272-3082. The examiner can normally be reached on Flexible Work Schedule.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ayaz R. Sheikh can be reached on (571) 272-3795. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Respectfully submitted,

Date: July 25, 2016

By:     /Phirin Sam/      
Primary Examiner  
Art Unit 2476

<b>Notice of References Cited</b>	Application/Control No. 13/621,294	Applicant(s)/Patent Under Reexamination RAO ET AL.	
	Examiner PHIRIN SAM	Art Unit 2476	Page 1 of 1

**U.S. PATENT DOCUMENTS**

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-6,654,602 B1	11-2003	Fye; Donald Mugar	H04M3/42	455/414.1
*	B	US-6,009,264 A	12-1999	Merritt; John Earl	G06F9/5072	703/27
	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	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

**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.

<b>Search Notes</b>  	<b>Application/Control No.</b>  13621294	<b>Applicant(s)/Patent Under Reexamination</b>  RAO ET AL.
	<b>Examiner</b>  PHIRIN SAM	<b>Art Unit</b>  2476

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
370/328,329,336,338,339,340,341,342,347,351-354,356,436,437,442 (Text search - See search history printout).	06/16/2014; 04/04/2015	PS
H04B/02; H04B7/024; H04B7/026; H04B7/0404; H04B7/0408; H04B7/0413; H04B7/0452; H04B7/06; H04B7/08; H04W72/042; H04W72/0413; H04W72/0446 (See text search history).	04/04/2015	PS
h04w36/18;h04w16/24;h04w88/04;h04w88/06;h04w88/022;h04w88/16;h041/0002;h04127/12 (see text search history).	12/26/2015	PS
H04W64/026;H04W64/003;H04W64/006;H04W4/00;H04W4/003;H04W8/18;H04M1/026;H04B7/0404 (See text search history).	07/25/2016	PS


INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
	See text search history for interference.	07/25/2016	PS

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<b>Issue Classification</b> 	<b>Application/Control No.</b> 13621294	<b>Applicant(s)/Patent Under Reexamination</b> RAO ET AL.
	<b>Examiner</b> PHIRIN SAM	<b>Art Unit</b> 2476

<input type="checkbox"/> <b>Claims renumbered in the same order as presented by applicant</b>																<input type="checkbox"/> <b>CPA</b>		<input type="checkbox"/> <b>T.D.</b>		<input type="checkbox"/> <b>R.1.47</b>	
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original						
	1	16	17																		
1	2	17	18																		
5	3	18	19																		
8	4	19	20																		
12	5	20	21																		
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3	7																				
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7	10																				
9	11																				
10	12																				
11	13																				
13	14																				
14	15																				
15	16																				

NONE		<b>Total Claims Allowed:</b>	
		20	
(Assistant Examiner)	(Date)		
/PHIRIN SAM/ Primary Examiner. Art Unit 2476	07/25/2016	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	10

## EAST Search History

## EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	2	"20020154705".pn. or "6873608".pn.	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2016/07/25: 11:04
L2	3	"7848300".pn.	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2016/07/25: 11:33
L3	1	2 and sub\$1task\$1	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2016/07/25: 11:34
L4	1	"6169789".pn.	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2016/07/25: 11:46
L5	0	4 and sub\$1task\$1	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2016/07/25: 11:46
L6	1	"7286502".pn.	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2016/07/25: 11:47
L7	1	6 and sub\$1task\$1	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2016/07/25: 11:47
L8	330782	antennas	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2016/07/25: 11:48
L9	250013	(transmitters and receivers) or transceivers	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2016/07/25: 11:49
L10	2813470	processor\$1	US- PGPUB; USPAT;	OR	OFF	2016/07/25: 11:49

			USOCR; FPRS; EPO; JPO; IBM_TDB			
L11	15583	9 and 10	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2016/07/25 11:50
L12	320765	parallel\$4 near4 process\$3	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2016/07/25 11:50
L13	14042	11 and 12	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2016/07/25 11:50
L14	46	assign\$4 same sub\$1task\$3 same channel\$1	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2016/07/25 11:51
L15	2	13 and 14	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2016/07/25 11:51
L16	347	sub\$1task\$3 same channel\$1	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2016/07/25 11:55
L17	12	13 and 16	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2016/07/25 11:55
L18	1587	assign\$4 same sub\$1task\$3	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2016/07/25 12:00
L19	19	18 and 13	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2016/07/25 12:01
L20	10953	13 and (wireless or mobile)	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2016/07/25 12:01
L21	11	20 and (sub\$1task\$3 same channel\$3)	US- PGPUB;	OR	OFF	2016/07/25 12:02

			USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB			
L22	18	20 and (assign\$4 same sub\$1task\$3)	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2016/07/25; 12:02
L23	3674	20 and (server\$1 and controller and ((wireless or mobile) adj3 (device\$1 or unit\$1 or apparatus or terminal\$1)))	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2016/07/25; 12:05
L24	13	22 AND ( ( H01L2924/0002 OR H01L2924/00 OR H01L22/14 OR H01L22/20 OR H01L22/22 OR H01L25/0657 OR A63B2024/0025 OR A63B2024/0056 OR A63B2071/0691 OR A63B2102/32 OR A63B2220/12 OR A63B2220/13 OR A63B2220/14 OR A63B2220/20 OR A63B2220/62 OR A63B2220/836 OR A63B2225/50 OR A63B2225/54 OR A63B24/0021 OR A63B55/60 OR A63B55/61 OR A63B71/06 OR A63B2208/02 OR A63B2220/30 OR A63B2225/305 OR A63B57/00).CPC. )	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2016/07/25; 12:44
L25	3191	13 and (assign\$6 same channel\$4)	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2016/07/25; 12:46
L26	2040	25 and (sampl\$3 same (channel\$3 or data or signal\$4))	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2016/07/25; 12:47
L27	2013	26 and (parallel\$3 near4 process\$3)	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2016/07/25; 12:47
L28	1564	27 and wireless	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2016/07/25; 12:48
L29	800	28 and server\$1	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2016/07/25; 12:48
L30	741	29 and controller\$1	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2016/07/25; 12:48
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L32	3638	(H04M1/026;H04B7/0404). cpc.	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2016/07/25: 12:52
L33	422	30 and antennas	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2016/07/25: 12:53
L34	422	33 and frequenc\$3	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2016/07/25: 12:53
L35	199	34 AND ( ( H04W64/00 OR H04W4/22 OR H04W76/007 OR H04W72/085 OR H04W24/02 OR H04W88/08 OR H04W52/241 OR H04W72/042 OR H04W24/08 OR H04W16/14 OR H04W72/04 OR H04W28/06 OR H04W4/028 OR H04W52/265 OR H04W52/42 OR H04W72/044 OR H04W84/18 OR H04W88/06 OR H04W24/10 OR H04W72/046 OR H04W72/082 OR H04W4/02 OR H04W64/006 OR H04W72/08 OR H04W24/00 OR H04W28/04 OR H04W28/26 OR H04W52/243 OR H04W88/02 OR H04W4/003 OR H04W88/12 OR H04W8/18 OR H04W36/0033 OR H04W36/14 OR H04W4/00 OR H04W72/0453 OR H04W72/12 OR H04W84/10 OR H04W16/18 OR H04W16/26 OR H04W28/22 OR H04W36/0088 OR H04W40/08 OR H04W40/12 OR H04W40/20 OR H04W48/16 OR H04W48/18 OR H04W4/021 OR H04W80/04 OR H04W84/22 OR H04W88/085 OR H04W12/12 OR H04W36/0094 OR H04W36/18 OR H04W48/04 OR H04W52/028 OR H04W52/267 OR H04W72/0406 OR H04W72/0446 OR H04W72/0486 OR H04W72/1205 OR H04W72/1242 OR H04W72/1252 OR H04W72/1268 OR H04W72/1278 OR H04W76/02 OR H04W88/16 OR H04W8/005 OR H04W8/245 OR H04W12/06 OR H04W12/08 OR H04W28/08 OR H04W36/06 OR H04W36/22 OR H04W40/02 OR H04W48/06 OR H04W48/08 OR H04W4/008 OR H04W4/025 OR H04W4/026 OR H04W4/027 OR H04W4/12 OR H04W4/18 OR H04W4/20 OR H04W56/001 OR H04W60/005 OR H04W68/02 OR H04W72/02 OR H04W72/0413 OR H04W72/087 OR H04W72/1263 OR H04W80/00 OR H04W84/02 OR H04W84/04 OR H04W84/047 OR H04W84/12 OR H04W88/10 OR H04W92/00 OR H04W92/02 OR H04W92/12). cpc. )	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2016/07/25: 12:54
L36	38054	(H04W64/026;H04W64/003;H04W64/006;H04W4/00;H04W4/003;H04W8/18). cpc.	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2016/07/25: 12:58
L37	41670	(H04W64/026;H04W64/003;H04W64/006;H04W4/00;H04W4/003;H04W8/18;H04M1/026;H04B7/0404). cpc.	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2016/07/25: 12:59
L38	15	37 and 34	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2016/07/25: 12:59
L39	0	(sub\$1task\$3 same assign\$4 same (channel\$1 or slot\$1 or time\$1slot\$1 or (time adj2 slot\$1)) same sampl\$3). dm.	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2016/07/25: 13:00


EAST Search History (Interference)

Ref	Hits	Search Query	DBs	Default	Plurals	Time
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7/25/2016 1:07:21 PM

C:\Users\psam\Documents\EAST\Workspaces\14-855321.wsp

<b><i>Index of Claims</i></b> 	<b>Application/Control No.</b> 13621294	<b>Applicant(s)/Patent Under Reexamination</b> RAO ET AL.
	<b>Examiner</b> PHIRIN SAM	<b>Art Unit</b> 2476

✓	<b>Rejected</b>	-	<b>Cancelled</b>	N	<b>Non-Elected</b>	A	<b>Appeal</b>
=	<b>Allowed</b>	÷	<b>Restricted</b>	I	<b>Interference</b>	O	<b>Objected</b>

Claims renumbered in the same order as presented by applicant
  CPA
  T.D.
  R.1.47

CLAIM		DATE							
Final	Original	06/16/2014	12/26/2015	07/25/2016					
	1	-	-	-					
	2	✓	✓	=					
	3	✓	✓	=					
	4	✓	✓	=					
	5	✓	✓	=					
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	7		✓	=					
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	17		✓	=					
	18		✓	=					
	19		✓	=					
	20		✓	=					
	21		✓	=					



04245.001000.

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application No.: 13/621,294	)	
	:	Examiner: Phirin Sam
First Named Inventor:	)	
	:	Group Art Unit: 2476
SUNIL K. RAO, ET AL.	)	
	:	Confirmation No.: 5130
Filed: September 17, 2012	)	
	:	
For: A SYSTEM TO INTERFACE	)	
INTERNET PROTOCOL (IP) BASED	:	
WIRELESS DEVICES WITH	)	
OPTICAL AND OTHER NETWORKS	:	
FOR IMPROVED FLEXIBILITY,	)	
PERFORMANCE, AND DATA	:	
TRANSFER	)	May 27, 2016

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

AMENDMENT

Commissioner:

In response to the Office Action dated December 28, 2015, the period for response having been extended to May 28, 2016, by the accompanying Petition for Extension of Time with fee, please amend the above-identified application, as follows:

CERTIFICATE OF EFS-WEB TRANSMISSION  
I hereby certify that this correspondence is being filed electronically by EFS-Web transmission to the United States Patent Office on  
May 27, 2016  
(Date of Deposit)

Michael K. O'Neill, Reg. No. 32,622  
(Name of Attorney for Applicants)

/Michael K. O'Neill/                      May 27, 2016  
Signature                                      Date of Signature

IN THE CLAIMS:

Please amend the claims as follows:

1. (Cancelled).

2. (Currently Amended) A wireless communication device comprising:  
a plurality of antennas; and

a communication component coupled to the plurality of antennas, the communication component including a processor, a transmitter, and a receiver, ~~the communication component configured to transmit a first data stream by simultaneously transmitting a first plurality of signal streams using the plurality of antennas, the first plurality of signal streams collectively representing the first data stream, the communication component configured to receive a second data stream by simultaneously receiving a second plurality of signal streams using the plurality of antennas and generating the second data stream from the second plurality of signal streams;~~

wherein the communication component is configured to communicate via a first frequency band using a wireless communication protocol; and

wherein one or more subtasks are assigned to one or more channels, and the one or more channels are sampled and clocked individually; and

wherein the processor comprises multiple ones of the one or more channels and is further configured to process [[the]] a first data stream and [[the]] a second data stream in parallel.

3. (Currently Amended) A wireless communication device comprising:

a plurality of antennas; and

a communication component coupled to the plurality of antennas, the communication component including a processor, a transmitter, and a receiver, ~~the communication component configured to transmit a first data stream by simultaneously transmitting a first plurality of signal streams using the plurality of antennas, the first plurality of signal streams collectively representing the first data stream, the communication component configured to receive a second data stream by simultaneously receiving a second plurality of signal streams using the plurality of antennas and generating the second data stream from the second plurality of signal streams;~~

wherein the communication component includes at least one additional transmitter;

wherein the transmitter is configured to transmit on a first frequency and the at least one additional transmitter is configured to transmit on a second frequency;

wherein the transmitter is configured to transmit using a first communication protocol and the at least one additional transmitter is configured to transmit using a second communication protocol, wherein the first communication protocol is different than the second communication protocol; and

wherein one or more subtasks are assigned to one or more channels, and the one or more channels are sampled and clocked individually; and

wherein the processor comprises multiple ones of the one or more channels and is further configured to process [[the]] a first data stream and [[the]] a second data stream in parallel.

4. (Currently Amended) A wireless communication device comprising:

a plurality of antennas; and

a communication component coupled to the plurality of antennas, the communication component including a processor, a transmitter, and a receiver, ~~the communication component configured to transmit a first data stream by simultaneously transmitting a first plurality of signal streams using the plurality of antennas, the first plurality of signal streams collectively representing the first data stream, the communication component configured to receive a second data stream by simultaneously receiving a second plurality of signal streams using the plurality of antennas and generating the second data stream from the second plurality of signal streams; and~~

wherein the communication component includes at least one additional receiver;

wherein the receiver is configured to receive using a first communication protocol and the at least one additional receiver is configured to receive using a second communication protocol, wherein the first communication protocol is different than the second communication protocol; and

wherein one or more subtasks are assigned to one or more channels, and the one or more channels are sampled and clocked individually; and

wherein the processor comprises multiple ones of the one or more channels and is further configured to process [[the]] a first data stream and [[the]] a second data stream in parallel.

5. (Currently Amended) A wireless communication device comprising:

a plurality of antennas; and

a communication component coupled to the plurality of antennas, the communication component including a processor, a transmitter, and a receiver, ~~the communication component configured to transmit a first data stream by simultaneously transmitting a first plurality of signal streams using the plurality of antennas, the first plurality of signal streams collectively representing the first data stream, the communication component configured to receive a second data stream by simultaneously receiving a second plurality of signal streams using the plurality of antennas and generating the second data stream from the second plurality of signal streams; and~~

wherein a first set of antennas of the plurality of antennas is configured to operate in a first frequency band and a second set of antennas of the plurality of antennas is configured to operate in a second frequency band, wherein the first frequency band is different than the second frequency band;

wherein the first set of antennas of the plurality of antennas is configured to operate using a first communication protocol and the second set of antennas of the plurality of antennas is configured to operate using a second communication protocol, wherein the first communication protocol is different than the second communication protocol; and

wherein one or more subtasks are assigned to one or more channels, and the one or more channels are sampled and clocked individually; and

wherein the processor comprises multiple ones of the one or more channels and is further configured to process [[the]] a first data stream and [[the]] a second data stream in parallel.

6. (Previously Presented) The device of Claim 2, wherein the device is enabled to multiplex incoming and outgoing wireless signals and further configured with

enhanced capabilities to differentiate between various signals or to combine multiple paths into a single communication channel.

7. (Previously Presented) The device of Claim 2, further in communication with a network switch box configured with a plurality of ports and configured to connect to a plurality of networks to forward packets between different networks and join a virtual network.

8. (Previously Presented) The device of Claim 7, further in communication with a second network switch box, wherein the first network switch box is configured to transmit and receive a plurality of data packets from and to the second network switch box over at least one network path.

9. (Previously Presented) The device of Claim 3, in communication with a server configured with a controller in communication with a plurality of network devices wherein the server supervises the connection of a plurality of wireless devices.

10. (Previously Presented) The device of Claim 9, wherein the device operates with a plurality of streams including a first stream and a second stream and multipath communication.

11. (Previously Presented) The device of Claim 4, wherein the device is enabled to operate on a plurality of frequencies including a higher frequency and lower frequencies.

12. (Previously Presented) The device of Claim 11, wherein the device is enabled to communicate with a network device server, said server comprising a plurality of antennas sequentially or simultaneously.

13. (Previously Presented) The device of Claim 12, wherein the device is a cellular telephone with multiple processors and further multiplex incoming and outgoing wireless signals.

14. (Previously Presented) The device of Claim 5, wherein the device is enabled for internet protocol based data communication.

15. (Previously Presented) The device of Claim 14, wherein the device is enabled to send and receive a plurality of streams using multipath communication.

16. (Previously Presented) The device of Claim 5, wherein the device is enabled to modulate power levels, frequency and the signal strength as determined by one or more of the power, line of sight, or interference or combinations thereof.

17. (Previously Presented) The device of Claim 16, wherein the device is a network box and wherein a signal stream is split into a plurality of signal streams.

18. (Previously Presented) The device of Claim 17, wherein the device is enabled to be in communication with a mobile device and a network switch box.

19. (Previously Presented) The device of Claim 5, in communication with a second wireless device, wherein in a given assigned frequency band, the data speed is fixed but the power is varied, and wherein data be transmitted over a wireless network is also determined by the ability to encode and decode the signal at the transmit and receive ends using the electronics and computing power resident at each end.

20. (Previously Presented) The device of Claim 19, wherein the device is enabled with multiple inputs and configured for sending data across multiple outputs.

21. (Previously Presented) The device of Claim 5, wherein data transferred to a mobile device over a wireless network is encoded and decoded at the mobile device after the data is received by a receiver.



REMARKS

This application has been carefully reviewed in light of the Office Action dated December 28, 2015. Claims 2 to 21 are in the application, of which Claims 2 to 5 are independent. Reconsideration and further examination are respectfully requested.

The Office Action entered a rejection of all claims, under pre-AIA 35 U.S.C. § 102(e) or pre-AIA 35 U.S.C. § 103(a), but it is believed that the art relied on by the Office is not prior art to the subject application. Specifically, it is Applicants' understanding that the subject application is entitled to its claim to domestic priority of December 16, 1996. In contrast, the art applied in the rejection is entitled only to dates after December 16, 1996, as follows:

Applied Art	Earliest Apparent Date (based solely on cover page analysis)
U.S. Application Publication No. 2002/0154705 (Walton) (published October 24, 2002)	March 22, 2000
U.S. Patent No. 6,873,608 (Plotnik) (published March 29, 2005)	August 6, 1997
U.S. Patent No. 7,720,468 (Hong) (published May 18, 2010)	June 23, 1999
U.S. Patent No. 6,498,939 (Thomas) (published December 24, 2002)	June 12, 2000

As such, it is believed that the art relied on by the Office is not prior art to the subject application. The rejections are therefore traversed, and their withdrawal is respectfully requested.

It will moreover be appreciated that as amended, the present claims relate generally to wireless communication in which a plurality of antennas are coupled to a communication component. In such wireless communication, the communication component includes a processor, a transmitter, and a receiver. According to one further

aspect of the claims, one or more subtasks are assigned to one or more channels and the one or more channels are sampled and clocked individually.

Further, it is respectfully submitted that the applied art does not disclose or suggest the subject matter defined by the claims herein.

When considered as a whole, therefore, it is respectfully submitted that the claims herein recite subject matter that would not have been obvious to those of ordinary skill in the art based any permissible combination of Walton, Plotnik, Hong or Thomas, and allowance is respectfully requested.

No other matters being raised, it is believed the entire application is fully in condition for allowance, and such action is courteously solicited.

Any fees due in connection with this paper are being charged concurrently to a credit card, and no additional fees are believed due. However, should it be determined that processing of this paper requires additional fees under 37 C.F.R. 1.16 or 1.17, the Commissioner is hereby authorized to charge such fees to Deposit Account 06-1205.

Applicants' undersigned attorney may be reached in our Costa Mesa, California office by telephone at (714) 540-8700. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,

/Michael K. O'Neill/  
Michael K. O'Neill  
Attorney for Applicants  
Registration No. 32,622

FITZPATRICK, CELLA, HARPER & SCINTO  
1290 Avenue of the Americas  
New York, New York 10104-3800  
Facsimile: (212) 218-2200

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	13621294			
<b>Filing Date:</b>	17-Sep-2012			
<b>Title of Invention:</b>	SYSTEM TO INTERFACE INTERNET PROTOCOL (IP) BASED WIRELESS DEVICES WITH OPTICAL AND OTHER NETWORKS FOR IMPROVED FLEXIBILITY, PERFORMANCE, AND DATA TRANSFER			
<b>First Named Inventor/Applicant Name:</b>	Sunil K. Rao			
<b>Filer:</b>	Michael K. O'Neill			
<b>Attorney Docket Number:</b>	04245.001000.			
Filed as Small Entity				
<b>Filing Fees for Utility under 35 USC 111(a)</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
<b>Extension-of-Time:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension - 2 months with \$0 paid	2252	1	300	300
<b>Miscellaneous:</b>				
<b>Total in USD (\$)</b>				<b>300</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	25914546
<b>Application Number:</b>	13621294
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	5130
<b>Title of Invention:</b>	SYSTEM TO INTERFACE INTERNET PROTOCOL (IP) BASED WIRELESS DEVICES WITH OPTICAL AND OTHER NETWORKS FOR IMPROVED FLEXIBILITY, PERFORMANCE, AND DATA TRANSFER
<b>First Named Inventor/Applicant Name:</b>	Sunil K. Rao
<b>Customer Number:</b>	5514
<b>Filer:</b>	Michael K. O'Neill
<b>Filer Authorized By:</b>	
<b>Attorney Docket Number:</b>	04245.001000.
<b>Receipt Date:</b>	27-MAY-2016
<b>Filing Date:</b>	17-SEP-2012
<b>Time Stamp:</b>	20:45:49
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$300
RAM confirmation Number	8409
Deposit Account	503939
Authorized User	O'NEILL, MICHAEL K.

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 CFR 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 CFR 1.17 (Patent application and reexamination processing fees)

<b>File Listing:</b>					
<b>Document Number</b>	<b>Document Description</b>	<b>File Name</b>	<b>File Size(Bytes)/ Message Digest</b>	<b>Multi Part /.zip</b>	<b>Pages (if appl.)</b>
1	Extension of Time	04245_001000_Extension_05272016.pdf	54867 b2a528d1e18d5fcfdeb06c0d7bbe03a00d340f51	no	2
<b>Warnings:</b>					
<b>Information:</b>					
2	Amendment/Req. Reconsideration-After Non-Final Reject	04245_001000_Amend_05272016.pdf	69400 11a849ccf86f2a4f0d9e52739bcdab89ad16ea8	no	11
<b>Warnings:</b>					
<b>Information:</b>					
3	Fee Worksheet (SB06)	fee-info.pdf	30888 4dd1c014d4ca0edf9e2c8844f32d768893b07d3f	no	2
<b>Warnings:</b>					
<b>Information:</b>					
<b>Total Files Size (in bytes):</b>			155155		
<p><b>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.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b>  <b>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.</b></p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b>  <b>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.</b></p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b>  <b>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.</b></p>					

04245.001000.

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application No.: 13/621,294	)	
	:	Examiner: Phirin Sam
First Named Inventor:	)	
	:	Group Art Unit: 2476
SUNIL K. RAO, ET AL.	)	
	:	Confirmation No.: 5130
Filed: September 17, 2012	)	
	:	
For: A SYSTEM TO INTERFACE	)	
INTERNET PROTOCOL (IP) BASED	:	
WIRELESS DEVICES WITH	)	
OPTICAL AND OTHER NETWORKS	:	
FOR IMPROVED FLEXIBILITY,	)	
PERFORMANCE, AND DATA	:	
TRANSFER	)	May 27, 2016

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

PETITION FOR EXTENSION OF TIME  
UNDER 37 C.F.R. § 1.136(a)

Commissioner:

Applicant petitions the Commissioner for Patents to extend the time for response to the Office Action dated December 28, 2015 for two months from March 28, 2016 to May 28, 2016.

CERTIFICATE OF EFS-WEB TRANSMISSION  
I hereby certify that this correspondence is being filed electronically by EFS-Web transmission to the United States Patent Office on  
May 27, 2016  
(Date of Deposit)

Michael K. O'Neill, Reg. No. 32,622  
(Name of Attorney for Applicants)

/Michael K. O'Neill/  
Signature

May 27, 2016  
Date of Signature



The \$300.00 (small entity) fee for this extension is being charged concurrently to a credit card. The Commissioner is authorized to charge any deficiency in this fee, or to credit any overpayment therein, to Deposit Account No. 06-1205.

Applicants' undersigned attorney may be reached in our Costa Mesa, California office by telephone at (714) 540-8700. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,

/Michael K. O'Neill/  
Michael K. O'Neill  
Attorney for Applicants  
Registration No. 32,622

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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.

<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875			Application or Docket Number <b>13/621,294</b>	Filing Date <b>09/17/2012</b>	<input type="checkbox"/> To be Mailed		
ENTITY: <input type="checkbox"/> LARGE <input checked="" type="checkbox"/> SMALL <input type="checkbox"/> MICRO							
<b>APPLICATION AS FILED – PART I</b>							
(Column 1)		(Column 2)					
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)			
<input type="checkbox"/> BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>	N/A	N/A	N/A				
<input type="checkbox"/> SEARCH FEE <small>(37 CFR 1.16(k), (l), or (m))</small>	N/A	N/A	N/A				
<input type="checkbox"/> EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>	N/A	N/A	N/A				
TOTAL CLAIMS <small>(37 CFR 1.16(j))</small>	minus 20 =	*	X \$ =				
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>	minus 3 =	*	X \$ =				
<input type="checkbox"/> APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small>	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 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).						
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small>							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL				
<b>APPLICATION AS AMENDED – PART II</b>							
(Column 1)		(Column 2)	(Column 3)				
AMENDMENT	<b>05/27/2016</b>	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 20	Minus	** 20	= 0	X \$40 = 0	
	Independent (37 CFR 1.16(h))	* 4	Minus	*** 4	= 0	X \$210 = 0	
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))						
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	<b>0</b>	
(Column 1)		(Column 2)	(Column 3)				
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =	
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))						
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE		
<p>* 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.</p>							

LIE  
/MARGARET BYARS/

This collection of information is required by 37 CFR 1.16. 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, 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.



UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/621,294	09/17/2012	Sunil K. Rao	04245.001000.	5130

5514 7590 12/28/2015  
FITZPATRICK CELLA HARPER & SCINTO  
1290 Avenue of the Americas  
NEW YORK, NY 10104-3800

EXAMINER
----------

SAM, PHIRIN

ART UNIT	PAPER NUMBER
2476	

MAIL DATE	DELIVERY MODE
12/28/2015	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 13/621,294	<b>Applicant(s)</b> RAO ET AL.	
	<b>Examiner</b> PHIRIN SAM	<b>Art Unit</b> 2476	<b>AIA (First Inventor to File) Status</b> No

-- 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 MONTHS 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 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 07/07/2015.  
 A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on \_\_\_\_\_.
- 2a)  This action is **FINAL**.                      2b)  This action is non-final.
- 3)  An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_\_; the restriction requirement and election have been incorporated into this action.
- 4)  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\***

- 5)  Claim(s) 2-21 is/are pending in the application.  
5a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 6)  Claim(s) \_\_\_\_\_ is/are allowed.
- 7)  Claim(s) 2-21 is/are rejected.
- 8)  Claim(s) \_\_\_\_\_ is/are objected to.
- 9)  Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

\* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see [http://www.uspto.gov/patents/init\\_events/pph/index.jsp](http://www.uspto.gov/patents/init_events/pph/index.jsp) or send an inquiry to [PPHfeedback@uspto.gov](mailto:PPHfeedback@uspto.gov).

**Application Papers**

- 10)  The specification is objected to by the Examiner.
- 11)  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).

**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).

**Certified copies:**

- 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)).

\*\* 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)  Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)  
Paper No(s)/Mail Date 08/31/15
- 3)  Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 4)  Other: \_\_\_\_\_

### DETAILED ACTION

1. The present application is being examined under the pre-AIA first to invent provisions.

#### *Claim Rejections - 35 USC § 102*

2. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

3. The following is a quotation of the appropriate paragraphs of pre-AIA 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 a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (**pre-AIPA** 35 U.S.C. 102(e)).

4. Claim 2 is rejected under pre-AIA 35 U.S.C. 102(e) as being anticipated by US Pub. 2002/0154705 to Walton et al. (hereinafter Walton).

**In regard to claim 2**, Walton teaches or suggests a wireless communication device (see Fig. 1) comprising:

a plurality of antennas (see Fig. 1, elements 116a-116t and 122a-122t); and  
a communication component coupled to the plurality of antennas (see Fig. 1, elements 114a-114t, 112, 116a-116t, 124a-124t, 126, and 1221-122t), the communication component including a processor (see Fig. 1, elements 112 and 126), a transmitter, and a receiver (see Fig. 1, elements 114a-114t and 124a-124t, abstract, paragraphs [0032], [0033]), the communication component configured to transmit a first data stream by simultaneously transmitting a first plurality of signal streams using the plurality of antennas (see Fig. 1, paragraph [0074], *a channel data stream that is transmitted on one particular sub-channel from four transmit antennas. The channel data stream is demultiplexed into four data sub-streams, one data sub-stream for each transmit antenna. Each data sub-stream is then modulated using a particular modulation scheme (e.g., M-PSK, M-QAM, or other) selected based on the CSI for that sub-band and for that transmit antenna. Four modulation sub-streams are thus generated for the four data sub-streams, with each modulation sub-streams including a stream of modulation symbols.*), the first plurality of signal streams collectively representing the first data stream (see Fig. 1, abstract, paragraphs [0074], and [0096], *the aggregate input data stream that includes all data to be transmitted by system 110 is provided to a demultiplexer (DEMUX) 310 within data processor 112. Demultiplexer 310 demultiplexes the input data stream into a number of*

*(K) channel data stream, S, through Sk. Each channel data stream may correspond to, for example, a signaling channel, a broadcast channel, a voice call, or a traffic data transmission.*), the communication component configured to receive a second data stream by simultaneously receiving a second plurality of signal streams using the plurality of antennas (see Fig. 1, paragraphs [0104], [0110], and [0111], *each sub-channel data stream is then provided to a respective spatial division processor 430. Each spatial division processor 430 may further demultiplex the received sub-channel data stream into a number of (up to  $N_t$ ) data sub-streams, one data sub-stream for each antenna used to transmit the data.*) and generating the second data stream from the second plurality of signal streams (see Fig. 1, and 6, paragraphs [0029], [0074], [0110], and [0111], *the channel data stream is demultiplexed into four data sub-streams, one data sub-stream for each transmit antenna. Within channel data processor 400, a demultiplexer 420 receives and demultiplexes the encoded data stream, Xi, into a number of sub-channel data streams. Each sub-channel data stream is then provided to a respective spatial division processor 430. Each spatial division processor 430 may further demultiplex the received sub-channel data stream into a number of (up to  $N_T$ ) data sub-streams*),

wherein the communication component is configured to communicate via a first frequency band using a wireless communication protocol (see paragraphs [0016], [0017], [0042], [0043], [0044], [0048], [0049], and [0053]); and

wherein the processor comprises multiple channels configured to process the first data stream and the second data stream in parallel (see Figs. 1, 2, 5c, and 6, paragraphs [0062], [0075], [0099], [0101], [0104], and [0107], *the full-CSI based processing is typically employed in*

*the MIMO communications mode where parallel data streams are transmitted to a specific user on each of the channel eigenmodes for the each of the allocated sub-channels. Data processor 320 assigns each channel data stream to one or more sub-channels, at one or more time slots, and on one or more antennas. For example, for a channel data stream corresponding to a voice call, data processor 320 may assign one sub-channel on one antenna (if transmit diversity is not used) or multiple antennas (if transmit diversity is used) for as many time slots as needed for that call. For a channel data stream corresponding to a signaling or broadcast channel, data processor 320 may assign the designated sub-channel(s) on one or more antennas, again depending on whether transmit diversity is used).*

***Claim Rejections - 35 USC § 103***

5. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

6. The following is a quotation of pre-AIA 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 negated by the manner in which the invention was made.



This application currently names joint inventors. In considering patentability of the claims under pre-AIA 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of pre-AIA 35 U.S.C. 103(c) and potential pre-AIA 35 U.S.C. 102(e), (f) or (g) prior art under pre-AIA 35 U.S.C. 103(a).

7. Claims 3-6, 11, 16, 17, and 19-21 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Walton in view of US Patent 6,873,608 to Plotnik et al. (hereinafter Plotnik).

**In regard to claim 3**, Walton teaches or suggests a wireless communication device (see Fig. 1) comprising:

a plurality of antennas (see Fig. 1, elements 116a-116t and 122a-122t); and  
a communication component coupled to the plurality of antennas (see Fig. 1, elements 114a-114t, 112, 116a-116t, 124a-124t, 126, and 1221-122t), the communication component including a processor (see Fig. 1, elements 112 and 126), a transmitter, and a receiver (see Fig. 1, elements 114a-114t and 124a-124t, abstract, paragraphs [0032], [0033]), the communication component configured to transmit a first data stream by simultaneously transmitting a first plurality of signal streams using the plurality of antennas (see Fig. 1, paragraph [0074], *a channel data stream that is transmitted on one particular sub-channel from four transmit*

*antennas. The channel data stream is demultiplexed into four data sub-streams, one data sub-stream for each transmit antenna. Each data sub-stream is then modulated using a particular modulation scheme (e.g., M-PSK, M-QAM, or other) selected based on the CSI for that sub-band and for that transmit antenna. Four modulation sub-streams are thus generated for the four data sub-streams, with each modulation sub-streams including a stream of modulation symbols.*), the first plurality of signal streams collectively representing the first data stream (see Fig. 1, abstract, paragraphs [0074], [0096], *the aggregate input data stream that includes all data to be transmitted by system 110 is provided to a demultiplexer (DEMUX) 310 within data processor 112. Demultiplexer 310 demultiplexes the input data stream into a number of (K) channel data stream, S, through Sk. Each channel data stream may correspond to, for example, a signaling channel, a broadcast channel, a voice call, or a traffic data transmission.*), the communication component configured to receive a second data stream by simultaneously receiving a second plurality of signal streams using the plurality of antennas (see Fig. 1, paragraphs [0104], [0110], [0111], *each sub-channel data stream is then provided to a respective spatial division processor 430. Each spatial division processor 430 may further demultiplex the received sub-channel data stream into a number of (up to Nt) data sub-streams, one data sub-stream for each antenna used to transmit the data.*) and generating the second data stream from the second plurality of signal streams (see Fig. 1, 6, paragraphs [0029], [0074], [0110], and [0111], *the channel data stream is demultiplexed into four data sub-streams, one data sub-stream for each transmit antenna. Within channel data processor 400, a demultiplexer 420 receives and demultiplexes the encoded data stream, Xi, into a number of sub-channel data streams. Each sub-channel data stream is then provided to a respective*

***spatial division processor 430. Each spatial division processor 430 may further demultiplex the received sub-channel data stream into a number of (up to  $N_t$ ) data sub-streams);***

wherein the communication component includes at least one additional transmitter (see Figs. 1, 3, 4b, and 5a, paragraphs [0033], [0034], [0035], and [0045]);

wherein the transmitter is configured to transmit on a first frequency and the at least one additional transmitter is configured to transmit on a second frequency (see Figs. 1, 3, 4b, and 5a, paragraphs [0033], [0034], [0035], and [0045]);

wherein the processor comprises multiple channels configured to process the first data stream and the second data stream in parallel (see Fig. , paragraphs [0062], [0075], [0099], [0101], [0104], [0107], ***the full-CSI based processing is typically employed in the MIMO communications mode where parallel data streams are transmitted to a specific user on each of the channel eigenmodes for the each of the allocated sub-channels. Data processor 320 assigns each channel data stream to one or more sub-channels, at one or more time slots, and on one or more antennas. For example, for a channel data stream corresponding to a voice call, data processor 320 may assign one sub-channel on one antenna (if transmit diversity is not used) or multiple antennas (if transmit diversity is used) for as many time slots as needed for that call. For a channel data stream corresponding to a signaling or broadcast channel, data processor 320 may assign the designated sub-channel(s) on one or more antennas, again depending on whether transmit diversity is used.***

Walton may not teach or suggest wherein the transmitter is configured to transmit using a first communication protocol and the at least one additional transmitter is configured to transmit

using a second communication protocol, wherein the first communication protocol is different than the second communication protocol.

However, Plotnik teaches or suggests wherein the transmitter is configured to transmit using a first communication protocol (see Fig. 4, col. 2, lines 57-67, col. 8, lines 1-6, 44-51, *the term cellular transceiver is defined as any apparatus having one or more antennas and RF circuitry that is capable of receiving and transmitting a wireless cellular signal. The term cellular protocol denotes the compatibility specification permitting a mobile station and a land station to communicate with each other*) and the at least one additional transmitter is configured to transmit using a second communication protocol (see Figs. 5, 10, col. 2, lines 57-67, col. 8, lines 1-6), wherein the first communication protocol is different than the second communication protocol (see Fig. 5, col. 2, lines 58-67, col. 3, lines 1-22, col. 12, lines 43-47, *the PSTN modem task 164 operates in either ground line or cellular mode. In cellular mode it operates with special optimizations and protocols to yield more efficient cellular data communications. The PSTN block provides standard telephony modulations such as ITU-T V.32bis, V.34, etc.*).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the transmitter and receiver units for use in communications system of Walton by including the transmitter is configured to transmit using a first communication protocol and the at least one additional transmitter is configured to transmit using a second communication protocol, wherein the first communication protocol is different than the second communication protocol suggested by Plotnik. This modification would provide reduce the amount of dedicated hardware required and functions to increase the flexibility in implementing devices read on column 2, lines 34-36.

**In regard to claim 4**, Walton teaches or suggests a wireless communication device comprising:

a plurality of antennas (see Fig. 1, elements 116a-116t and 122a-122t); and

a communication component coupled to the plurality of antennas (see Fig. 1, elements 114a-114t, 112, 116a-116t, 124a-124t, 126, and 1221-122t), the communication component including a processor (see Fig. 1, elements 112 and 126), a transmitter, and a receiver (see Fig. 1, elements 114a-114t and 124a-124t, abstract, paragraphs [0032], and [0033]), the communication component configured to transmit a first data stream by simultaneously transmitting a first plurality of signal streams using the plurality of antennas (see Fig. 1, paragraph [0074], *a channel data stream that is transmitted on one particular sub-channel from four transmit antennas. The channel data stream is demultiplexed into four data sub-streams, one data sub-stream for each transmit antenna. Each data sub-stream is then modulated using a particular modulation scheme (e.g., M-PSK, M-QAM, or other) selected based on the CSI for that sub-band and for that transmit antenna. Four modulation sub-streams are thus generated for the four data sub-streams, with each modulation sub-streams including a stream of modulation symbols.*), the first plurality of signal streams collectively representing the first data stream (see Fig. 1, abstract, paragraphs [0074], [0096], *the aggregate input data stream that includes all data to be transmitted by system 110 is provided to a demultiplexer (DEMUX) 310 within data processor 112. Demultiplexer 310 demultiplexes the input data stream into a number of (K) channel data stream, S, through Sk. Each channel data stream may correspond to, for example, a signaling channel, a broadcast channel, a voice call, or a traffic data*

*transmission.*), the communication component configured to receive a second data stream by simultaneously receiving a second plurality of signal streams using the plurality of antennas (see Fig. 1, paragraphs [0104], [0110], and [0111], **each sub-channel data stream is then provided to a respective spatial division processor 430. Each spatial division processor 430 may further demultiplex the received sub-channel data stream into a number of (up to  $N_t$ ) data sub-streams, one data sub-stream for each antenna used to transmit the data.**) and generating the second data stream from the second plurality of signal streams (see Figs. 1 and 6, paragraphs [0029], [0074], [0110], and [0111], **the channel data stream is demultiplexed into four data sub-streams, one data sub-stream for each transmit antenna. Within channel data processor 400, a demultiplexer 420 receives and demultiplexes the encoded data stream,  $X_i$ , into a number of sub-channel data streams. Each sub-channel data stream is then provided to a respective spatial division processor 430. Each spatial division processor 430 may further demultiplex the received sub-channel data stream into a number of (up to  $N_t$ ) data sub-streams**); and

wherein the communication component includes at least one additional receiver (see Fig. 1, paragraphs [0034], [0035], [0036], [0045], [0060], and [0061]);

wherein the processor comprises multiple channels configured to process the first data stream and the second data stream in parallel (see Fig. 1, paragraphs [0062], [0075], [0099], [0101], [0104], and [0107], **the full-CSI based processing is typically employed in the MIMO communications mode where parallel data streams are transmitted to a specific user on each of the channel eigenmodes for the each of the allocated sub-channels. Data processor 320 assigns each channel data stream to one or more sub-channels, at one or more time slots, and**

*on one or more antennas. For example, for a channel data stream corresponding to a voice call, data processor 320 may assign one sub-channel on one antenna (if transmit diversity is not used) or multiple antennas (if transmit diversity is used) for as many time slots as needed for that call. For a channel data stream corresponding to a signaling or broadcast channel, data processor 320 may assign the designated sub-channel(s) on one or more antennas, again depending on whether transmit diversity is used).*

Walton may not explicitly teach or suggest wherein the receiver is configured to receive using a first communication protocol and the at least one additional receiver is configured to receive using a second communication protocol, wherein the first communication protocol is different than the second communication protocol.

However, Plotnik teaches or suggests wherein the receiver is configured to receive using a first communication protocol (see Fig. 4, col. 2, lines 57-67, and col. 8, lines 1-6, 44-51, ***the term cellular transceiver is defined as any apparatus having one or more antennas and RF circuitry that is capable of receiving and transmitting a wireless cellular signal. The term cellular protocol denotes the compatibility specification permitting a mobile station and a land station to communicate with each other.***) and the at least one additional receiver is configured to receive using a second communication protocol (see Figs. 5, 10, col. 2, lines 57-67, col. 8, lines 1-6), wherein the first communication protocol is different than the second communication protocol (see Fig. 5, col. 2, lines 58-67, col. 3, lines 1-22, col. 12, lines 43-47, ***the PSTN modem task 164 operates in either ground line or cellular mode. In cellular mode it operates with special optimizations and protocols to yield more efficient cellular data communications. The PSTN block provides standard telephony modulations such as ITU-T V.32bis, V.34, etc.***).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the transmitter and receiver units for use in communications system of Walton by including the receiver is configured to receive using a first communication protocol and the at least one additional receiver is configured to receive using a second communication protocol, wherein the first communication protocol is different than the second communication protocol suggested by Plotnik. This modification would provide reduce the amount of dedicated hardware required and functions to increase the flexibility in implementing devices read on column 2, lines 34-36.

**In regard to claim 5**, Walton teaches or suggests a wireless communication device (see Fig. 1) comprising:

a plurality of antennas (see Fig. 1, elements 116a-116t and 122a-122t); and  
a communication component coupled to the plurality of antennas (see Fig. 1, elements 114a-114t, 112, 116a-116t, 124a-124t, 126, and 1221-122t), the communication component including a processor (see Fig. 1, elements 112 and 126), a transmitter, and a receiver (see Fig. 1, elements 114a-114t and 124a-124t, abstract, paragraphs [0032], [0033]), the communication component configured to transmit a first data stream by simultaneously transmitting a first plurality of signal streams using the plurality of antennas (see Fig. 1, paragraph [0074], *a channel data stream that is transmitted on one particular sub-channel from four transmit antennas. The channel data stream is demultiplexed into four data sub-streams, one data sub-stream for each transmit antenna. Each data sub-stream is then modulated using a particular modulation scheme (e.g., M-PSK, M-QAM, or other) selected based on the CSI for that sub-*



*band and for that transmit antenna. Four modulation sub-streams are thus generated for the four data sub-streams, with each modulation sub-streams including a stream of modulation symbols.*), the first plurality of signal streams collectively representing the first data stream (see Fig. 1, abstract, paragraphs [0074], [0096], *the aggregate input data stream that includes all data to be transmitted by system 110 is provided to a demultiplexer (DEMUX) 310 within data processor 112. Demultiplexer 310 demultiplexes the input data stream into a number of (K) channel data stream, S, through Sk. Each channel data stream may correspond to, for example, a signaling channel, a broadcast channel, a voice call, or a traffic data transmission.*), the communication component configured to receive a second data stream by simultaneously receiving a second plurality of signal streams using the plurality of antennas (see Fig. 1, paragraphs [0104], [0110], [0111], *each sub-channel data stream is then provided to a respective spatial division processor 430. Each spatial division processor 430 may further demultiplex the received sub-channel data stream into a number of (up to Nt) data sub-streams, one data sub-stream for each antenna used to transmit the data.*) and generating the second data stream from the second plurality of signal streams (see Fig. 1, 6, paragraphs [0029], [0074], [0110], and [0111], *the channel data stream is demultiplexed into four data sub-streams, one data sub-stream for each transmit antenna. Within channel data processor 400, a demultiplexer 420 receives and demultiplexes the encoded data stream, Xi, into a number of sub-channel data streams. Each sub-channel data stream is then provided to a respective spatial division processor 430. Each spatial division processor 430 may further demultiplex the received sub-channel data stream into a number of (up to Nt) data sub-streams*); and

wherein the processor comprises multiple channels configured to process the first data stream and the second data stream in parallel (see Fig. , paragraphs [0062], [0075], [0099], [0101], [0104], and [0107], *the full-CSI based processing is typically employed in the MIMO communications mode where parallel data streams are transmitted to a specific user on each of the channel eigenmodes for the each of the allocated sub-channels. Data processor 320 assigns each channel data stream to one or more sub-channels, at one or more time slots, and on one or more antennas. For example, for a channel data stream corresponding to a voice call, data processor 320 may assign one sub-channel on one antenna (if transmit diversity is not used) or multiple antennas (if transmit diversity is used) for as many time slots as needed for that call. For a channel data stream corresponding to a signaling or broadcast channel, data processor 320 may assign the designated sub-channel(s) on one or more antennas, again depending on whether transmit diversity is used).*

Walton may not explicitly teach or suggest wherein a first set of antennas of the plurality of antennas is configured to operate in a first frequency band and a second set of antennas of the plurality of antennas is configured to operate in a second frequency band, wherein the first frequency band is different than the second frequency band;

wherein the first set of antennas of the plurality of antennas is configured to operate using a first communication protocol and the second set of antennas of the plurality of antennas is configured to operate using a second communication protocol, wherein the first communication protocol is different than the second communication protocol.

However, Plotnik teaches or suggests wherein a first set of antennas of the plurality of antennas is configured to operate in a first frequency band (see Fig. 4, col. 2, lines 57-67, col. 8,

lines 1-6, 44-51, *the term cellular transceiver is defined as any apparatus having one or more antennas and RF circuitry that is capable of receiving and transmitting a wireless cellular signal. The term cellular protocol denotes the compatibility specification permitting a mobile station and a land station to communicate with each other.*) and a second set of antennas of the plurality of antennas is configured to operate in a second frequency band (see Figs. 5, 10, col. 2, lines 57-67, col. 8, lines 1-6), wherein the first frequency band is different than the second frequency band (see Fig. 5, col. 2, lines 58-67, col. 3, lines 1-22, and col. 12, lines 43-47, *the PSTN modem task 164 operates in either ground line or cellular mode. In cellular mode it operates with special optimizations and protocols to yield more efficient cellular data communications. The PSTN block provides standard telephony modulations such as ITU-T V.32bis, V.34, etc.*).

wherein the first set of antennas of the plurality of antennas is configured to operate using a first communication protocol (see Fig. 4, col. 2, lines 57-67, and col. 8, lines 1-6, 44-51, *the term cellular transceiver is defined as any apparatus having one or more antennas and RF circuitry that is capable of receiving and transmitting a wireless cellular signal. The term cellular protocol denotes the compatibility specification permitting a mobile station and a land station to communicate with each other.*) and the second set of antennas of the plurality of antennas is configured to operate using a second communication protocol (see Figs. 5, 10, col. 2, lines 57-67, col. 8, lines 1-6), wherein the first communication protocol is different than the second communication protocol (see Fig. 5, col. 2, lines 58-67, col. 3, lines 1-22, and col. 12, lines 43-47, *the PSTN modem task 164 operates in either ground line or cellular mode. In cellular mode it operates with special optimizations and protocols to yield more efficient*

*cellular data communications. The PSTN block provides standard telephony modulations such as ITU-T V.32bis, V.34, etc.).*

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the transmitter and receiver units for use in communications system of Walton by including wherein a first set of antennas of the plurality of antennas is configured to operate in a first frequency band and a second set of antennas of the plurality of antennas is configured to operate in a second frequency band, wherein the first frequency band is different than the second frequency band; and wherein the first set of antennas of the plurality of antennas is configured to operate using a first communication protocol and the second set of antennas of the plurality of antennas is configured to operate using a second communication protocol, wherein the first communication protocol is different than the second communication protocol suggested by Plotnik. This modification would provide reduce the amount of dedicated hardware required and functions to increase the flexibility in implementing devices read on column 2, lines 34-36.

**In regard to claim 6**, Walton teaches or suggests the device of claim 2, wherein the device is enable to multiplex incoming or outgoing wireless signals and further configured with enhanced capabilities to differentiate between various signals or to combine multiple path into a single communication channel (see Figs. 1 and 2, paragraphs [0085], and [0086]).

**In regard to claim 11**, Walton teaches or suggests the device of claim 4, wherein the device is enabled to operate on a plurality of streams including a first stream and a second stream and multipath communication (see Fig. 1, paragraphs [0104], [0110], and [0111], *each sub-*

*channel data stream is then provided to a respective spatial division processor 430. Each spatial division processor 430 may further demultiplex the received sub-channel data stream into a number of (up to  $N_t$ ) data sub-streams, one data sub-stream for each antenna used to transmit the data).*

**In regard to claim 16**, Walton teaches or suggests the device of claim 5, wherein the device is enable to modulate power levels, frequency and the signal strength as determined by one or more of the power, line of sight, or interference or combinations of (see Fig. 1, paragraphs [0038], [0039], [0040], and [0046]).

**In regard to claim 17**, Walton teaches or suggests the device of claim 5, wherein the device is a network box and wherein a signal steam is split into a plurality of signal streams (see Figs. 1 and 4, paragraph [0049]).

**In regard to claim 19**, Walton teaches or suggests the device of claim 5, in communication with a second wireless device, wherein in a given assigned frequency band (see paragraph [0049]), the data speed is fixed but the power is varied (see paragraph [0052]), and wherein data be transmitted over a wireless network is also determined by the ability to encode and decode the signal at the transmit and receive ends using the electronics and computing power resident at each end (see Figs. 3 and 4, paragraphs [0107], [0108], [0109], [0110], and [0111]).

**In regard to claim 20**, Walton teaches or suggests the device of claim 5, wherein the device is enabled with multiple inputs and configured for sending data across multiple outputs (see paragraphs [0052], [0053], [0056], [0057], and [0058]).

**In regard to claim 21**, Walton teaches or suggests the device of claim 5, wherein data transferred to a mobile device over a wireless network is encoded and decoded at the mobile device after the data is received by a receiver (see Figs. 3 and 4, paragraphs [0107], [0108], [0109], [0110], and [0111]).

8. Claims 7 and 8 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Walton in view of US Patent 7,720,468 to Hong et al. (hereinafter Hong).

**In regard to claim 7**, Walton may not teach or suggest the device of claim 2, further in communication with a network switch box configured with a plurality of ports and configured to connect to a plurality of networks to forward packets between different networks and join a virtual network.

However, Hong teaches or suggests the device further in communication with a network switch box configured with a plurality of ports and configured to connect to a plurality of networks to forward packets between different networks and join a virtual network (see Fig. 3, elements 104, 330, 326, 318, col. 3, lines 15-67, col. 4, lines 1-28).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the transmitter and receiver units for use in communications system of Walton by including the device further in communication with a network switch box configured with a plurality of ports and configured to connect to a plurality of networks to forward packets between different networks and join a virtual network suggested by Hong. This modification would provide to efficiently obtain information about and from transceiver units read on column 1, lines 42-43.

**In regard to claim 8**, Walton may not teach or suggest the device of Claim 7, further in communication with a second network switch box, wherein the first network switch box is configured to transmit and receive a plurality of data packets from and to the second network switch box over at least one network path.

However, Hong teaches or suggests wherein the first network switch box is configured to transmit and receive a plurality of data packets from and to the second network switch box over at least one network path (see Fig. 3, col. 3, lines 45-67, and col. 4, lines 1-46).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the transmitter and receiver units for use in communications system of Walton by including wherein the first network switch box is configured to transmit and receive a plurality of data packets from and to the second network switch box over at least one network path suggested by Hong. This modification would provide to efficiently obtain information about and from transceiver units read on column 1, lines 42-43.

9. Claims 9, 10, 14, 15, and 18 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Walton in view of Plotnik as applied to claims above, and further in view of US Patent 7,720,468 to Hong et al. (hereinafter Hong).

**In regard to claim 9**, Walton may not teach or suggests the device of claim 3, in communication with a server configured with a controller in communication with a plurality of network devices wherein the server supervises the connection of a plurality of wireless devices.

However, Hong teaches or suggests the device in communication with a server configured with a controller in communication with a plurality of network devices wherein the server supervises the connection of a plurality of wireless devices (see Fig. 3, elements 104, 330, 326, 318, col. 3, lines 15-67, col. 4, lines 1-28).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the transmitter and receiver units for use in communications system of Walton and the communication system utilizing host signal processing of Plotnik by including the device in communication with a server configured with a controller in communication with a plurality of network devices wherein the server supervises the connection of a plurality of wireless devices suggested by Hong. This modification would provide to efficiently obtain information about and from transceiver units read on column 1, lines 42-43.



**In regard to claim 10**, Walton teaches or suggests the device of Claim 9, wherein the device operates with a plurality of streams including a first stream and a second stream and multipath communication (see Fig. 1, paragraphs [0033], [0035], and [0037]).

**In regard to claim 14**, Walton may not teach or suggest the device of claim 5, wherein the device is enable for internet protocol based data communication.

However, Hong teaches or suggests the device is enable for internet protocol based data communication (see Fig. 3, col. 3, lines 50-59).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the transmitter and receiver units for use in communications system of Walton and the communication system utilizing host signal processing of Plotnik by including the device is enable for internet protocol based data communication suggested by Hong. This modification would provide to efficiently obtain information about and from transceiver units read on column 1, lines 42-43.

**In regard to claim 15**, Walton teaches or suggests the device of Claim 14, wherein the device is enabled to send and receive a plurality of streams using multipath communication (see Fig. 1, paragraphs [0033], [0035], and [0037]).

**In regard to claim 18**, Walton may not teach or suggest the device of claim 5, wherein the device is enabled to be in communication with a mobile device and a network switch box.

However, Hong teaches or suggests wherein the device is enabled to be in communication with a mobile device and a network switch box (see Fig. 3, col. 3, lines 45-67, col. 4, lines 28).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the transmitter and receiver units for use in communications system of Walton by including wherein the device is enabled to be in communication with a mobile device and a network switch box suggested by Hong. This modification would provide to efficiently obtain information about and from transceiver units read on column 1, lines 42-43.

10. Claims 12 and 13 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Walton in view of Plotnik as applied to claims above, and further in view of US Patent 6,498,939 to Thomas.

**In regard to claim 12,** Walton and Plotnik may not teach or suggest the device of claim 11, wherein the device is enabled to communicate with a network device server, said server comprising a plurality of antennas sequentially or simultaneously.

However, Thomas teaches or suggests said server comprising a plurality of antennas sequentially or simultaneously (see Fig. 1, 2, col. 7, lines 20-51).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the transmitter and receiver units for use in communications system of Walton

and the communication system utilizing host signal processing of Plotnik by including said server comprising a plurality of antennas sequentially or simultaneously suggested by Hong. This modification would provide to efficiently obtain information about and from transceiver units read on column 1, lines 42-43.

**In regard to claim 13**, Walton teaches or suggests the device of claim 11, wherein the device is a cellular telephone with multiple processors and further multiplex incoming and outgoing wireless signals (see Figs. 1 and 3-6).

***Remark***

11. Please note even if the examiner has cited pertinent portions of the reference(s) (for instant, figures, paragraph numbers and/or column and line numbers) for the convenience of the applicant, other portions in each the reference may also teach the claim limitations. Therefore, the reference(s) should be considered in its entirety with respect to the claimed invention.

***Conclusion***

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to PHIRIN SAM whose telephone number is (571)272-3082. The examiner can normally be reached on Flexible Work Schedule.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ayaz R. Sheikh can be reached on (571) 272-3795. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Application/Control Number: 13/621,294  
Art Unit: 2476

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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). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Respectfully submitted,

Date: December 26, 2015

By:           /Phirin Sam/            
Primary Examiner  
Art Unit 2476

<b>Notice of References Cited</b>	Application/Control No. 13/621,294	Applicant(s)/Patent Under Reexamination RAO ET AL.	
	Examiner PHIRIN SAM	Art Unit 2476	Page 1 of 1

**U.S. PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A US-2002/0154705	10-2002	Walton et al.	375/267
*	B US-6,873,608	03-2005	Plotnik et al.	370/328
*	C US-7,720,468	05-2010	Hong et al.	455/423
*	D US-6,498,939	12-2002	Thomas, David R.	455/562.1
	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				
	O				
	P				
	Q				
	R				
	S				
	T				

**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.

<b><i>Index of Claims</i></b> 	<b>Application/Control No.</b> 13621294	<b>Applicant(s)/Patent Under Reexamination</b> RAO ET AL.
	<b>Examiner</b> PHIRIN SAM	<b>Art Unit</b> 2476

✓	<b>Rejected</b>	-	<b>Cancelled</b>	N	<b>Non-Elected</b>	A	<b>Appeal</b>
=	<b>Allowed</b>	÷	<b>Restricted</b>	I	<b>Interference</b>	O	<b>Objected</b>

Claims renumbered in the same order as presented by applicant
  CPA
  T.D.
  R.1.47

CLAIM		DATE							
Final	Original	06/16/2014	12/26/2015						
	1	-	-						
	2	✓	✓						
	3	✓	✓						
	4	✓	✓						
	5	✓	✓						
	6		✓						
	7		✓						
	8		✓						
	9		✓						
	10		✓						
	11		✓						
	12		✓						
	13		✓						
	14		✓						
	15		✓						
	16		✓						
	17		✓						
	18		✓						
	19		✓						
	20		✓						
	21		✓						

## EAST Search History

## EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1559277	transmit\$3 near4 (signal\$4 or pilot\$1 or preamble or overhead)	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/12/26: 21:57
L2	230873	(process\$3 or generat\$3) same (data near3 stream\$4)	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/12/26: 21:57
L3	1477414	UE or ((wireless or mobile) adj3 (unit\$1 or device\$1 or station\$1 or apparatus or terminal\$1))	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/12/26: 21:57
L4	101333	(dual or plurality) near3 antenna\$1	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/12/26: 21:57
L5	62438	L2 and L3	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/12/26: 21:57
L6	6844	L5 and L4	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/12/26: 21:57
L7	5055235	(process\$3 or generat\$3) same (signal\$4 or pilot\$1 or preamble or overhead)	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/12/26: 21:57
L8	6737	L6 and L7	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/12/26: 21:57
L9	74541	transmit\$4 near4 (data near3 stream\$4)	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/12/26: 21:57

L10	4155	L8 and L9	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM TDB	OR	OFF	2015/12/26: 21:57
L11	3967	L10 and L1	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM TDB	OR	OFF	2015/12/26: 21:57
L12	3489	channels and L11	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM TDB	OR	OFF	2015/12/26: 21:57
L13	61	L12 and @ad<"20000717"	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM TDB	OR	OFF	2015/12/26: 21:57
L14	35	13 AND ( (H04W36/18 OR H04W88/06 OR H04W16/24 OR H04W52/46 OR H04W88/085 OR H04W52/04 OR H04W52/08 OR H04W52/362 OR H04W52/367 OR H04W52/40 OR H04W28/14 OR H04W40/02 OR H04W52/0245 OR H04W28/06 OR H04W28/26 OR H04W48/08 OR H04W48/16 OR H04W4/18 OR H04W52/029 OR H04W52/343 OR H04W76/02 OR H04W88/02 OR H04W8/183 OR H04W8/205 OR H04W16/14 OR H04W24/00 OR H04W4/00 OR H04W52/0216 OR H04W52/38 OR H04W52/42 OR H04W72/12 OR H04W84/14 OR H04W88/08 OR H04W92/02 OR H04W12/10 OR H04W16/00 OR H04W16/12 OR H04W16/32 OR H04W28/10 OR H04W28/22 OR H04W28/24 OR H04W36/0055 OR H04W36/0083 OR H04W36/12 OR H04W40/00 OR H04W48/18 OR H04W52/0261 OR H04W52/12 OR H04W52/20 OR H04W52/225 OR H04W52/24 OR H04W52/34 OR H04W56/00 OR H04W72/02 OR H04W72/04 OR H04W72/042 OR H04W72/044 OR H04W72/0446 OR H04W72/0453 OR H04W72/1278 OR H04W74/00 OR H04W74/04 OR H04W76/023 OR H04W76/041 OR H04W84/00 OR H04W84/10 OR H04W84/12 OR H04W84/18 OR H04W88/04 OR H04W88/16 OR H04W8/005 OR H04W8/18 OR H04W92/12 OR H04W92/18).CPC. )	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM TDB	OR	OFF	2015/12/26: 22:01
L15	18	14 AND ( (H04L1/0002 OR H04L27/12 OR H04L1/0025 OR H04L1/0032 OR H04L1/1671 OR H04L1/1685 OR H04L69/18 OR H04L1/0003 OR H04L27/156 OR H04L29/06 OR H04L29/12009 OR H04L61/00 OR H04L69/32 OR H04L12/403 OR H04L1/0026 OR H04L45/00 OR H04L45/48 OR H04L1/0001 OR H04L1/0007 OR H04L1/0029 OR H04L1/0038 OR H04L1/0057 OR H04L1/0061 OR H04L1/0084 OR H04L1/02 OR H04L1/06 OR H04L1/08 OR H04L1/1642 OR H04L1/1657 OR H04L1/18 OR H04L1/188 OR H04L1/1887 OR H04L2007/045 OR H04L2025/03414 OR H04L2025/03426 OR H04L2025/03802 OR H04L25/0204 OR H04L25/0226 OR H04L25/0232 OR H04L25/0248 OR H04L25/03343 OR H04L27/14 OR H04L27/2601 OR H04L27/2613 OR H04L27/2647 OR H04L5/0023 OR H04L5/0026 OR H04L5/0041 OR H04L5/0048 OR H04L5/0051 OR H04L5/0091 OR H04L5/143 OR H04L65/103 OR H04L65/104 OR H04L65/1069 OR H04L65/1083 OR H04L65/80 OR H04L67/04 OR H04L69/324 OR H04L69/329 OR H04L7/027 OR H04L7/046).CPC. )	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM TDB	OR	OFF	2015/12/26: 22:04
L16	86847	(h04w36/18;h04w16/24;h04w88/04;h04w88/06;h04w88/022;h04w88/16;h0411/0002;h04127/12).cpc.	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM TDB	OR	OFF	2015/12/26: 22:05
L17	23	16 and 113	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM TDB	OR	OFF	2015/12/26: 22:06
S3	230668	((process\$3 or generat\$3) same (data near\$3 stream\$4)	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM TDB	OR	OFF	2015/12/22: 13:57
S4	1475869	UE or ((wireless or mobile) adj\$3 (unit\$1 or device\$1 or station\$1 or apparatus or terminal\$1))	US- PGPUB; USPAT; USOCR;	OR	OFF	2015/12/22: 13:58



			FPRS; EPO; JPO; IBM_TDB			
S5	101238	(dual or plurality) near3 antenna\$1	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/12/22 13:58
S6	62334	S3 and S4	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/12/22 13:58
S7	6839	S6 and S5	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/12/22 13:58
S8	5052352	(process\$3 or generat\$3) same (signal\$4 or pilot\$1 or preamble or overhead)	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/12/22 13:59
S9	6732	S7 and S8	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/12/22 14:00
S10	150971	transmit\$4 same (data near3 stream\$4)	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/12/22 14:00
S11	1558077	transmit\$3 near4 (signal\$4 or pilot\$1 or preamble or overhead)	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/12/22 14:02
S12	230668	(process\$3 or generat\$3) same (data near3 stream\$4)	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/12/22 14:02
S13	1475869	UE or ((wireless or mobile) adj3 (unit\$1 or device\$1 or station\$1 or apparatus or terminal\$1))	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/12/22 14:02
S14	101238	(dual or plurality) near3 antenna\$1	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/12/22 14:02

S15	62334	S12 and S13	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM TDB	OR	OFF	2015/12/22 14:02
S16	6839	S15 and S14	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM TDB	OR	OFF	2015/12/22 14:02
S17	5052352	(process\$3 or generat\$3) same (signal\$4 or pilot\$1 or preamble or overhead)	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM TDB	OR	OFF	2015/12/22 14:02
S18	6732	S16 and S17	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM TDB	OR	OFF	2015/12/22 14:02
S19	74467	transmit\$4 near4 (data near3 stream\$4)	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM TDB	OR	OFF	2015/12/22 14:03
S20	4150	S18 and S19	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM TDB	OR	OFF	2015/12/22 14:04
S21	3963	S20 and S11	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM TDB	OR	OFF	2015/12/22 14:04
S22	3485	channels and S21	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM TDB	OR	OFF	2015/12/22 14:05
S23	61	S22 and @ad<"20000717"	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM TDB	OR	OFF	2015/12/22 14:05
S25	1558077	transmit\$3 near4 (signal\$4 or pilot\$1 or preamble or overhead)	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM TDB	OR	OFF	2015/12/22 16:44
S26	230668	(process\$3 or generat\$3) same (data near3 stream\$4)	US- PGPUB; USPAT; USOCR;	OR	OFF	2015/12/22 16:44

			FPRS; EPO; JPO; IBM_TDB			
S27	1475869	UE or ((wireless or mobile) adj3 (unit\$1 or device\$1 or station\$1 or apparatus or terminal\$1))	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/12/22 16:44
S28	101238	(dual or plurality) near3 antenna\$1	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/12/22 16:44
S29	62334	S26 and S27	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/12/22 16:44
S30	6839	S29 and S28	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/12/22 16:44
S31	5052352	(process\$3 or generat\$3) same (signal\$4 or pilot\$1 or preamble or overhead)	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/12/22 16:44
S32	6732	S30 and S31	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/12/22 16:44
S33	74467	transmit\$4 near4 (data near3 stream\$4)	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/12/22 16:44
S34	4150	S32 and S33	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/12/22 16:44
S35	3963	S34 and S25	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/12/22 16:44
S36	3485	channels and S35	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/12/22 16:44

S37	61	S36 and @ad<"20000717"	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM TDB	OR	OFF	2015/12/22 16:44
S38	22	S37 and (first adj3 (frequenc\$3 or band\$1))	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM TDB	OR	OFF	2015/12/22 16:46
S39	17	S38 and (second adj3 (frequenc\$3 or band\$1))	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM TDB	OR	OFF	2015/12/22 16:46
S41	17	S39 and protocol\$1	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM TDB	OR	OFF	2015/12/22 16:52
S43	1477414	UE or ((wireless or mobile) adj3 (unit\$1 or device\$1 or station\$1 or apparatus or terminal\$1))	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM TDB	OR	OFF	2015/12/26 18:01
S44	153100	(dual or plurality or array\$3) near3 antenna\$1	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM TDB	OR	OFF	2015/12/26 18:01
S45	5574312	(network adj3 switch\$3) or switch\$3	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM TDB	OR	OFF	2015/12/26 18:05
S46	1701234	server\$1	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM TDB	OR	OFF	2015/12/26 18:05
S47	54349	S43 and S44	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM TDB	OR	OFF	2015/12/26 18:05
S48	31480	S47 and S45	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM TDB	OR	OFF	2015/12/26 18:05
S49	10049	S48 and S46	US- PGPUB; USPAT; USOCR;	OR	OFF	2015/12/26 18:06


			FPRS; EPO; JPO; IBM_TDB			
S50	8641	S49 and (IP or Internet\$1)	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/12/26: 18:06
S51	73	S50 and @ad<"20000717"	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/12/26: 18:07
S52	1559277	transmit\$3 near4 (signal\$4 or pilot\$1 or preamble or overhead)	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/12/26: 21:56
S53	230873	(process\$3 or generat\$3) same (data near3 stream\$4)	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/12/26: 21:56

**EAST Search History (Interference)**

<This search history is empty>

12/ 26/ 2015 10:08:37 PM

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<b>Search Notes</b>  	<b>Application/Control No.</b>  13621294	<b>Applicant(s)/Patent Under Reexamination</b>  RAO ET AL.
	<b>Examiner</b>  PHIRIN SAM	<b>Art Unit</b>  2476

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
370/328,329,336,338,339,340,341,342,347,351-354,356,436,437,442 (Text search - See search history printout).	06/16/2014; 04/04/2015	PS
H04B/02; H04B7/024; H04B7/026; H04B7/0404; H04B7/0408; H04B7/0413; H04B7/0452; H04B7/06; H04B7/08; H04W72/042; H04W72/0413; H04W72/0446 (See text search history).	04/04/2015	PS
h04w36/18;h04w16/24;h04w88/04;h04w88/06;h04w88/022;h04w88/16;h041/0002;h04127/12 (see text search history).	12/26/2015	PS

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

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04245.001000.

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application No.: 13/621,294	)	
	:	Examiner: Phirin Sam
First Named Inventor:	)	
	:	Group Art Unit: 2476
SUNIL K. RAO, ET AL.	)	
	:	Confirmation No.: 5130
Filed: September 17, 2012	)	
	:	
For: A SYSTEM TO INTERFACE INTERNET	)	
PROTOCOL (IP) BASED WIRELESS	:	
DEVICES WITH OPTICAL AND OTHER	)	
NETWORKS FOR IMPROVED	:	
FLEXIBILITY, PERFORMANCE, AND	)	
DATA TRANSFER	:	August 31, 2015

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

INFORMATION DISCLOSURE STATEMENT

Commissioner:

Pursuant to 37 C.F.R. § 1.56, Applicants respectfully direct the Examiner's attention to the documents listed below and on the attached Form PTO-1449. Copies of non-U.S. patent documents are enclosed.

U.S. Patent 4,675,653

CERTIFICATE OF EFS-WEB TRANSMISSION  
I hereby certify that this correspondence is being filed electronically by EFS-Web transmission to the United States Patent Office on  
August 31, 2015  
\_\_\_\_\_  
(Date of Deposit)

\_\_\_\_\_  
Michael K. O'Neill, Reg. No. 32,622  
(Name of Attorney for Applicant)

\_\_\_\_\_  
/Michael K. O'Neill/  
Signature

\_\_\_\_\_  
August 31, 2015  
Date of Signature

U.S. Patent 5,025,486  
U.S. Patent 5,121,391  
U.S. Patent 5,195,130  
U.S. Patent 5,379,341  
U.S. Patent 5,410,738  
U.S. Patent 5,457,714  
U.S. Patent 5,465,401  
U.S. Patent 5,507,035  
U.S. Patent 5,513,242  
U.S. Patent 5,517,553  
U.S. Patent 5,533,029  
U.S. Patent 5,539,391  
U.S. Patent 5,546,429  
U.S. Patent 5,555,258  
U.S. Patent 5,559,794  
U.S. Patent 5,565,929  
U.S. Patent 5,566,205  
U.S. Patent 5,577,118  
U.S. Patent 5,598,407  
U.S. Patent 5,610,617  
U.S. Patent 5,633,742  
U.S. Patent 5,636,211

U.S. Patent 5,745,884  
U.S. Patent 5,802,469

U.S. Patent 5,816,918  
U.S. Patent 5,828,658  
U.S. Patent 5,889,816  
U.S. Patent 5,909,183  
U.S. Patent 5,960,039

U.S. Patent 6,049,721  
U.S. Patent 6,058,422  
U.S. Patent 6,067,290  
U.S. Patent 6,072,994

U.S. Patent 6,119,179  
U.S. Patent 6,128,489  
U.S. Patent 6,154,658

U.S. Patent 6,167,253  
U.S. Patent 6,169,789  
U.S. Patent 6,246,688  
U.S. Patent 6,246,875



U.S. Patent 6,285,861

U.S. Patent 6,377,570

U.S. Patent 6,405,049

U.S. Patent 6,456,610

U.S. Patent 6,466,558

U.S. Patent 6,496,979

U.S. Patent 6,519,478

U.S. Patent 6,542,736

U.S. Patent 6,549,534

U.S. Patent 6,600,734

U.S. Patent 6,628,702

U.S. Patent 6,640,086

U.S. Patent 6,659,947

U.S. Patent 6,677,894

U.S. Patent 6,775,285

U.S. Patent 6,826,174

U.S. Patent 6,865,169

U.S. Patent 6,895,253

U.S. Patent 7,027,773

U.S. Patent 7,099,695

U.S. Patent 7,277,679

U.S. Patent 7,286,502

U.S. Patent 7,643,848

U.S. Patent 8,019,991

U.S. Patent 8,295,406

U.S. Patent 8,824,434

U.S. Patent 8,842,653

U.S. Patent 8,964,712

U.S. Patent 8,982,863

U.S. Patent 9,019,946

U.S. Patent 9,049,743

U.S. Patent Design D374,675

U.S. Patent Application Publication No. 2001/0006517

U.S. Patent Application Publication No. 2002/0084889

U.S. Patent Application Publication No. 2002/0171581

U.S. Patent Application Publication No. 2005/0220086  
U.S. Patent Application Publication No. 2006/0023666  
U.S. Patent Application Publication No. 2010/0190453  
U.S. Patent Application Publication No. 2010/0260063  
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Applicants' undersigned attorney may be reached in our Costa Mesa, CA office by telephone at (714) 540-8700. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,

/Michael K. O'Neill/  
Michael K. O'Neill  
Attorney for Applicants  
Registration No. 32,622

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New York, New York 10104-3800  
Facsimile: (212) 218-2200

FORM PTO 1449 (modified)		ATTY DOCKET NO. <b>04245.001000.</b>		APPLICATION NO. <b>13/621,294</b>	
U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		APPLICANT <b>SUNIL K. RAO, ET AL.</b>		FILING DATE <b>September 17, 2012</b>	
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EXAMINER /Phirin Sam/ (12/26/2015)			DATE CONSIDERED 12/26/2015		

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↓	6,640,086	10/28/2003	Wall			
↓	6,659,947	12-2003	Carter	600	300	
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↓	8,982,863	03/17/2015	Rao	370	338	
↓	9,019,946	04/28/2015	Rao	370	338	
↓	9,049,743	06/02/2015	Rao	370	338	
↓	D374,675	10/15/1996	Sakai et al.	D14	242	
↓	2001/0006517	07/05/2001	Lin et al.			
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04245.001000.

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application No.: 13/621,294	)	
	:	Examiner: Phirin Sam
First Named Inventor:	)	
	:	Group Art Unit: 2476
SUNIL K. RAO, ET AL.	)	
	:	Confirmation No.: 5130
Filed: September 17, 2012	)	
	:	
For: A SYSTEM TO INTERFACE INTERNET	)	
PROTOCOL (IP) BASED WIRELESS	:	
DEVICES WITH OPTICAL AND OTHER	)	
NETWORKS FOR IMPROVED	:	
FLEXIBILITY, PERFORMANCE, AND	)	
DATA TRANSFER	:	August 31, 2015

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

INFORMATION DISCLOSURE STATEMENT

Commissioner:

Pursuant to 37 C.F.R. § 1.56, Applicants respectfully direct the Examiner's attention to the documents listed below and on the attached Form PTO-1449. Copies of non-U.S. patent documents are enclosed.

U.S. Patent 4,675,653

CERTIFICATE OF EFS-WEB TRANSMISSION  
I hereby certify that this correspondence is being filed electronically by  
EFS-Web transmission to the United States Patent Office on  
August 31, 2015  
\_\_\_\_\_  
(Date of Deposit)

\_\_\_\_\_  
Michael K. O'Neill, Reg. No. 32,622  
(Name of Attorney for Applicant)

\_\_\_\_\_  
/Michael K. O'Neill/  
Signature

\_\_\_\_\_  
August 31, 2015  
Date of Signature



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## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	23363641
<b>Application Number:</b>	13621294
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	5130
<b>Title of Invention:</b>	SYSTEM TO INTERFACE INTERNET PROTOCOL (IP) BASED WIRELESS DEVICES WITH OPTICAL AND OTHER NETWORKS FOR IMPROVED FLEXIBILITY, PERFORMANCE, AND DATA TRANSFER
<b>First Named Inventor/Applicant Name:</b>	Sunil K. Rao
<b>Customer Number:</b>	5514
<b>Filer:</b>	Michael K. O'Neill
<b>Filer Authorized By:</b>	
<b>Attorney Docket Number:</b>	04245.001000.
<b>Receipt Date:</b>	31-AUG-2015
<b>Filing Date:</b>	17-SEP-2012
<b>Time Stamp:</b>	20:10:22
<b>Application Type:</b>	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	Information Disclosure Statement (IDS) Form (SB08)	04245_001000_IDS_08312015.pdf	180262 7087a5da2bc266417538bc6718d35c8b585ab5e8	no	9

### Warnings:

### Information:

This is not an USPTO supplied IDS fillable form

**Total Files Size (in bytes):**

180262

**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 NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/621,294	09/17/2012	Sunil K. Rao	04245.001000.	5130

5514 7590 07/13/2015  
FITZPATRICK CELLA HARPER & SCINTO  
1290 Avenue of the Americas  
NEW YORK, NY 10104-3800

EXAMINER

SAM, PHIRIN

ART UNIT PAPER NUMBER

2476

DATE MAILED: 07/13/2015

Please find below and/or attached an Office communication concerning this application or proceeding.

The request for deferral/suspension of action under 37 CFR 1.103 has been approved.

Doc code: RCEX

Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (07-09)

Approved for use through 07/31/2012. 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.

### REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL (Submitted Only via EFS-Web)

Application Number	13621294	Filing Date	2012-09-17	Docket Number (if applicable)	04245.001000.	Art Unit	2476
First Named Inventor	SUNIL K. RAO, ET AL.			Examiner Name	Phirin Sam		

**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. The Instruction Sheet for this form is located at WWW.USPTO.GOV

#### 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).

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.

Consider the arguments in the Appeal Brief or Reply Brief previously filed on \_\_\_\_\_

Other \_\_\_\_\_

Enclosed

Amendment/Reply

Information Disclosure Statement (IDS)

Affidavit(s)/ Declaration(s)

Other  
 \_\_\_\_\_  
 Request to Suspend Action

#### MISCELLANEOUS

Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months 3  
 (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

Other I hereby certify that this correspondence is being filed electronically by EFS-Web transmission to the USPTO on July 7, 2015. /Michael K. O'Neill/ by Michael K. O'Neill, Reg. No. 32,622

#### FEES

**The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**

The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 061205

#### SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

Patent Practitioner Signature

Applicant Signature

Doc code: RCEX

Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (07-09)

Approved for use through 07/31/2012. 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.

Signature of Registered U.S. Patent Practitioner			
Signature	/Michael K. O'Neill/	Date (YYYY-MM-DD)	2015-07-07
Name	Michael K. O'Neill	Registration Number	32622

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.

*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 the Freedom of Information Act requires disclosure of these records.
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 inspections 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.

04245.001000.

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application No.: 13/621,294	)	
	:	Examiner: Phirin Sam
First Named Inventor:	)	
	:	Group Art Unit: 2476
SUNIL K. RAO, ET AL.	)	
	:	Confirmation No.: 5130
Filed: September 17, 2012	)	
	:	
For: A SYSTEM TO INTERFACE	)	
INTERNET PROTOCOL (IP) BASED	:	
WIRELESS DEVICES WITH	)	
OPTICAL AND OTHER NETWORKS	:	
FOR IMPROVED FLEXIBILITY,	)	
PERFORMANCE, AND DATA	:	
TRANSFER	)	July 7, 2015

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

REQUEST TO SUSPEND ACTION  
UNDER 37 C.F.R. § 1.103(c)

Commissioner:

A Request for Continued Examination (RCE) is being filed concurrently herewith. Applicants hereby request a suspension of action for a period of three (3) months, pursuant to 37 C.F.R. § 1.103(c).

CERTIFICATE OF EFS-WEB TRANSMISSION  
I hereby certify that this correspondence is being filed electronically by  
EFS-Web transmission to the United States Patent Office on  
July 7, 2015  
\_\_\_\_\_  
(Date of Deposit)

Michael K. O'Neill, Reg. No. 32,622  
\_\_\_\_\_  
(Name of Attorney for Applicants)

_____ /Michael K. O'Neill/ Signature	_____ July 7, 2015 Date of Signature
--	--

Pursuant to 37 C.F.R. § 1.17(i), the fee for the suspension is \$70.00 (small entity) and has been charged to Deposit Account No. 50-3939. Any deficiency in or overpayment of this fee should be charged or credited to Deposit Account No. 06-1205.

Applicants' undersigned attorney may be reached in our Costa Mesa, California office by telephone at (714) 540-8700. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,

/Michael K. O'Neill/  
Michael K. O'Neill  
Attorney for Applicants  
Registration No. 32,622

FITZPATRICK, CELLA, HARPER & SCINTO  
1290 Avenue of the Americas  
New York, New York 10104-3800  
Facsimile: (212) 218-2200



## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	13621294				
<b>Filing Date:</b>	17-Sep-2012				
<b>Title of Invention:</b>	SYSTEM TO INTERFACE INTERNET PROTOCOL (IP) BASED WIRELESS DEVICES WITH OPTICAL AND OTHER NETWORKS FOR IMPROVED FLEXIBILITY, PERFORMANCE, AND DATA TRANSFER				
<b>First Named Inventor/Applicant Name:</b>	Sunil K. Rao				
<b>Filer:</b>	Michael K. O'Neill/Margaret Lee				
<b>Attorney Docket Number:</b>	04245.001000.				
Filed as Small Entity					
<b>Filing Fees for Utility under 35 USC 111(a)</b>					
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>	
<b>Basic Filing:</b>					
<b>Pages:</b>					
<b>Claims:</b>					
<b>Miscellaneous-Filing:</b>					
PROCESSING FEE, EXCEPT PROV. APPLS.	2830	1	70	70	
<b>Petition:</b>					
<b>Patent-Appeals-and-Interference:</b>					
<b>Post-Allowance-and-Post-Issuance:</b>					

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Extension-of-Time:</b>				
<b>Miscellaneous:</b>				
Request for Continued Examination	2801	1	600	600
<b>Total in USD (\$)</b>				<b>670</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	22848968
<b>Application Number:</b>	13621294
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	5130
<b>Title of Invention:</b>	SYSTEM TO INTERFACE INTERNET PROTOCOL (IP) BASED WIRELESS DEVICES WITH OPTICAL AND OTHER NETWORKS FOR IMPROVED FLEXIBILITY, PERFORMANCE, AND DATA TRANSFER
<b>First Named Inventor/Applicant Name:</b>	Sunil K. Rao
<b>Customer Number:</b>	5514
<b>Filer:</b>	Michael K. O'Neill/Margaret Lee
<b>Filer Authorized By:</b>	Michael K. O'Neill
<b>Attorney Docket Number:</b>	04245.001000.
<b>Receipt Date:</b>	07-JUL-2015
<b>Filing Date:</b>	17-SEP-2012
<b>Time Stamp:</b>	17:36:42
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$670
RAM confirmation Number	4053
Deposit Account	503939
Authorized User	O'NEILL, MICHAEL K.

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

**File Listing:**

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Amendment Submitted/Entered with Filing of CPA/RCE	04245_001000_Prelim_Amend_Sub_RCE_07072015.pdf	66732 94994f1691818426e171f0358973965838e1688e	no	9
<b>Warnings:</b>					
<b>Information:</b>					
2	Request for Continued Examination (RCE)	04245_001000_RCE_Transmittal.PDF	697955 a9d199934dc0af9f56410751935e37a723703d0	no	3
<b>Warnings:</b>					
<b>Information:</b>					
3	Letter Requesting Suspension of Action	04245_001000_Request_to_Suspend_07072015.pdf	57103 cdf2915dcb1493a5206cd4f32cf06e5e6c0f050f	no	2
<b>Warnings:</b>					
<b>Information:</b>					
4	Fee Worksheet (SB06)	fee-info.pdf	33027 444e8541b509b201c01a3baef2a08bb3f4afe34b	no	2
<b>Warnings:</b>					
<b>Information:</b>					
<b>Total Files Size (in bytes):</b>			854817		

**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.

04245.001000.

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application No.: 13/621,294	)	
	:	Examiner: Phirin Sam
First Named Inventor:	)	
	:	Group Art Unit: 2476
SUNIL K. RAO, ET AL.	)	
	:	Confirmation No.: 5130
Filed: September 17, 2012	)	
	:	
For: A SYSTEM TO INTERFACE	)	
INTERNET PROTOCOL (IP) BASED	:	
WIRELESS DEVICES WITH	)	
OPTICAL AND OTHER NETWORKS	:	
FOR IMPROVED FLEXIBILITY,	)	
PERFORMANCE, AND DATA	:	
TRANSFER	)	July 7, 2015

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

PRELIMINARY AMENDMENT SUBMITTED WITH RCE

Commissioner:

Prior to examination, please further amend the above-identified application,

as follows:

CERTIFICATE OF EFS-WEB TRANSMISSION  
 I hereby certify that this correspondence is being filed electronically by  
 EFS-Web transmission to the United States Patent Office on  
 July 7, 2015  
 \_\_\_\_\_  
 (Date of Deposit)

Michael K. O'Neill, Reg. No. 32,622  
 \_\_\_\_\_  
 (Name of Attorney for Applicants)

\_\_\_\_\_  
 /Michael K. O'Neill/  
 Signature

\_\_\_\_\_  
 July 7, 2015  
 Date of Signature

IN THE CLAIMS:

Please add Claims 6 to 21, as follows:

1. (Cancelled).

2. (Previously Presented) A wireless communication device comprising:  
a plurality of antennas; and

a communication component coupled to the plurality of antennas, the communication component including a processor, a transmitter, and a receiver, the communication component configured to transmit a first data stream by simultaneously transmitting a first plurality of signal streams using the plurality of antennas, the first plurality of signal streams collectively representing the first data stream, the communication component configured to receive a second data stream by simultaneously receiving a second plurality of signal streams using the plurality of antennas and generating the second data stream from the second plurality of signal streams;

wherein the communication component is configured to communicate via a first frequency band using a wireless communication protocol; and

wherein the processor comprises multiple channels configured to process the first data stream and the second data stream in parallel.

3. (Previously Presented) A wireless communication device comprising:  
a plurality of antennas; and

a communication component coupled to the plurality of antennas, the communication component including a processor, a transmitter, and a receiver, the communication component configured to transmit a first data stream by simultaneously transmitting a first plurality of signal streams using the plurality of antennas, the first plurality of signal streams collectively representing the first data stream, the communication component configured to receive a second data stream by simultaneously receiving a second plurality of signal streams using the plurality of antennas and generating the second data stream from the second plurality of signal streams;

wherein the communication component includes at least one additional transmitter;

wherein the transmitter is configured to transmit on a first frequency and the at least one additional transmitter is configured to transmit on a second frequency;

wherein the transmitter is configured to transmit using a first communication protocol and the at least one additional transmitter is configured to transmit using a second communication protocol, wherein the first communication protocol is different than the second communication protocol; and

wherein the processor comprises multiple channels configured to process the first data stream and the second data stream in parallel.

4. (Previously Presented) A wireless communication device comprising:

a plurality of antennas; and

a communication component coupled to the plurality of antennas, the communication component including a processor, a transmitter, and a receiver, the

communication component configured to transmit a first data stream by simultaneously transmitting a first plurality of signal streams using the plurality of antennas, the first plurality of signal streams collectively representing the first data stream, the communication component configured to receive a second data stream by simultaneously receiving a second plurality of signal streams using the plurality of antennas and generating the second data stream from the second plurality of signal streams; and

wherein the communication component includes at least one additional receiver;

wherein the receiver is configured to receive using a first communication protocol and the at least one additional receiver is configured to receive using a second communication protocol, wherein the first communication protocol is different than the second communication protocol; and

wherein the processor comprises multiple channels configured to process the first data stream and the second data stream in parallel.

5. (Previously Presented) A wireless communication device comprising:

a plurality of antennas; and

a communication component coupled to the plurality of antennas, the communication component including a processor, a transmitter, and a receiver, the communication component configured to transmit a first data stream by simultaneously transmitting a first plurality of signal streams using the plurality of antennas, the first plurality of signal streams collectively representing the first data stream, the communication component configured to receive a second data stream by simultaneously



receiving a second plurality of signal streams using the plurality of antennas and generating the second data stream from the second plurality of signal streams; and

wherein a first set of antennas of the plurality of antennas is configured to operate in a first frequency band and a second set of antennas of the plurality of antennas is configured to operate in a second frequency band, wherein the first frequency band is different than the second frequency band;

wherein the first set of antennas of the plurality of antennas is configured to operate using a first communication protocol and the second set of antennas of the plurality of antennas is configured to operate using a second communication protocol, wherein the first communication protocol is different than the second communication protocol; and

wherein the processor comprises multiple channels configured to process the first data stream and the second data stream in parallel.

6. (New) The device of Claim 2, wherein the device is enabled to multiplex incoming and outgoing wireless signals and further configured with enhanced capabilities to differentiate between various signals or to combine multiple paths into a single communication channel.

7. (New) The device of Claim 2, further in communication with a network switch box configured with a plurality of ports and configured to connect to a plurality of networks to forward packets between different networks and join a virtual network.

8. (New) The device of Claim 7, further in communication with a second network switch box, wherein the first network switch box is configured to transmit and receive a plurality of data packets from and to the second network switch box over at least one network path.

9. (New) The device of Claim 3, in communication with a server configured with a controller in communication with a plurality of network devices wherein the server supervises the connection of a plurality of wireless devices.

10. (New) The device of Claim 9, wherein the device operates with a plurality of streams including a first stream and a second stream and multipath communication.

11. (New) The device of Claim 4, wherein the device is enabled to operate on a plurality of frequencies including a higher frequency and lower frequencies.

12. (New) The device of Claim 11, wherein the device is enabled to communicate with a network device server, said server comprising a plurality of antennas sequentially or simultaneously.

13. (New) The device of Claim 12, wherein the device is a cellular telephone with multiple processors and further multiplex incoming and outgoing wireless signals.

14. (New) The device of Claim 5, wherein the device is enabled for internet protocol based data communication.

15. (New) The device of Claim 14, wherein the device is enabled to send and receive a plurality of streams using multipath communication.

16. (New) The device of Claim 5, wherein the device is enabled to modulate power levels, frequency and the signal strength as determined by one or more of the power, line of sight, or interference or combinations thereof.

17. (New) The device of Claim 16, wherein the device is a network box and wherein a signal stream is split into a plurality of signal streams.

18. (New) The device of Claim 17, wherein the device is enabled to be in communication with a mobile device and a network switch box.

19. (New) The device of Claim 5, in communication with a second wireless device, wherein in a given assigned frequency band, the data speed is fixed but the power is varied, and wherein data be transmitted over a wireless network is also determined by the ability to encode and decode the signal at the transmit and receive ends using the electronics and computing power resident at each end.

20. (New) The device of Claim 19, wherein the device is enabled with multiple inputs and configured for sending data across multiple outputs.

21. (New) The device of Claim 5, wherein data transferred to a mobile device over a wireless network is encoded and decoded at the mobile device after the data is received by a receiver.

REMARKS

Claims 2 to 21 are in the application, of which all of Claims 2 to 5 are independent and have been allowed, and of which Claims 6 to 21 are dependent and are newly added.

Favorable consideration and early passage to issue are respectfully requested.

No fees are believed due. However, should it be determined that processing of this paper requires additional fees under 37 C.F.R. 1.16 or 1.17, the Director is hereby authorized to charge such fees to Deposit Account 06-1205.

Applicants' undersigned attorney may be reached in our Costa Mesa, California office by telephone at (714) 540-8700. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,

/Michael K. O'Neill/  
Michael K. O'Neill  
Attorney for Applicants  
Registration No. 32,622

FITZPATRICK, CELLA, HARPER & SCINTO  
1290 Avenue of the Americas  
New York, New York 10104-3800  
Facsimile: (212) 218-2200

04245.001000.

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application No.: 13/621,294	)	
	:	Examiner: Phirin Sam
First Named Inventor:	)	
	:	Group Art Unit: 2476
SUNIL K. RAO, ET AL.	)	
	:	Confirmation No.: 5130
Filed: September 17, 2012	)	
	:	
For: A SYSTEM TO INTERFACE	)	
INTERNET PROTOCOL (IP)	:	
BASED WIRELESS DEVICES	)	
WITH OPTICAL AND OTHER	:	
NETWORKS FOR IMPROVED	)	
FLEXIBILITY, PERFORMANCE,	:	
AND DATA TRANSFER	)	May 6, 2015

RESPONSE TO NOTICE REQUIRING INVENTOR’S DECLARATION

Sir:

This is a response to the Notice Requiring Inventor’s Oath or Declaration,  
which was mailed April 28, 2015.

CERTIFICATE OF EFS-WEB TRANSMISSION  
I hereby certify that this correspondence is being filed electronically by  
EFS-Web transmission to the United States Patent Office on  
May 6, 2015  
(Date of Deposit)

Michael K. O’Neill, Reg. No. 32,622  
(Name of Attorney for Applicants)

/Michael K. O’Neill/  
Signature

May 6, 2015  
Date of Signature

According to the Notice, a compliant oath or declaration had not yet been submitted.

It is respectfully submitted that the Notice was issued erroneously, inasmuch as a compliant declarations for all three inventors have already been filed, in two separate filings as follows:

<u>Date of Filing</u>	<u>Inventor(s)</u>
April 9, 2013	Raman K. Rao, by his legal representative
December 19, 2013	Sunil K. Rao, Sanjay K. Rao

Copies of these papers, previously filed, are attached herewith. The undersigned confirms that these papers are also visible on the USPTO's image file wrapper (IFW) page for this application.

Regarding patent term adjustment, the filing of this paper, even though it is filed after issuance of a Notice of Allowance, is not a failure of Applicant to engage in reasonable efforts to conclude prosecution, for the reason that the USPTO issued its Notice in error, and Applicant should not be penalized for patent term adjustment.

In view of the foregoing, it is respectfully submitted that the Notice was issued erroneously and should be withdrawn, and that Applicant should not be charged with any patent term adjustment in connection with the filing of this Response.

Applicants' undersigned attorney may be reached in our Costa Mesa, California office by telephone at (714) 540-8700. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,

/Michael K. O'Neill/  
Michael K. O'Neill  
Attorney for Applicants  
Registration No. 32,622

FITZPATRICK, CELLA, HARPER & SCINTO  
1290 Avenue of the Americas  
New York, New York 10104-3800  
Facsimile: (212) 218-2200



COPY

PTO/AIA/01 (08-12)  
Approved for use through 01/31/2014. OMB 0651-0032  
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.

**DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)**

<b>Title of Invention</b>	<b>System to Interface Internet Protocol (IP) Based Wireless Devices with Optical and Other Networks for Improved Flexibility, Performance, and Data Transfer</b>
---------------------------	---

As the below named inventor, I hereby declare that:

This declaration is directed to:  The attached application, or  
 United States application or PCT international application number 13/621,294  
filed on September 17, 2012.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

**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.

**LEGAL NAME OF INVENTOR**

Inventor: Sunil K. Rao Date (Optional): 12/18/2013

Signature: 

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. 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 1 minute 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.

COPY

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**DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)**

<b>Title of Invention</b>	<b>System to Interface Internet Protocol (IP) Based Wireless Devices with Optical and Other Networks for Improved Flexibility, Performance, and Data Transfer</b>
---------------------------	---

As the below named inventor, I hereby declare that:

This declaration is directed to:  The attached application, or  United States application or PCT international application number 13/621,294 filed on September 17, 2012

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

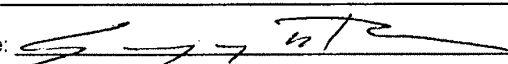
I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

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**LEGAL NAME OF INVENTOR**

Inventor: Sanjay K. Rao Date (Optional): 12/18/2013

Signature: 

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. 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 1 minute 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.*

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**SUBSTITUTE STATEMENT IN LIEU OF AN OATH OR DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (35 U.S.C. 115(d) AND 37 CFR 1.64)**

<b>Title of Invention</b>	System to Interface Internet Protocol (IP) Based Wireless Devices with Optical and Other Networks for Improved Flexibility, Performance, and Data Transfer		
This statement is directed to:			
<input type="checkbox"/> The attached application,			
OR			
<input checked="" type="checkbox"/> United States application or PCT international application number <u>13/621,294</u> filed on <u>9/17/2012</u> .			
<b>LEGAL NAME of inventor to whom this substitute statement applies:</b>			
(E.g., Given Name (first and middle (if any)) and Family Name or Surname)			
Raman K. Rao			
Residence (except for a deceased or legally incapacitated inventor):			
City	State	Country	
Palo Alto	CA	USA	
Mailing Address (except for a deceased or legally incapacitated inventor):			
City	State	Zip	Country
I believe the above-named inventor or joint inventor to be the original inventor or an original joint inventor of a claimed invention in the application.			
The above-identified application was made or authorized to be made by me.			
I hereby acknowledge that any willful false statement made in this statement is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.			
Relationship to the inventor to whom this substitute statement applies:			
<input checked="" type="checkbox"/> Legal Representative (for deceased or legally incapacitated inventor only),			
<input checked="" type="checkbox"/> Assignee,			
<input type="checkbox"/> Person to whom the inventor is under an obligation to assign,			
<input type="checkbox"/> Person who otherwise shows a sufficient proprietary interest in the matter (petition under 37 CFR 1.46 is required), or			
<input type="checkbox"/> Joint Inventor.			

[Page 1 of 2]

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. 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 1 minute 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.

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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.

# SUBSTITUTE STATEMENT

Circumstances permitting execution of this substitute statement:

- Inventor is deceased,
- Inventor is under legal incapacity,
- Inventor cannot be found or reached after diligent effort, or
- Inventor has refused to execute the oath or declaration under 37 CFR 1.63.

If there are joint inventors, please check the appropriate box below:

- An application data sheet under 37 CFR 1.76 (PTO/AIA/14 or equivalent) naming the entire inventive entity has been or is currently submitted.
- OR
- An application data sheet under 37 CFR 1.76 (PTO/AIA/14 or equivalent) has not been submitted. Thus, a Substitute Statement Supplemental Sheet (PTO/AIA/11 or equivalent) naming the entire inventive entity and providing inventor information is attached. See 37 CFR 1.64(b).

### 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.

### PERSON EXECUTING THIS SUBSTITUTE STATEMENT:

Name: <b>Rekha K. Rao</b>	Date (Optional):
---------------------------	------------------

Signature: **/Rekha K. Rao/**

Residence (unless provided in an application data sheet, PTO/AIA/14 or equivalent):

City <b>Palo Alto</b>	State <b>CA</b>	Country <b>USA</b>
-----------------------	-----------------	--------------------

Mailing Address (unless provided in an application data sheet, PTO/AIA/14 or equivalent)  
**3087 Alexis Drive**

City <b>Palo Alto</b>	State <b>CA</b>	Zip <b>94304</b>	Country <b>US</b>
-----------------------	-----------------	------------------	-------------------

Note: Use an additional PTO/AIA/02 form for each inventor who is deceased, legally incapacitated, cannot be found or reached after diligent effort, or has refused to execute the oath or declaration under 37 CFR 1.63.

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	22275072
<b>Application Number:</b>	13621294
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	5130
<b>Title of Invention:</b>	SYSTEM TO INTERFACE INTERNET PROTOCOL (IP) BASED WIRELESS DEVICES WITH OPTICAL AND OTHER NETWORKS FOR IMPROVED FLEXIBILITY, PERFORMANCE, AND DATA TRANSFER
<b>First Named Inventor/Applicant Name:</b>	Sunil K. Rao
<b>Customer Number:</b>	5514
<b>Filer:</b>	Michael K. O'Neill/Margaret Lee
<b>Filer Authorized By:</b>	Michael K. O'Neill
<b>Attorney Docket Number:</b>	04245.001000.
<b>Receipt Date:</b>	06-MAY-2015
<b>Filing Date:</b>	17-SEP-2012
<b>Time Stamp:</b>	17:44:09
<b>Application Type:</b>	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	04245_001000_Resp_to_Notice_Requiring_Inventors_Declaration_05062015.pdf	57451 fac84fe299654ba04d4dbdda0a6acb860df187279	no	3

### Warnings:

### Information:

2	Oath or Declaration filed	04245_001000_Declarations_Copies.pdf	321337 f185da04ac3b88ae753be6411cbae00d17a2f0	no	4
<b>Warnings:</b>					
<b>Information:</b>					
<b>Total Files Size (in bytes):</b>			378788		
<p><b>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.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b>  <b>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.</b></p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b>  <b>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.</b></p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b>  <b>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.</b></p>					



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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

Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
Row 1: 13/621,294, 09/17/2012, Sunil K. Rao, 04245.001000, 5130
Row 2: (Empty), (Empty), (Empty), EXAMINER, (Empty)
Row 3: (Empty), (Empty), (Empty), SAM, PHIRIN, (Empty)
Row 4: (Empty), (Empty), (Empty), ART UNIT, PAPER NUMBER
Row 5: (Empty), (Empty), (Empty), 2476, (Empty)
Row 6: (Empty), (Empty), (Empty), MAIL DATE, DELIVERY MODE
Row 7: (Empty), (Empty), (Empty), 04/28/2015, PAPER

7590 04/28/2015
FITZPATRICK CELLA HARPER & SCINTO
1290 Avenue of the Americas
NEW YORK, NY 10104-3800

NOTICE REQUIRING INVENTOR'S OATH OR DECLARATION

An inventor's oath or declaration in compliance with 37 CFR 1.63 or 1.64 executed by or with respect to each inventor has not yet been submitted.

An oath or declaration in compliance with 37 CFR 1.63, or a substitute statement in compliance with 37 CFR 1.64, executed by or with respect to each inventor MUST be filed no later than the date on which the issue fee is paid. See 35 U.S.C. 115(f). Failure to timely comply will result in ABANDONMENT of this application. This period for reply is not extendable under 37 CFR 1.136(a).

Questions relating to this Notice should be directed to the Application Assistance Unit at 571-272-4200.

(571)-272-4200 or 1(888)-786-0101
Patent Publication Branch
Office of Data Management



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UNITED STATES DEPARTMENT OF COMMERCE
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Alexandria, Virginia 22313-1450
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NOTICE OF ALLOWANCE AND FEE(S) DUE

5514 7590 04/07/2015
FITZPATRICK CELLA HARPER & SCINTO
1290 Avenue of the Americas
NEW YORK, NY 10104-3800

EXAMINER

SAM, PHIRIN

ART UNIT PAPER NUMBER

2476

DATE MAILED: 04/07/2015

Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.

13/621,294 09/17/2012 Sunil K. Rao 04245.001000. 5130

TITLE OF INVENTION: SYSTEM TO INTERFACE INTERNET PROTOCOL (IP) BASED WIRELESS DEVICES WITH OPTICAL AND OTHER NETWORKS FOR IMPROVED FLEXIBILITY, PERFORMANCE, AND DATA TRANSFER

Table with 7 columns: APPLN. TYPE, ENTITY STATUS, ISSUE FEE DUE, PUBLICATION FEE DUE, PREV. PAID ISSUE FEE, TOTAL FEE(S) DUE, DATE DUE

nonprovisional SMALL \$480 \$0 \$0 \$480 07/07/2015

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 DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). 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. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

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.



**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)

5514 7590 04/07/2015  
**FITZPATRICK CELLA HARPER & SCINTO**  
 1290 Avenue of the Americas  
 NEW YORK, NY 10104-3800

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.
13/621,294	09/17/2012	Sunil K. Rao	04245.001000.	5130

TITLE OF INVENTION; SYSTEM TO INTERFACE INTERNET PROTOCOL (IP) BASED WIRELESS DEVICES WITH OPTICAL AND OTHER NETWORKS FOR IMPROVED FLEXIBILITY, PERFORMANCE, AND DATA TRANSFER

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$480	\$0	\$0	\$480	07/07/2015

EXAMINER	ART UNIT	CLASS-SUBCLASS
SAM, PHIRIN	2476	370-338000

<p>1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).</p> <p><input type="checkbox"/> Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.</p> <p><input type="checkbox"/> "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. <b>Use of a Customer Number is required.</b></p>	<p>2. For printing on the patent front page, list</p> <p>(1) The names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____</p> <p>(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. 2 _____</p> <p>3 _____</p>
---	---

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

<p>4a. The following fee(s) are submitted:</p> <p><input type="checkbox"/> Issue Fee</p> <p><input type="checkbox"/> Publication Fee (No small entity discount permitted)</p> <p><input type="checkbox"/> Advance Order - # of Copies _____</p>	<p>4b. Payment of Fee(s): (<b>Please first reapply any previously paid issue fee shown above</b>)</p> <p><input type="checkbox"/> A check is enclosed.</p> <p><input type="checkbox"/> Payment by credit card. Form PTO-2038 is attached.</p> <p><input type="checkbox"/> The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).</p>
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5. **Change in Entity Status** (from status indicated above)

Applicant certifying micro entity status. See 37 CFR 1.29

Applicant asserting small entity status. See 37 CFR 1.27

Applicant changing to regular undiscounted fee status.

**NOTE:** Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

**NOTE:** If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

**NOTE:** Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____	Date _____
Typed or printed name _____	Registration No. _____



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
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Alexandria, Virginia 22313-1450
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Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
Values: 13/621,294, 09/17/2012, Sunil K. Rao, 04245.001000., 5130

5514 7590 04/07/2015
FITZPATRICK CELLA HARPER & SCINTO
1290 Avenue of the Americas
NEW YORK, NY 10104-3800

EXAMINER

SAM, PHIRIN

ART UNIT PAPER NUMBER

2476

DATE MAILED: 04/07/2015

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

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 1-(888)-786-0101 or (571)-272-4200.

## OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B 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.

### 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.

<b>Notice of Allowability</b>	<b>Application No.</b> 13/621,294	<b>Applicant(s)</b> RAO ET AL.	
	<b>Examiner</b> PHIRIN SAM	<b>Art Unit</b> 2476	<b>AIA (First Inventor to File) Status</b> No

**-- 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 12/20/2014.  
 A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on \_\_\_\_\_.
2.  An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_\_; the restriction requirement and election have been incorporated into this action.
3.  The allowed claim(s) is/are 2-5. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see [http://www.uspto.gov/patents/init\\_events/pph/index.jsp](http://www.uspto.gov/patents/init_events/pph/index.jsp) or send an inquiry to [FPHfeedback@uspto.gov](mailto:FPHfeedback@uspto.gov).
4.  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

- 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.**

5.  **CORRECTED DRAWINGS** ( as "replacement sheets") must be submitted.  
 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. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 5. <input type="checkbox"/> Examiner's Amendment/Comment                             |
| 2. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),<br>Paper No./Mail Date _____    | 6. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| 3. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material | 7. <input type="checkbox"/> Other _____.   |
| 4. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____.                     |  |

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**DETAILED ACTION**

1. The present application is being examined under the pre-AIA first to invent provisions.

*Allowable Subject Matter*

2. The following is an examiner's statement of reasons for allowance:

**In regard to amended claim 2**, the prior arts of record do not teach or suggest a wireless communication device comprising: a plurality of antennas; and a communication component coupled to the plurality of antennas, the communication component including a processor, a transmitter, and a receiver, the communication component configured to transmit a first data stream by simultaneously transmitting a first plurality of signal streams using the plurality of antennas, the first plurality of signal streams collectively representing the first data stream, the communication component configured to receive a second data stream by simultaneously receiving a second plurality of signal streams using the plurality of antennas and generating the second data stream from the second plurality of signal streams; wherein the communication component is configured to communicate via a first frequency band using a wireless communication protocol, and wherein the processor comprises multiple channels configured to process the first data stream and the second data stream in parallel.

**In regard to amended claim 3**, the prior arts of record do not teach or suggest a wireless communication device comprising: a plurality of antennas; and a communication component coupled to the plurality of antennas, the communication component including a processor, a transmitter, and a receiver, the communication component configured to transmit a first data stream by simultaneously transmitting a first plurality of signal streams using the plurality of antennas, the first plurality of signal streams collectively representing the first data stream, the communication component configured to receive a second data stream by simultaneously receiving a second plurality of signal streams using the plurality of antennas and generating the second data stream from the second plurality of signal streams; wherein the communication component includes at least one additional transmitter; wherein the transmitter is configured to transmit on a first frequency and the at least one additional transmitter is configured to transmit on a second frequency; wherein the transmitter is configured to transmit using a first communication protocol and the at least one additional transmitter is configured to transmit using a second communication protocol, wherein the first communication protocol is different than the second communication protocol; and wherein the processor comprises multiple channels configured to process the first data stream and the second data stream in parallel.

**In regard to amended claim 4**, the prior arts of record do not teach or suggest a wireless communication device comprising: a plurality of antennas; and a communication component coupled to the plurality of antennas, the communication component including a processor, a transmitter, and a receiver, the communication component configured to transmit a first data

stream by simultaneously transmitting a first plurality of signal streams using the plurality of antennas, the first plurality of signal streams collectively representing the first data stream, the communication component configured to receive a second data stream by simultaneously receiving a second plurality of signal streams using the plurality of antennas and generating the second data stream from the second plurality of signal streams; and wherein the communication component includes at least one additional receiver; wherein the receiver is configured to receive using a first communication protocol and the at least one additional receiver is configured to receive using a second communication protocol, wherein the first communication protocol is different than the second communication protocol, and wherein the processor comprises multiple channels configured to process the first data stream and the second data stream in parallel.

**In regard to amended claim 5**, the prior arts of record do not teach or suggest a wireless communication device comprising: a plurality of antennas; and a communication component coupled to the plurality of antennas, the communication component including a processor, a transmitter, and a receiver, the communication component configured to transmit a first data stream by simultaneously transmitting a first plurality of signal streams using the plurality of antennas, the first plurality of signal streams collectively representing the first data stream, the communication component configured to receive a second data stream by simultaneously receiving a second plurality of signal streams using the plurality of antennas and generating the second data stream from the second plurality of signal streams; and wherein a first set of antennas of the plurality of antennas is configured to operate in a first frequency band and a

second set of antennas of the plurality of antennas is configured to operate in a second frequency band, wherein the first frequency band is different than the second frequency band; wherein the first set of antennas of the plurality of antennas is configured to operate using a first communication protocol and the second set of antennas of the plurality of antennas is configured to operate using a second communication protocol, wherein the first communication protocol is different than the second communication protocol; and wherein the processor comprises multiple channels configured to process the first data stream and the second data stream in parallel.

### *Conclusion*

3. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to PHIRIN SAM whose telephone number is (571)272-3082. The examiner can normally be reached on Flexible Work Schedule.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Ayaz R. Sheikh can be reached on (571) 272-3795. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



Application/Control Number: 13/621,294  
Art Unit: 2476

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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). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Respectfully submitted,

Date: April 4, 2015

By:           /Phirin Sam/            
Primary Examiner  
Art Unit 2476

<b>Notice of References Cited</b>	Application/Control No. 13/621,294	Applicant(s)/Patent Under Reexamination RAO ET AL.	
	Examiner PHIRIN SAM	Art Unit 2476	Page 1 of 1

**U.S. PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A US-2002/0154705	10-2002	Walton et al.	375/267
*	B US-6,515,978	02-2003	Buehrer et al.	370/342
*	C US-6,370,129	04-2002	Huang, Howard	370/329
*	D US-6,115,427	09-2000	Calderbank et al.	375/267
*	E US-5,812,951	09-1998	Ganesan et al.	455/445
	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				
	O				
	P				
	Q				
	R				
	S				
	T				

**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.







<b>Search Notes</b>  	<b>Application/Control No.</b>  13621294	<b>Applicant(s)/Patent Under Reexamination</b>  RAO ET AL.
	<b>Examiner</b>  PHIRIN SAM	<b>Art Unit</b>  2476

CPC- SEARCHED		
Symbol	Date	Examiner


CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
370/328,329,336,338,339,340,341,342,347,351-354,356,436,437,442 (Text search - See search history printout).	06/16/2014; 04/04/2015	PS
H04B/02; H04B7/024; H04B7/026; H04B7/0404; H04B7/0408; H04B7/0413; H04B7/0452; H04B7/06; H04B7/08; H04W72/042; H04W72/0413; H04W72/0446 (See text search history).	04/04/2015	PS

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
	See text search history for interference.	04/04/2015	PS

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<b><i>Index of Claims</i></b> 	<b>Application/Control No.</b> 13621294	<b>Applicant(s)/Patent Under Reexamination</b> RAO ET AL.
	<b>Examiner</b> PHIRIN SAM	<b>Art Unit</b> 2476

✓	<b>Rejected</b>	-	<b>Cancelled</b>	N	<b>Non-Elected</b>	A	<b>Appeal</b>
=	<b>Allowed</b>	÷	<b>Restricted</b>	I	<b>Interference</b>	O	<b>Objected</b>

<input type="checkbox"/> Claims renumbered in the same order as presented by applicant				<input type="checkbox"/> CPA		<input type="checkbox"/> T.D.		<input type="checkbox"/> R.1.47	
CLAIM		DATE							
Final	Original	06/16/2014	04/04/2015						
	1	-	-						
	2	✓	=						
	3	✓	=						
	4	✓	=						
	5	✓	=						

## EAST Search History

## EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1443156	((wireless or mobile or hand\$1help) adj4 (terminal\$1 or device\$1 or unit\$1 or node\$1 or apparatus or station\$1)) or PDA	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/04/04 13:20
L2	281935	antennas	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/04/04 13:20
L3	4275349	processor\$1 or (process\$3 adj3 (device\$1 or unit\$1 or node\$1 or apparatus or module or circuit\$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/04/04 13:23
L4	1231626	((transmit\$4 and receiv\$3) or transceiv\$3) adj3 (device\$1 or unit\$1 or node\$1 or apparatus or module or circuit\$3)) or (transmitter\$1 and receiver\$1) or transceiver\$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/04/04 13:26
L5	11340	(transmit\$4 or send\$3 or transceiv\$3) same ((data or packet\$1 or fram\$3) near3 stream\$4) same antennas	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/04/04 13:29
L6	9544	receiv\$3 same ((data or packet\$1 or fram\$3) near3 stream\$4) same antennas	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/04/04 13:29
L7	125065	l1 and l2	US-PGPUB; USPAT;	OR	OFF	2015/04/04 13:30



EAST Search History

			USOCR; FPRS; EPO; JPO; IBM_TDB			
L8	94800	I7 and I3	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/04/04 13:30
L9	80091	I8 and I4	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/04/04 13:30
L10	6908	I9 and I5	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/04/04 13:30
L11	5451	I10 and I6	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/04/04 13:31
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## EAST Search History

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		OR H04W16/14 OR H04W28/0236 OR H04W28/065 OR H04W36/0044 OR H04W36/0055 OR H04W36/10 OR H04W36/22 OR H04W36/245 OR H04W36/32 OR H04W48/20 OR H04W4/02 OR H04W4/22 OR H04W52/0206 OR H04W52/22 OR H04W56/00 OR H04W68/04 OR H04W72/0406 OR H04W72/0426 OR H04W72/046 OR H04W72/0473 OR H04W72/10 OR H04W72/1278 OR H04W76/027 OR H04W88/02 OR H04W8/08 OR H04W12/00 OR H04W12/06 OR H04W12/12 OR H04W16/10 OR H04W28/02 OR H04W28/0215 OR H04W28/0289 OR H04W28/08 OR H04W28/10 OR H04W28/16 OR H04W36/00 OR H04W36/0016 OR H04W36/0022 OR H04W36/0027 OR H04W36/0066 OR H04W36/0083 OR H04W36/08 OR H04W36/14 OR H04W36/30 OR H04W48/04 OR H04W48/08 OR H04W48/16 OR H04W4/023 OR H04W4/06 OR H04W4/08 OR H04W52/0212 OR H04W52/0216 OR H04W52/0225 OR H04W52/0229 OR H04W52/0235 OR H04W52/243 OR H04W52/244 OR H04W52/42 OR H04W64/003 OR H04W72/04 OR H04W72/06 OR H04W72/1215 OR H04W72/1226 OR H04W72/1257 OR H04W72/1284 OR H04W72/14 OR H04W74/0808 OR H04W74/0816 OR H04W74/0825 OR H04W76/021 OR H04W76/048 OR H04W84/20 OR H04W88/04). CPC. )				
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L22	51356	H04B/02.cpc. or H04B7/024.cpc. or H04B7/026.cpc. or H04B7/0404.cpc. or H04B7/0408.cpc. or H04B7/0413.cpc. or H04B7/0452.cpc. or H04B7/06.cpc. or H04B7/08.cpc. or H04W72/042.cpc. or H04W72/0413.cpc. or H04W72/0446.cpc.	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/04/04 14:40
L23	4	l22 and l14	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/04/04 14:41
L24	4	l22 and l12	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	OFF	2015/04/04 14:41

EAST Search History

			IBM_TDB			
L25	1077	l22 and l11	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/04/04 14:41
L26	1	((transmit\$4 or send\$3 or transceiv\$3) same (first adj4 ((data or packet\$1 or fram\$3) near3 stream\$4)) same antennas same (receiv\$3 same ((data or packet\$1 or fram\$3) near3 stream\$4) same antennas) same ((processor\$1 or (process\$3 adj3 (device\$1 or unit\$1 or node\$1 or apparatus or module or circuit\$3))) same (first adj3 (data or packet\$1 or fram\$3) near3 stream\$4) same (second adj3 (data or packet\$1 or fram\$4) near3 stream\$4) same parallel\$4)).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/04/04 14:43

**EAST Search History (Interference)**

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L27	1	((transmit\$4 or send\$3 or transceiv\$3) same (first adj4 ((data or packet\$1 or fram\$3) near3 stream\$4)) same antennas same (receiv\$3 same ((data or packet\$1 or fram\$3) near3 stream\$4) same antennas) same ((processor\$1 or (process\$3 adj3 (device\$1 or unit\$1 or node\$1 or apparatus or module or circuit\$3))) same (first adj3 (data or packet\$1 or fram\$3) near3 stream\$4) same (second adj3 (data or packet\$1 or fram\$4) near3 stream\$4) same parallel\$4)).clm.	US-PGPUB; USPAT; UPAD	OR	OFF	2015/04/04 14:43

4/ 4/ 2015 2:52:52 PM

C:\Users\psam\Documents\EAST\Workspaces\13-384158.wsp

04245.001000.

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application No.: 13/621,294	)	
	:	Examiner: Phirin Sam
First Named Inventor:	)	
	:	Group Art Unit: 2476
SUNIL K. RAO, ET AL.	)	
	:	Confirmation No.: 5130
Filed: September 17, 2012	)	
	:	
For: A SYSTEM TO INTERFACE	)	
INTERNET PROTOCOL (IP) BASED	:	
WIRELESS DEVICES WITH	)	
OPTICAL AND OTHER NETWORKS	:	
FOR IMPROVED FLEXIBILITY,	)	
PERFORMANCE, AND DATA	:	
TRANSFER	)	December 20, 2014

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

AMENDMENT

Commissioner:

In response to the Office Action dated June 23, 2014, the period for response to which having been extended to December 23, 2014 by the accompanying Petition for Extension of Time with fee, please amend the above-identified application, as follows:

CERTIFICATE OF EFS-WEB TRANSMISSION  
I hereby certify that this correspondence is being filed electronically by EFS-Web transmission to the United States Patent Office on  
December 20, 2014  
\_\_\_\_\_  
(Date of Deposit)

Michael K. O'Neill, Reg. No. 32,622  
\_\_\_\_\_  
(Name of Attorney for Applicants)

_____ /Michael K. O'Neill/ Signature	_____ December 20, 2014 Date of Signature
--	---

IN THE CLAIMS:

Please amend the claims as follows:

1. (Cancelled).

2. (Currently Amended) A wireless communication device comprising:  
a plurality of antennas; and

a communication component coupled to the plurality of antennas, the communication component including a processor, a transmitter, and a receiver, the communication component configured to transmit a first data stream by simultaneously transmitting a first plurality of signal streams using the plurality of antennas, the first plurality of signal streams collectively representing the first data stream, the communication component configured to receive a second data stream by simultaneously receiving a second plurality of signal streams using the plurality of antennas and generating the second data stream from the second plurality of signal streams;

wherein the communication component is configured to communicate via a first frequency band using a wireless communication protocol; and

wherein the processor comprises multiple channels configured to process the first data stream and the second data stream in parallel.

3. (Currently Amended) A wireless communication device comprising:  
a plurality of antennas; and

a communication component coupled to the plurality of antennas, the communication component including a processor, a transmitter, and a receiver, the communication component configured to transmit a first data stream by simultaneously transmitting a first plurality of signal streams using the plurality of antennas, the first plurality of signal streams collectively representing the first data stream, the communication component configured to receive a second data stream by simultaneously receiving a second plurality of signal streams using the plurality of antennas and generating the second data stream from the second plurality of signal streams;

wherein the communication component includes at least one additional transmitter;

wherein the transmitter is configured to transmit on a first frequency and the at least one additional transmitter is configured to transmit on a second frequency; [[and]]

wherein the transmitter is configured to transmit using a first communication protocol and the at least one additional transmitter is configured to transmit using a second communication protocol, wherein the first communication protocol is different than the second communication protocol; and

wherein the processor comprises multiple channels configured to process the first data stream and the second data stream in parallel.

4. (Currently Amended) A wireless communication device comprising:

a plurality of antennas; and

a communication component coupled to the plurality of antennas, the communication component including a processor, a transmitter, and a receiver, the

communication component configured to transmit a first data stream by simultaneously transmitting a first plurality of signal streams using the plurality of antennas, the first plurality of signal streams collectively representing the first data stream, the communication component configured to receive a second data stream by simultaneously receiving a second plurality of signal streams using the plurality of antennas and generating the second data stream from the second plurality of signal streams; and

wherein the communication component includes at least one additional receiver; [[and]]

wherein the receiver is configured to receive using a first communication protocol and the at least one additional receiver is configured to receive using a second communication protocol, wherein the first communication protocol is different than the second communication protocol; and

wherein the processor comprises multiple channels configured to process the first data stream and the second data stream in parallel.

5. (Currently Amended) A wireless communication device comprising:

a plurality of antennas; and

a communication component coupled to the plurality of antennas, the communication component including a processor, a transmitter, and a receiver, the communication component configured to transmit a first data stream by simultaneously transmitting a first plurality of signal streams using the plurality of antennas, the first plurality of signal streams collectively representing the first data stream, the communication component configured to receive a second data stream by simultaneously



receiving a second plurality of signal streams using the plurality of antennas and generating the second data stream from the second plurality of signal streams; and

wherein a first set of antennas of the plurality of antennas is configured to operate in a first frequency band and a second set of antennas of the plurality of antennas is configured to operate in a second frequency band, wherein the first frequency band is different than the second frequency band; [[and]]

wherein [[a]] the first set of antennas of the plurality of antennas is configured to operate using a first communication protocol and [[a]] the second set of antennas of the plurality of antennas is configured to operate using a second communication protocol, wherein the first communication protocol is different than the second communication protocol; and

wherein the processor comprises multiple channels configured to process the first data stream and the second data stream in parallel.

### REMARKS

This application has been carefully reviewed in light of the Office Action dated June 23, 2014. Claims 2 to 5 are in the application, of which all claims are independent. Reconsideration and further examination are respectfully requested.

Claims 2 to 4 were rejected under 35 U.S.C. §103(a) over U.S. Patent No. 5,960,344 (Mahany) in view of U.S. Patent No. 6,493,331 (Walton). Claim 5 was rejected under 35 U.S.C. §103(a) over Mahany, Walton and further in view of U.S. Patent No. 6,091,365 (Derneryd). Reconsideration and withdrawal of these rejections are respectfully requested.

The present claims relate, in general, to a wireless communication device comprising a plurality of antennas and a communication component coupled to the plurality of antennas. In such a wireless communication device, the communication component includes a processor, a transmitter, and a receiver. The communication component is configured to transmit a first data stream by simultaneously transmitting a first plurality of signal streams using the plurality of antennas, the first plurality of signal streams collectively representing the first data stream, and is configured to receive a second data stream by simultaneously receiving a second plurality of signal streams using the plurality of antennas and generating the second data stream from the second plurality of signal streams. According to one further aspect of the claims, the processor comprises multiple channels configured to process the first data stream and the second data stream in parallel.

By virtue of the claimed arrangements, it is typically possible to achieve parallel processing of signals and data streams through the plurality of antennas. This

often allows for the wireless communication device to achieve faster data rates with flexible connections for making multiple applications sequentially or simultaneously available on a single cellular telephone or mobile device. Moreover, in many use scenarios, parallel processing of data streams allows for each signal to be better processed and tuned to a specific frequency band of the signal. Thus, better quality of output can frequently be achieved for each type of signal and application. See, for example, at least paragraphs [0022], [0030], [0031] and [0063] of the subject application.

Naturally, it will be understood that the foregoing references to the specification do not limit the scope of the claims. Rather, the specification merely describes representative examples of arrangements that fall within the scope of the claims, with a further understanding that other embodiments, not explicitly described in the specification, may also fall within the scope of the claims.

The applied art is not seen to disclose or to suggest the subject matter of the present claims, and the attendant benefits provided thereby. In particular, Mahany, Walton and Derneryd, considered alone or in any permissible combination, are not seen to disclose or to suggest at least the claimed features of a communication component having a processor, a transmitter and a receiver, wherein the communication component is configured to transmit a first data stream by simultaneously transmitting a first plurality of signal streams using the plurality of antennas, the first plurality of signal streams collectively representing the first data stream, wherein the communication component is further configured to receive a second data stream by simultaneously receiving a second plurality of signal streams using the plurality of antennas and generating the second data stream from the second plurality of signal streams, and wherein the processor comprises

multiple channels configured to process the first data stream and the second data stream in parallel.

More specifically, Mahany is merely seen to disclose a communication network having at least one access point and supporting wireless communication among a plurality of wireless roaming devices via a first and second wireless channel. See Mahany at column 2, lines 10-29. However, as understood by Applicants, Mahany is not understood to disclose or suggest at least a processor comprising multiple channels configured to process a first data stream and a second data stream in parallel.

Walton is seen to disclose a method for controlling transmissions in a communications system. Specifically, Walton discloses partitioning available system resources into a plurality of channels and reallocating resources among the channels based on detected conditions of the communications system. See Walton at column 2, lines 59-67. However, as understood by Applicants, Walton does not describe parallel processing of data streams using a multichannel processor. Accordingly, Walton is not understood to disclose or suggest anything that, when combined with Mahany, would have resulted in at least the feature of a processor comprising multiple channels configured to process a first data stream and a second data stream in parallel.

Derneryd has been studied but is not seen to overcome the deficiencies of Mahany and Walton, considered alone or in any permissible combination.

It is therefore respectfully submitted that the claims herein recite subject matter that would not have been obvious to those of ordinary skill in the art, based on any permissible combination of Mahany, Walton and Derneryd, and withdrawal of the rejections under §103(a) is respectfully requested.

No other matters being raised, it is believed the entire application is fully in condition for allowance, and such action is courteously solicited.

Any fees due in connection with this paper are being charged concurrently to a credit card, and no additional fees are believed due. However, should it be determined that processing of this paper requires additional fees under 37 C.F.R. 1.16 or 1.17, the Director is hereby authorized to charge such fees to Deposit Account 06-1205.

Applicants' undersigned attorney may be reached in our Costa Mesa, California office by telephone at (714) 540-8700. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,

/Michael K. O'Neill/  
Michael K. O'Neill  
Attorney for Applicants  
Registration No. 32,622

FITZPATRICK, CELLA, HARPER & SCINTO  
1290 Avenue of the Americas  
New York, New York 10104-3800  
Facsimile: (212) 218-2200

04245.001000.

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application No.: 13/621,294	)	
	:	Examiner: Phirin Sam
First Named Inventor:	)	
	:	Group Art Unit: 2476
SUNIL K. RAO, ET AL.	)	
	:	Confirmation No.: 5130
Filed: September 17, 2012	)	
	:	
For: A SYSTEM TO INTERFACE	)	
INTERNET PROTOCOL (IP)	:	
BASED WIRELESS DEVICES	)	
WITH OPTICAL AND OTHER	:	
NETWORKS FOR IMPROVED	)	
FLEXIBILITY, PERFORMANCE,	:	
AND DATA TRANSFER	)	December 20, 2014

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

PETITION FOR EXTENSION OF TIME

Commissioner:

Applicants petition the Commissioner for Patents to extend the time for response to the Office Action dated June 23, 2014 for three months from September 23, 2014 to December 23, 2014.

CERTIFICATE OF EFS-WEB TRANSMISSION  
I hereby certify that this correspondence is being filed electronically by EFS-Web transmission to the United States Patent Office on  
December 20, 2014  
(Date of Deposit)

Michael K. O'Neill, Reg. No. 32,622  
(Name of Attorney for Applicants)

/Michael K. O'Neill/  
Signature

December 20, 2014  
Date of Signature

The \$700.00 fee for this extension (small entity) is being charged concurrently to a credit card, and no additional fees are believed due. However, should it be determined that processing of this paper requires additional fees under 37 C.F.R. 1.16 or 1.17, the Director is hereby authorized to charge such fees to Deposit Account 06-1205.

Applicants' undersigned attorney may be reached in our Costa Mesa, California office by telephone at (714) 540-8700. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,

/Michael K. O'Neill/  
Michael K. O'Neill  
Attorney for Applicants  
Registration No. 32,622

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1290 Avenue of the Americas  
New York, New York 10104-3800  
Facsimile: (212) 218-2200

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	13621294			
<b>Filing Date:</b>	17-Sep-2012			
<b>Title of Invention:</b>	System to Interface Internet Protocol (IP) Based Wireless Devices with Optical and Other Networks for Improved Flexibility, Performance, and Data Transfer			
<b>First Named Inventor/Applicant Name:</b>	Sunil K. Rao			
<b>Filer:</b>	Michael K. O'Neill			
<b>Attorney Docket Number:</b>	04245.001000.			
Filed as Small Entity				
<b>Filing Fees for Utility under 35 USC 111(a)</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
<b>Extension-of-Time:</b>				



Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension - 3 months with \$0 paid	2253	1	700	700
<b>Miscellaneous:</b>				
<b>Total in USD (\$)</b>				<b>700</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	21027038
<b>Application Number:</b>	13621294
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	5130
<b>Title of Invention:</b>	System to Interface Internet Protocol (IP) Based Wireless Devices with Optical and Other Networks for Improved Flexibility, Performance, and Data Transfer
<b>First Named Inventor/Applicant Name:</b>	Sunil K. Rao
<b>Customer Number:</b>	5514
<b>Filer:</b>	Michael K. O'Neill
<b>Filer Authorized By:</b>	
<b>Attorney Docket Number:</b>	04245.001000.
<b>Receipt Date:</b>	20-DEC-2014
<b>Filing Date:</b>	17-SEP-2012
<b>Time Stamp:</b>	12:25:59
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$700
RAM confirmation Number	9191
Deposit Account	503939
Authorized User	O'NEILL, MICHAEL K.

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

- Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)
- Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

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**File Listing:**

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Amendment/Req. Reconsideration-After Non-Final Reject	04245_001000_Amend_12202014.pdf	67602 <small>de46e805506df72ba01414ec6666402bce7663cb</small>	no	9

**Warnings:**

**Information:**

2	Extension of Time	04245_001000_Extension_12202014.pdf	54570 <small>24c7c0209b45763ba1bb31869e6157861afe2a30</small>	no	2
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**Warnings:**

**Information:**

3	Fee Worksheet (SB06)	fee-info.pdf	30872 <small>270adf2854081cdb888ec31bcb995a1a30ae2bd8</small>	no	2
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**Warnings:**

**Information:**

<b>Total Files Size (in bytes):</b>	153044
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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.

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.

<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875	Application or Docket Number <b>13/621,294</b>	Filing Date <b>09/17/2012</b>	<input type="checkbox"/> To be Mailed
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ENTITY:  LARGE  SMALL  MICRO

**APPLICATION AS FILED – PART I**

FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A	
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =	
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 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).			
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

**APPLICATION AS AMENDED – PART II**

	(Column 1)	(Column 2)	(Column 3)	(Column 3)	RATE (\$)	ADDITIONAL FEE (\$)
<b>AMENDMENT</b>	<b>12/20/2014</b>	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		
	Total (37 CFR 1.16(i))	* 4	Minus	** 20	= 0	X \$40 = 0
	Independent (37 CFR 1.16(h))	* 4	Minus	***4	= 0	X \$210 = 0
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))					
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					
					TOTAL ADD'L FEE	<b>0</b>

	(Column 1)	(Column 2)	(Column 3)	(Column 3)	RATE (\$)	ADDITIONAL FEE (\$)
<b>AMENDMENT</b>		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))					
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					
					TOTAL ADD'L 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.

LIE  
/NICOLE NICHOLSON/

This collection of information is required by 37 CFR 1.16. 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, 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.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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13/621,294	09/17/2012	Sunil K. Rao	04245.001000.	5130
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5514 7590 06/23/2014  
 FITZPATRICK CELLA HARPER & SCINTO  
 1290 Avenue of the Americas  
 NEW YORK, NY 10104-3800

EXAMINER
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SAM, PHIRIN

ART UNIT	PAPER NUMBER
----------	--------------

2476

MAIL DATE	DELIVERY MODE
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06/23/2014

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 13/621,294	<b>Applicant(s)</b> RAO ET AL.	
	<b>Examiner</b> PHIRIN SAM	<b>Art Unit</b> 2476	<b>AIA (First Inventor to File) Status</b> No

**-- 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 MONTHS 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 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 09/17/2012.  
 A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on \_\_\_\_\_.
- 2a)  This action is **FINAL**.                      2b)  This action is non-final.
- 3)  An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_\_; the restriction requirement and election have been incorporated into this action.
- 4)  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\***

- 5)  Claim(s) 2-5 is/are pending in the application.  
5a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 6)  Claim(s) \_\_\_\_\_ is/are allowed.
- 7)  Claim(s) 2-5 is/are rejected.
- 8)  Claim(s) \_\_\_\_\_ is/are objected to.
- 9)  Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

\* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see [http://www.uspto.gov/patents/init\\_events/pph/index.jsp](http://www.uspto.gov/patents/init_events/pph/index.jsp) or send an inquiry to [PPHfeedback@uspto.gov](mailto:PPHfeedback@uspto.gov).

**Application Papers**

- 10)  The specification is objected to by the Examiner.
- 11)  The drawing(s) filed on 09/17/2012 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).

**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).

**Certified copies:**

- 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)).

\*\* 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)  Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)  
Paper No(s)/Mail Date 09/17/2012.
- 3)  Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 4)  Other: \_\_\_\_\_.

### DETAILED ACTION

1. The present application is being examined under the pre-AIA first to invent provisions.

#### *Claim Rejections - 35 USC § 103*

2. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

3. The following is a quotation of pre-AIA 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 negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under pre-AIA 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of pre-AIA 35 U.S.C. 103(c) and potential pre-AIA 35 U.S.C. 102(e), (f) or (g) prior art under pre-AIA 35 U.S.C. 103(a).

4. Claims 2-4 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over US Patent 5,960,344 to Mahany in view of US Patent 6,493,331 to Walton et al. (hereinafter Walton).

**In regard to claim 2**, Mahany teaches or suggests a wireless communication device comprising:

- (a) a plurality of antennas (see Fig. 2, elements 21-24); and
- (b) a communication component coupled to the plurality of antennas (see Fig. 2, elements 15, 16, and 21-24, col. 6, lines 11-15, *each wireless adapter 15 and 16 includes at least two antennas 21 and 23, 22 and 24, respectively positioned to create an antenna diversity scheme*), the communication component including a processor (see Fig. 2, elements 13, 19, 20, col. 6, lines 24-26, *the MAC processor 19 then determines the quality if the signal coming in on each of the antennas 21 and 23 connected to the wireless adapter 15*), a transmitter and a receiver (see Fig. 2, elements 21 and 3, col. 6, lines 22-24, 46-48, *an incoming signal is received on both antennas 21 and 23 of the wireless adapter 15. While one of the wireless adapters is transmitting, the other wireless adapter can operate as a promiscuous listener to determine if the correct message is being sent.*), the communication component configured to transmit a first data stream by simultaneously transmitting a first plurality of signal streams using the plurality of antennas (see Fig. 2, col. 6, lines 46-48), the first plurality of signal streams collectively representing the first data stream, the communication component configured to receive a second data stream by simultaneously receiving a second plurality of signal streams using the plurality of antennas (see Fig. 2, col. 6, lines 22-23, 61-64, *the configuration in which each of the*



*wireless adapters is listening on the same channel, another advantage achieved by this configuration is the ability to receive two concurrent messages) and generating the second data stream from the second plurality of signal streams (see Fig. 2, col. 6, lines 24-31, **the MAC processor 19 then determines the quality of the signal coming in on each of the antennas 21 and 23 connected to the wireless adapter 15. Based upon the signal quality information, the MAC processor 19 will choose which of the antennas 21 and 23 to use to receive the incoming transmission. The MAC processor will also forward the signal quality information regarding the selected antenna to the CPU processor**);*

Mahany may not teach or suggest wherein the communication component is configured to communicate via a first frequency band using a wireless communication protocol. However, Walton teaches or suggests wherein the communication component is configured to communicate via a first frequency band using a wireless communication protocol (see Fig. 1, col. 7, lines 41-48, *for example, the total operating bandwidth  $W$  can be divided into  $N$  equal operating frequency bands (i.e.,  $B=W/N$ ) and each cell can be assigned to one of the  $N$  frequency bands. The frequency bands are periodically reused to achieve higher spectral efficiency. For a 7-cell reuse pattern such as that supported by FIG. 1, cell 102a may be assigned the first frequency band, cell 102b may be assigned the second frequency band*).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify an access point of Mahany by including the communication component is configured to communicate via a first frequency band using a wireless communication protocol suggested by Walton. This modification would provide the controlling transmissions of a

communications system to increase efficiency and improve performance read on column 2, lines 36-38.

**In regard to claim 3**, Mahany teaches or suggests a wireless communication device comprising:

- (a) a plurality of antennas (see Fig. 2, elements 21-24); and
- (b) a communication component coupled to the plurality of antennas (see Fig. 2, elements 15, 16, and 21-24, col. 6, lines 11-15, *each wireless adapter 15 and 16 includes at least two antennas 21 and 23, 22 and 24, respectively positioned to create an antenna diversity scheme*), the communication component including a processor (see Fig. 2, elements 13, 19, 20, col. 6, lines 24-26, *the MAC processor 19 then determines the quality of the signal coming in on each of the antennas 21 and 23 connected to the wireless adapter 15*), a transmitter and a receiver (see Fig. 2, elements 21 and 3, col. 6, lines 22-24, 46-48, *an incoming signal is received on both antennas 21 and 23 of the wireless adapter 15. While one of the wireless adapters is transmitting, the other wireless adapter can operate as a promiscuous listener to determine if the correct message is being sent.*), the communication component configured to transmit a first data stream by simultaneously transmitting a first plurality of signal streams using the plurality of antennas (see Fig. 2, col. 6, lines 46-48), the first plurality of signal streams collectively representing the first data stream, the communication component configured to receive a second data stream by simultaneously receiving a second plurality of signal streams using the plurality of antennas (see Fig. 2, col. 6, lines 22-23, 61-64, *the configuration in which each of the wireless adapters is listening on the same channel, another advantage achieved by this*

*configuration is the ability to receive two concurrent messages*) and generating the second data stream from the second plurality of signal streams (see Fig. 2, col. 6, lines 24-31, *the MAC processor 19 then determines the quality of the signal coming in on each of the antennas 21 and 23 connected to the wireless adapter 15. Based upon the signal quality information, the MAC processor 19 will choose which of the antennas 21 and 23 to use to receive the incoming transmission. The MAC processor will also forward the signal quality information regarding the selected antenna to the CPU processor*);

(c) wherein the communication component includes at least one additional transmitter (see Fig. 2, elements 23 and 24);

(d) wherein the transmitter is configured to transmit on a first frequency and the at least one additional transmitter is configured to transmit on a second frequency (see Figs. 6, 7a, elements 735, 734);

(e) wherein the transmitter is configured to transmit using a first communication protocol (see Fig. 14a and 14b, elements 1458 and 1460, col. 17, lines 62-66, *the access point 1456 includes a time bounded adapter 1458 connected to an antenna 1460 which provides wireless communication on the deterministic, time bounded first wireless channel governed by a first wireless protocol.*) and the at least one additional transmitter is configured to transmit using a second communication protocol (see Figs. 14a and 14b, elements 1462 and 1464, col. 17, lines 66-67, col. 18, lines 1-3, *the access point 1456 also includes a contention adapter 1462 connected to an antenna 1464 which provides wireless communications on the non-deterministic, contention access second wireless channel governed by a second wireless protocol.*), wherein the first communication protocol is different than the second communication

protocol (see Figs. 14a and 1b, col. 17, lines 27-32, 64-66, 1-3, *the access point 1456 includes a time bounded adapter 1458 connected to an antenna 1460 which provides wireless communication on the deterministic, time bounded first wireless channel governed by a first wireless protocol. The access point 1456 also includes a contention adapter 1462 connected to an antenna 1464 which provides wireless communications on the non-deterministic, contention access second wireless channel governed by a second wireless protocol*).

Mahany may not teach or suggest wherein the transmitter is configured to transmit on a first frequency and the at least one additional transmitter is configured to transmit on a second frequency. However, Walton teaches or suggests wherein the transmitter is configured to transmit on a first frequency and the at least one additional transmitter is configured to transmit on a second frequency (see Fig. 1, col. 7, lines 41-48, *for example, the total operating bandwidth  $W$  can be divided into  $N$  equal operating frequency bands (i.e.,  $B=W/N$ ) and each cell can be assigned to one of the  $N$  frequency bands. The frequency bands are periodically reused to achieve higher spectral efficiency. For a 7-cell reuse pattern such as that supported by FIG. 1, cell 102a may be assigned the first frequency band, cell 102b may be assigned the second frequency band, and so on*).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify an access point of Mahany by including wherein the transmitter is configured to transmit on a first frequency and the at least one additional transmitter is configured to transmit on a second frequency suggested by Walton. This modification would provide the controlling transmissions of a communications system to increase efficiency and improve performance read on column 2, lines 36-38.

**In regard to claim 4**, Mahany teaches or suggests a wireless communication device comprising:

- (a) a plurality of antennas (see Fig. 2, elements 21-24); and
- (b) a communication component coupled to the plurality of antennas see Fig. 2, elements 15, 16, and 21-24, col. 6, lines 11-15, *each wireless adapter 15 and 16 includes at least two antennas 21 and 23, 22 and 24, respectively positioned to create an antenna diversity scheme*), the communication component including a processor (see Fig. 2, elements 13, 19, 20, col. 6, lines 24-26, *the MAC processor 19 then determines the quality if the signal coming in on each of the antennas 21 and 23 connected to the wireless adapter 15*), a transmitter, and a receiver (see Fig. 2, elements 21 and 3, col. 6, lines 22-24, 46-48, *an incoming signal is received on both antennas 21 and 23 of the wireless adapter 15. While one of the wireless adapters is transmitting, the other wireless adapter can operate as a promiscuous listener to determine if the correct message is being sent.*), the communication component configured to transmit a first data stream by simultaneously transmitting a first plurality of signal streams using the plurality of antennas (see Fig. 2, col. 6, lines 46-48), the first plurality of signal streams collectively representing the first data stream, the communication component configured to receive a second data stream by simultaneously receiving a second plurality of signal streams using the plurality of antennas see Fig. 2, col. 6, lines 22-23, 61-64, *the configuration in which each of the wireless adapters is listening on the same channel, another advantage achieved by this configuration is the ability to receive two concurrent messages*) and generating the second data stream from the second plurality of signal streams (see Fig. 2, col. 6, lines 24-31, *the MAC processor 19 then determines the quality if the signal coming in on each of the antennas 21*

*and 23 connected to the wireless adapter 15. Based upon the signal quality information, the MAC processor 19 will choose which of the antennas 21 and 23 to use to receive the incoming transmission. The MAC processor will also forward the signal quality information regarding the selected antenna to the CPU processor);*

(c) wherein the communication component includes at least one additional receiver (see Fig. 2, elements 23 and 24); and

(d) wherein the receiver is configured to receive using a first communication protocol (see Fig. 14a and 14b, elements 1458 and 1460, col. 17, lines 62-66, ***the access point 1456 includes a time bounded adapter 1458 connected to an antenna 1460 which provides wireless communication on the deterministic, time bounded first wireless channel governed by a first wireless protocol.***) and the at least one additional receiver is configured to receive using a second communication protocol (see Figs. 14a and 14b, elements 1462 and 1464, col. 17, lines 66-67, col. 18, lines 1-3, ***the access point 1456 also includes a contention adapter 1462 connected to an antenna 1464 which provides wireless communications on the non-deterministic, contention access second wireless channel governed by a second wireless protocol.***), wherein the first communication protocol is different than the second communication protocol (see Figs. 14a and 1b, col. 17, lines 27-32, 64-66, 1-3, ***the access point 1456 includes a time bounded adapter 1458 connected to an antenna 1460 which provides wireless communication on the deterministic, time bounded first wireless channel governed by a first wireless protocol. The access point 1456 also includes a contention adapter 1462 connected to an antenna 1464 which provides wireless communications on the non-deterministic, contention access second wireless channel governed by a second wireless protocol.***).

Mahany may not teach or suggest wherein the receiver is configured to receive using a first communication protocol and the at least one additional receiver is configured to receive using a second communication protocol. However, Walton teaches or suggests the receiver is configured to receive using a first communication protocol and the at least one additional receiver is configured to receive using a second communication protocol (see Fig. 1, col. 7, lines 41-48, *for example, the total operating bandwidth  $W$  can be divided into  $N$  equal operating frequency bands (i.e.,  $B=W/N$ ) and each cell can be assigned to one of the  $N$  frequency bands. The frequency bands are periodically reused to achieve higher spectral efficiency. For a 7-cell reuse pattern such as that supported by FIG. 1, cell 102a may be assigned the first frequency band, cell 102b may be assigned the second frequency band*).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify an access point of Mahany by including the receiver is configured to receive using a first communication protocol and the at least one additional receiver is configured to receive using a second communication protocol suggested by Walton. This modification would provide the controlling transmissions of a communications system to increase efficiency and improve performance read on column 2, lines 36-38.

5. Claim 5 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Mahany in view of Walton as applied to claims 2-4 above, and further in view of US Patent 6,091,365 to Derneryd et al. (hereinafter Derneryd).

**In regard to claim 5**, Mahany teaches or suggests a wireless communication device comprising:

- (a) a plurality of antennas (see Fig. 2, elements 21-24); and
- (b) a communication component coupled to the plurality of antennas (see Fig. 2, elements 15, 16, and 21-24, col. 6, lines 11-15, *each wireless adapter 15 and 16 includes at least two antennas 21 and 23, 22 and 24, respectively positioned to create an antenna diversity scheme*), the communication component including a processor (see Fig. 2, elements 13, 19, 20, col. 6, lines 24-26, *the MAC processor 19 then determines the quality if the signal coming in on each of the antennas 21 and 23 connected to the wireless adapter 15*), a transmitter, and a receiver (see Fig. 2, elements 21 and 3, col. 6, lines 22-24, 46-48, *an incoming signal is received on both antennas 21 and 23 of the wireless adapter 15. While one of the wireless adapters is transmitting, the other wireless adapter can operate as a promiscuous listener to determine if the correct message is being sent.*), the communication component configured to transmit a first data stream by simultaneously transmitting a first plurality of signal streams using the plurality of antennas (see Fig. 2, col. 6, lines 46-48), the first plurality of signal streams collectively representing the first data stream, the communication component configured to receive a second data stream by simultaneously receiving a second plurality of signal streams using the plurality of antennas (see Fig. 2, col. 6, lines 22-23, 61-64, *the configuration in which each of the wireless adapters is listening on the same channel, another advantage achieved by this configuration is the ability to receive two concurrent messages*) and generating the second data stream from the second plurality of signal streams (see Fig. 2, col. 6, lines 24-31, *the MAC processor 19 then determines the quality if the signal coming in on each of the antennas 21*



*and 23 connected to the wireless adapter 15. Based upon the signal quality information, the MAC processor 19 will choose which of the antennas 21 and 23 to use to receive the incoming transmission. The MAC processor will also forward the signal quality information regarding the selected antenna to the CPU processor 13); and*

(c) wherein a first set of antennas of the plurality of antennas is configured to operate using a first communication protocol (see Fig. 14a and 14b, elements 1458 and 1460, col. 17, lines 62-66, *the access point 1456 includes a time bounded adapter 1458 connected to an antenna 1460 which provides wireless communication on the deterministic, time bounded first wireless channel governed by a first wireless protocol.*) and a second set of antennas of the plurality of antennas is configured to operate using a second communication protocol (see Figs. 14a and 14b, elements 1462 and 1464, col. 17, lines 66-67, col. 18, lines 1-3, *the access point 1456 also includes a contention adapter 1462 connected to an antenna 1464 which provides wireless communications on the non-deterministic, contention access second wireless channel governed by a second wireless protocol.*), wherein the first communication protocol is different than the second communication protocol (see Figs. 14a and 1b, col. 17, lines 27-32, 64-66, 1-3, *the access point 1456 includes a time bounded adapter 1458 connected to an antenna 1460 which provides wireless communication on the deterministic, time bounded first wireless channel governed by a first wireless protocol. The access point 1456 also includes a contention adapter 1462 connected to an antenna 1464 which provides wireless communications on the non-deterministic, contention access second wireless channel governed by a second wireless protocol.*)

Walton and Mahany may not teach or suggest wherein a first set of antennas of the plurality of antennas is configured to operate in a first frequency band and a second set of antennas of the plurality of antennas is configured to operate in a second frequency band, wherein the first frequency band is different than the second frequency band.

However, Derneryd teaches or suggests a first set of antennas of the plurality of antennas is configured to operate in a first frequency band and a second set of antennas of the plurality of antennas is configured to operate in a second frequency band, wherein the first frequency band is different than the second frequency band (see Fig. , col. 5, lines 20-34, ***a number of first antennas intended for a first mobile telecommunication system operating in a first frequency band and a number of second antennas used for a second mobile telecommunication system operating in a second frequency band which is approximately twice that of the first frequency band and wherein the antennas for the first and the second system respectively coexist on one and the same mast***).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify an access point of Mahany and a device for controlling transmission of a communications system of Walton by including a first set of antennas of the plurality of antennas is configured to operate in a first frequency band and a second set of antennas of the plurality of antennas is configured to operate in a second frequency band, wherein the first frequency band is different than the second frequency band suggested by Derneryd. This modification would provide the same antenna arrangement can be used for different frequencies or frequency bands which improve communication system read on column 1, lines 10-12.

***Conclusion***

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to PHIRIN SAM whose telephone number is (571)272-3082. The examiner can normally be reached on Flexible Work Schedule.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ayaz R. Sheikh can be reached on (571) 272-3795. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Respectfully submitted,

Date: June 16, 2014

By:     /Phirin Sam/      
Primary Examiner  
Art Unit 2476

<b>Notice of References Cited</b>	Application/Control No. 13/621,294	Applicant(s)/Patent Under Reexamination RAO ET AL.	
	Examiner PHIRIN SAM	Art Unit 2476	Page 1 of 1

**U.S. PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A US-5,960,344	09-1999	Mahany, Ronald L.	455/432.2
*	B US-6,493,331	12-2002	Walton et al.	370/341
*	C US-6,091,365	07-2000	Derneryd et al.	343/700MS
*	D US-7,215,718	05-2007	Calderbank et al.	375/299
*	E US-6,952,454	10-2005	Jalali et al.	375/260
*	F US-6,542,556	04-2003	Kuchi et al.	375/299
	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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	S				
	T				


**NON-PATENT DOCUMENTS**

*	Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
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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.

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 1449/PTO  <b>INFORMATION DISCLOSURE                  STATEMENT BY APPLICANT</b> (Use as many sheets as necessary)		<b>Complete if Known</b>	
		Application Number	Not Yet Assigned
		Filing Date	09/17/2012
		First Named Inventor	Sunil K. Rao
		Art Unit	2476
		Examiner Name	Phirin Sam
		Attorney Docket Number	HMTR3
Sheet	1	of	1

U. S. PATENT DOCUMENTS					
Examiner Initials*	Cite No. <sup>1</sup>	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code <sup>2</sup> (if known)			
/P.S./ 	1	US- 5691974	11-25-1997	Zehavi	
	2	US- 4654867	03-31-1987	Labeledz	
	3	US- 6,108,314	08-22-2000	Jones et al.	
	4	US- 6,167,099	12-26-2000	Rader et al.	
	5	US- 6,570,871	05-27-2003	Schneider	
	6	US- 7,039,370	05-02-2006	Laroya et al.	
	7	US- 7,848,300	12-07-2010	Rao et al.	
	8	US- 2002/0126745	09-12-2002	Prysbly et al.	
	9	US- 2006/002366	02-02-2006	Jalali et al.	
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FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No. <sup>1</sup>	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T <sup>6</sup>
		Country Code <sup>3</sup> -Number <sup>4</sup> -Kind Code <sup>5</sup> (if known)				

Examiner Signature	/Phirin Sam/ (06/16/2014)	Date Considered	06/16/2014
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\*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. <sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> See Kinds Codes of USPTO Patent Documents at [www.uspto.gov](http://www.uspto.gov) or MPEP 901.04. <sup>3</sup> Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>4</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>5</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>6</sup> 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, 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 (1-800-786-9199) 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.

<b><i>Index of Claims</i></b> 	<b>Application/Control No.</b> 13621294	<b>Applicant(s)/Patent Under Reexamination</b> RAO ET AL.
	<b>Examiner</b> PHIRIN SAM	<b>Art Unit</b> 2476

✓	<b>Rejected</b>	-	<b>Cancelled</b>	N	<b>Non-Elected</b>	A	<b>Appeal</b>
=	<b>Allowed</b>	÷	<b>Restricted</b>	I	<b>Interference</b>	O	<b>Objected</b>

<input type="checkbox"/> Claims renumbered in the same order as presented by applicant		<input type="checkbox"/> CPA		<input type="checkbox"/> T.D.		<input type="checkbox"/> R.1.47			
CLAIM		DATE							
Final	Original	06/16/2014							
	1	-							
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	5	✓							


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**CONFIRMATION NO. 5130**

SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.	
13/621,294	09/17/2012	370	2476	04245.001000.	
<b>APPLICANTS</b> <b>INVENTORS</b> Sunil K. Rao, Palo Alto, CA; Sanjay K. Rao, Palo Alto, CA; Raman K. Rao, Palo Alto, CA;					
<b>** CONTINUING DATA *****</b> This application is a CON of 12/912,607 10/26/2010 which is a CON of 10/940,428 09/13/2004 PAT 7848300 which is a CON of 09/617,608 07/17/2000 PAT 7286502 which is a CIP of 09/281,739 06/04/1999 PAT 6169789 which is a CIP of 08/764,903 12/16/1996 ABN					
<b>** FOREIGN APPLICATIONS *****</b>					
<b>** IF REQUIRED, FOREIGN FILING LICENSE GRANTED *** SMALL ENTITY **</b> 10/03/2012					
Foreign Priority claimed <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No 35 USC 119(a-d) conditions met <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Verified and Acknowledged <u>/PHIRIN SAM/</u> Examiner's Signature	<input type="checkbox"/> Met after Allowance Initials	<b>STATE OR COUNTRY</b> CA	<b>SHEETS DRAWINGS</b> 5	<b>TOTAL CLAIMS</b> 4	<b>INDEPENDENT CLAIMS</b> 4
<b>ADDRESS</b> FITZPATRICK CELLA HARPER & SCINTO 1290 Avenue of the Americas NEW YORK, NY 10104-3800 UNITED STATES					
<b>TITLE</b> System to Interface Internet Protocol (IP) Based Wireless Devices with Optical and Other Networks for Improved Flexibility, Performance, and Data Transfer					
<b>FILING FEE RECEIVED</b> 740	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees (Filing) <input type="checkbox"/> 1.17 Fees (Processing Ext. of time) <input type="checkbox"/> 1.18 Fees (Issue) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit		



## EAST Search History

## EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1323230	((wireless or mobile\$1) near4 (unit\$1 or device or apparatus or terminal\$1)) or handhelp\$1 or PDA\$1 or smart\$1phone\$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2014/06/16 12:46
L2	251317	(plurality near3 antennas\$1) or antennas	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2014/06/16 12:46
L3	1343661	(generat\$3 or process\$3 or decod\$3 or encod\$3 or encapsulat\$3 or decapsulat\$3) same second same (data or stream\$3 or packet\$1 or frame\$1)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2014/06/16 12:46
L4	103850	L1 and L2	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2014/06/16 12:46
L5	11731	(transmit\$3 or send\$3) same first same (data or stream\$3 or packet\$1 or frame\$1) same antennas	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2014/06/16 12:46
L6	6928	L4 and L5	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2014/06/16 12:46
L7	244	L6 and @ad<"20000717"	US-PGPUB; USPAT;	OR	OFF	2014/06/16 12:46

EAST Search History

			USOCR; FPRS; EPO; JPO; IBM_TDB			
L8	149	L7 and L3	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2014/06/16 12:46
L10	238	((first adj4 antennas) same (first adj4 (frequency adj3 band)))	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2014/06/16 12:51
L11	249	((second adj4 antennas) same (second adj4 (frequency adj3 band)))	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2014/06/16 12:51
L12	181	I10 and I11	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2014/06/16 12:51
L13	91	I12 and I1	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2014/06/16 12:52
L14	72070	370/328,329,336,338,339,340,341,342,347,351- 354,356,436,437,442.ccls.	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2014/06/16 13:46
L15	5	I14 and I13	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2014/06/16 13:46

## EAST Search History

L16	7	I14 and I12	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2014/06/16 13:46
L17	32	I14 and I7	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2014/06/16 13:46
S1	1323230	((wireless or mobile\$1) near4 (unit\$1 or device or apparatus or terminal\$1)) or handhelp\$1 or PDA\$1 or smart\$1phone\$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2014/06/16 09:13
S2	251317	(plurality near3 antennas\$1) or antennas	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2014/06/16 09:13
S3	690302	(transmit\$3 or send\$3) same first same (data or stream\$3 or packet\$1 or frame\$1)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2014/06/16 09:17
S4	956755	receiv\$3 same second same (data or stream\$3 or packet\$1 or frame\$1)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2014/06/16 09:17
S5	1343661	(generat\$3 or process\$3 or decod\$3 or encod\$3 or encapsulat\$3 or decapsulat\$3) same second same (data or stream\$3 or packet\$1 or frame\$1)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2014/06/16 09:18
S6	103850	S1 and S2	US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	2014/06/16 09:19

EAST Search History

			JPO; IBM_TDB			
S7	37045	S6 and S3	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2014/06/16 09:19
S8	25416	S7 and S4	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2014/06/16 09:20
S9	19526	S8 and S5	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2014/06/16 09:20
S10	976	S9 and @ad<"20000717"	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2014/06/16 09:21
S11	11731	(transmit\$3 or send\$3) same first same (data or stream\$3 or packet\$1 or frame\$1) same antennas	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2014/06/16 09:21
S12	10663	receiv\$3 same second same (data or stream\$3 or packet\$1 or frame\$1) same antennas	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2014/06/16 09:21
S13	6928	S6 and S11	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2014/06/16 09:22
S14	4169	S13 and S12	US- PGPUB; USPAT;	OR	OFF	2014/06/16 09:22

EAST Search History


			USOCR; FPRS; EPO; JPO; IBM_TDB			
S15	244	S13 and @ad<"20000717"	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2014/06/16 09:22
S16	149	S15 and S5	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2014/06/16 09:27
S18	40	S16 and (first same frequenc\$3 same band\$1)	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2014/06/16 11:25
S19	7	S16 and (first adj3 frequenc\$3 adj3 band\$1)	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2014/06/16 11:27

**EAST Search History (Interference)**

<This search history is empty>

**6/ 16/ 2014 1:47:30 PM**

**C:\Users\psam\Documents\EAST\Workspaces\Searches370.wsp**

<b>Search Notes</b> 	<b>Application/Control No.</b> 13621294	<b>Applicant(s)/Patent Under Reexamination</b> RAO ET AL.
	<b>Examiner</b> PHIRIN SAM	<b>Art Unit</b> 2476

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
370/328,329,336,338,339,340,341,342,347,351-354,356,436,437,442 (Text search - See search history printout).	06/16/2014	PS

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

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United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
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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
13/621,294	09/17/2012	Sunil K. Rao	04245.001000.

5514  
FITZPATRICK CELLA HARPER & SCINTO  
1290 Avenue of the Americas  
NEW YORK, NY 10104-3800

**CONFIRMATION NO. 5130**  
**POA ACCEPTANCE LETTER**



Date Mailed: 12/27/2013

**NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY**

This is in response to the Power of Attorney filed 12/17/2013.

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.

/ddinh/

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



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www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/621,294	09/17/2012	Sunil K. Rao	HMTR3

105481  
Rekha Rao  
3087 Alexis Drive  
Palo Alto, CA 94304

**CONFIRMATION NO. 5130**  
**POWER OF ATTORNEY NOTICE**



Date Mailed: 12/27/2013

**NOTICE REGARDING CHANGE OF POWER OF ATTORNEY**

This is in response to the Power of Attorney filed 12/17/2013.

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

/ddinh/

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





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Table with 7 columns: APPLICATION NUMBER, FILING or 371(c) DATE, GRP ART UNIT, FIL FEE REC'D, ATTY DOCKET NO, TOT CLAIMS, IND CLAIMS. Row 1: 13/621,294, 09/17/2012, 2642, 740, 04245.001000, 4, 4

CONFIRMATION NO. 5130

UPDATED FILING RECEIPT

5514
FITZPATRICK CELLA HARPER & SCINTO
1290 Avenue of the Americas
NEW YORK, NY 10104-3800



Date Mailed: 12/27/2013

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections

Inventor(s)

Sunil K. Rao, Palo Alto, CA;
Sanjay K. Rao, Palo Alto, CA;
Raman K. Rao, Palo Alto, CA;

Applicant(s)

Sunil K. Rao, Palo Alto, CA;
Sanjay K. Rao, Palo Alto, CA;
Raman K. Rao, Palo Alto, CA;

Assignment For Published Patent Application

IP HOLDINGS, INC., Palo Alto, CA

Power of Attorney: The patent practitioners associated with Customer Number 05514

Domestic Priority data as claimed by applicant

This application is a CON of 12/912,607 10/26/2010
which is a CON of 10/940,428 09/13/2004 PAT 7848300
which is a CON of 09/617,608 07/17/2000 PAT 7286502
which is a CIP of 09/281,739 06/04/1999 PAT 6169789
which is a CIP of 08/764,903 12/16/1996 ABN

Foreign Applications for which priority is claimed (You may be eligible to benefit from the Patent Prosecution Highway program at the USPTO. Please see http://www.uspto.gov for more information.) - None.

Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

If Required, Foreign Filing License Granted: 10/03/2012

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 13/621,294**

**Projected Publication Date:** Request for Non-Publication Acknowledged

**Non-Publication Request:** Yes

**Early Publication Request:** No

**\*\* SMALL ENTITY \*\***

**Title**

System to Interface Internet Protocol (IP) Based Wireless Devices with Optical and Other Networks for Improved Flexibility, Performance, and Data Transfer

**Preliminary Class**

455

**Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications:** No

## **PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES**

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

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<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875	Application or Docket Number 13/621,294
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APPLICATION AS FILED - PART I			SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
	(Column 1)	(Column 2)					
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)		RATE(\$)	FEE(\$)
BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>	N/A	N/A	N/A	70		N/A	
SEARCH FEE <small>(37 CFR 1.16(k), (j), or (m))</small>	N/A	N/A	N/A	300		N/A	
EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>	N/A	N/A	N/A	360		N/A	
TOTAL CLAIMS <small>(37 CFR 1.16(i))</small>	4	minus 20 = *	x 40 =	0.00	OR		
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>	4	minus 3 = *	x 210 =	210			
APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small>	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 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).			0.00			
MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small>				0.00			
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	940		TOTAL	

APPLICATION AS AMENDED - PART II					SMALL ENTITY		OR	OTHER THAN SMALL ENTITY		
	(Column 1)	(Column 2)	(Column 3)							
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)	
	Total <small>(37 CFR 1.16(i))</small>	*	Minus	**	x	=	OR	x	=	
	Independent <small>(37 CFR 1.16(h))</small>	*	Minus	***	x	=	OR	x	=	
	Application Size Fee <small>(37 CFR 1.16(s))</small>							OR		
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE		
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)	
	Total <small>(37 CFR 1.16(i))</small>	*	Minus	**	x	=	OR	x	=	
	Independent <small>(37 CFR 1.16(h))</small>	*	Minus	***	x	=	OR	x	=	
	Application Size Fee <small>(37 CFR 1.16(s))</small>							OR		
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE		
<p>* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.</p> <p>** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".</p> <p>*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".</p> <p>The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.</p>										

Document code: WFEE

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04245.001000.

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application No.:	13/621,294	)	
		:	
First Named Inventor:		)	
		:	Group Art Unit: 2642
SUNIL K. RAO, ET AL.		)	
		:	Confirmation No.: 5130
Filed:	September 17, 2012	)	
		:	
For:	A SYSTEM TO INTERFACE	)	
	INTERNET PROTOCOL (IP)	:	
	BASED WIRELESS DEVICES	)	
	WITH OPTICAL AND OTHER	:	
	NETWORKS FOR IMPROVED	)	
	FLEXIBILITY, PERFORMANCE,	:	
	AND DATA TRANSFER	)	December 23, 2013

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

PRELIMINARY AMENDMENT

Sir:

Prior to examination, please amend the above-identified application, as follows:

CERTIFICATE OF EFS-WEB TRANSMISSION  
I hereby certify that this correspondence is being filed electronically by  
EFS-Web transmission to the United States Patent Office on  
December 23, 2013  
\_\_\_\_\_  
(Date of Deposit)

Michael K. O'Neill, Reg. No. 32,622  
\_\_\_\_\_  
(Name of Attorney for Applicants)

/Michael K. O'Neill/ _____ Signature	December 23, 2013 _____ Date of Signature
--	---

IN THE CLAIMS:

Please cancel Claim 1 without prejudice or disclaimer of subject matter, and substitute new Claims 2 to 5 therefor as follows:

1. (Cancelled).

2. (New) A wireless communication device comprising:

a plurality of antennas; and

a communication component coupled to the plurality of antennas, the communication component including a processor, a transmitter, and a receiver, the communication component configured to transmit a first data stream by simultaneously transmitting a first plurality of signal streams using the plurality of antennas, the first plurality of signal streams collectively representing the first data stream, the communication component configured to receive a second data stream by simultaneously receiving a second plurality of signal streams using the plurality of antennas and generating the second data stream from the second plurality of signal streams;

wherein the communication component is configured to communicate via a first frequency band using a wireless communication protocol.

3. (New) A wireless communication device comprising:

a plurality of antennas; and

a communication component coupled to the plurality of antennas, the communication component including a processor, a transmitter, and a receiver, the communication component configured to transmit a first data stream by simultaneously

transmitting a first plurality of signal streams using the plurality of antennas, the first plurality of signal streams collectively representing the first data stream, the communication component configured to receive a second data stream by simultaneously receiving a second plurality of signal streams using the plurality of antennas and generating the second data stream from the second plurality of signal streams;

wherein the communication component includes at least one additional transmitter;

wherein the transmitter is configured to transmit on a first frequency and the at least one additional transmitter is configured to transmit on a second frequency; and

wherein the transmitter is configured to transmit using a first communication protocol and the at least one additional transmitter is configured to transmit using a second communication protocol, wherein the first communication protocol is different than the second communication protocol.

4. (New) A wireless communication device comprising:

a plurality of antennas; and

a communication component coupled to the plurality of antennas, the communication component including a processor, a transmitter, and a receiver, the communication component configured to transmit a first data stream by simultaneously transmitting a first plurality of signal streams using the plurality of antennas, the first plurality of signal streams collectively representing the first data stream, the communication component configured to receive a second data stream by simultaneously



receiving a second plurality of signal streams using the plurality of antennas and generating the second data stream from the second plurality of signal streams; and

wherein the communication component includes at least one additional receiver; and

wherein the receiver is configured to receive using a first communication protocol and the at least one additional receiver is configured to receive using a second communication protocol, wherein the first communication protocol is different than the second communication protocol.

5. (New) A wireless communication device comprising:

a plurality of antennas; and

a communication component coupled to the plurality of antennas, the communication component including a processor, a transmitter, and a receiver, the communication component configured to transmit a first data stream by simultaneously transmitting a first plurality of signal streams using the plurality of antennas, the first plurality of signal streams collectively representing the first data stream, the communication component configured to receive a second data stream by simultaneously receiving a second plurality of signal streams using the plurality of antennas and generating the second data stream from the second plurality of signal streams; and

wherein a first set of antennas of the plurality of antennas is configured to operate in a first frequency band and a second set of antennas of the plurality of antennas is configured to operate in a second frequency band, wherein the first frequency band is different than the second frequency band; and

wherein a first set of antennas of the plurality of antennas is configured to operate using a first communication protocol and a second set of antennas of the plurality of antennas is configured to operate using a second communication protocol, wherein the first communication protocol is different than the second communication protocol.

REMARKS

Claims 2 to 5 are in the application, of which all claims are independent.

Claims 2 to 5 correspond to dependent Claims 37, 41, 44 and 47 in grandparent Application No. 10/940,428 (hereinafter, “the ‘428 application”), from which this case claims domestic priority. The noted claims of the ‘428 application were indicated to contain allowable subject matter in an Office Action dated March 5, 2008, although in a subsequent Office Action, a question arose over the recitations of wi-fi, bluetooth and satellite. Those recitations have been deleted in favor of a recitation of “a wireless communication protocol” for which there is clear support. Accordingly, all of Claims 2 to 5 are believed to be in condition for allowance.

Favorable consideration and early passage to issue are respectfully requested.

Applicants’ undersigned attorney may be reached in our Costa Mesa, California office by telephone at (714) 540-8700. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,

/Michael K. O’Neill/  
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## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	13621294			
<b>Filing Date:</b>	17-Sep-2012			
<b>Title of Invention:</b>	System to Interface Internet Protocol (IP) Based Wireless Devices with Optical and Other Networks for Improved Flexibility, Performance, and Data Transfer			
<b>First Named Inventor/Applicant Name:</b>	Sunil K. Rao			
<b>Filer:</b>	Michael K. O'Neill			
<b>Attorney Docket Number:</b>	04245.001000.			
Filed as Small Entity				
<b>Utility under 35 USC 111(a) Filing Fees</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
Independent Claims in Excess of 3	2201	1	210	210
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
<b>Extension-of-Time:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Miscellaneous:</b>				
<b>Total in USD (\$)</b>				<b>210</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	17749488
<b>Application Number:</b>	13621294
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	5130
<b>Title of Invention:</b>	System to Interface Internet Protocol (IP) Based Wireless Devices with Optical and Other Networks for Improved Flexibility, Performance, and Data Transfer
<b>First Named Inventor/Applicant Name:</b>	Sunil K. Rao
<b>Customer Number:</b>	5514
<b>Filer:</b>	Michael K. O'Neill
<b>Filer Authorized By:</b>	
<b>Attorney Docket Number:</b>	04245.001000.
<b>Receipt Date:</b>	23-DEC-2013
<b>Filing Date:</b>	17-SEP-2012
<b>Time Stamp:</b>	20:01:19
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$210
RAM confirmation Number	7981
Deposit Account	503939
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

- Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)
- Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

<b>File Listing:</b>					
<b>Document Number</b>	<b>Document Description</b>	<b>File Name</b>	<b>File Size(Bytes)/ Message Digest</b>	<b>Multi Part /.zip</b>	<b>Pages (if appl.)</b>
1	Preliminary Amendment	04245_001000_Prelim_Amend _12232013.pdf	59694  1a29cfd31b303a630d67a7426acf434aaa 2d06	no	6
<b>Warnings:</b>					
<b>Information:</b>					
2	Fee Worksheet (SB06)	fee-info.pdf	30540  d1eb4bd8d9460357e3e26e902d5b2a89a2 9e3fd5	no	2
<b>Warnings:</b>					
<b>Information:</b>					
<b>Total Files Size (in bytes):</b>			90234		
<p><b>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.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b>  <b>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.</b></p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b>  <b>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.</b></p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b>  <b>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.</b></p>					

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.

<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875	Application or Docket Number <b>13/621,294</b>	Filing Date <b>09/17/2012</b>	<input type="checkbox"/> To be Mailed
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ENTITY:  LARGE  SMALL  MICRO

**APPLICATION AS FILED – PART I**

FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A	
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =	
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 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).			
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

**APPLICATION AS AMENDED – PART II**

	(Column 1)	(Column 2)	(Column 3)	(Column 3)	RATE (\$)	ADDITIONAL FEE (\$)
<b>AMENDMENT</b>	<b>12/23/2013</b>	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		
	Total (37 CFR 1.16(i))	* 4	Minus	** 20	= 0	X \$40 = 0
	Independent (37 CFR 1.16(h))	* 4	Minus	***4	= 0	X \$210 = 0
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))					
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					
					TOTAL ADD'L FEE	<b>0</b>

	(Column 1)	(Column 2)	(Column 3)	(Column 3)	RATE (\$)	ADDITIONAL FEE (\$)
<b>AMENDMENT</b>		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))					
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					
					TOTAL ADD'L 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.

LIE  
/KAREN VESTAL/

This collection of information is required by 37 CFR 1.16. 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, 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.**

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04245.001000.

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application No.: 13/621,294	)	
	:	
First Named Inventor:	)	
	:	Group Art Unit: 2642
SUNIL K. RAO, ET AL.	)	
	:	Confirmation No.: 5130
Filed: September 17, 2012	)	
	:	
For: A SYSTEM TO INTERFACE	)	
INTERNET PROTOCOL (IP)	:	
BASED WIRELESS DEVICES	)	
WITH OPTICAL AND OTHER	:	
NETWORKS FOR IMPROVED	)	
FLEXIBILITY, PERFORMANCE,	:	
AND DATA TRANSFER	)	December 19, 2013

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

RESPONSE TO NOTICE TO FILE CORRECTED APPLICATION PAPERS  
AND  
SUBMISSION OF SUBSTITUTE SPECIFICATION

Sir:

In a response to the Notice to File Corrected Application Papers dated June 20, 2013, the period for response having been extended to December 20, 2013 by the accompanying Petition for Extension of Time with fee, attached herewith is a substitute specification which specifically mentions Figures 1A and 1B.

CERTIFICATE OF EFS-WEB TRANSMISSION  
I hereby certify that this correspondence is being filed electronically by  
EFS-Web transmission to the United States Patent Office on  
December 19, 2013  
\_\_\_\_\_  
(Date of Deposit)

Michael K. O'Neill, Reg. No. 32,622  
\_\_\_\_\_  
(Name of Attorney for Applicants)

\_\_\_\_\_  
/ Michael K. O'Neill/  
Signature

\_\_\_\_\_  
December 19, 2013  
Date of Signature

In the specification, relative to the originally-filed specification, the following changes have been made to paragraphs 7 and 25.

--[0007] FIG. 1A illustrates characteristics of a cellular telephone (CT/MD) of the prior art as opposed to a desired CT/MD of the present invention. FIG 1B shows the CT/MD has three transmit frequencies and three receive frequencies.--

--[0025] FIG. 1A illustrates characteristics of a cellular telephone/mobile device (CT/MD) 100 of the prior art as opposed to a desired CT/MD of the present invention having multiple transmit/receive (T/R) units and multiple antennas. In FIG. 1A, Cellphone 102, CB Radio 104, and Wireless 106 of the prior art all have a single transmit frequency and a single receive 15 frequency. In contrast, the CT/MD 108 of FIG. 1B of this embodiment of the present invention has three transmit frequencies and three receive frequencies.--

REMARKS

Pursuant to 37 C.F.R. § 1.125(c), the substitute specification is being submitted in two versions, one clean and one with markings to show changes. The nature of the changes is shown on the prior sheet.

No new matter has been added.

Entry of the substitute specification is respectfully requested.

No fees are believed due. However, should it be determined that processing of this paper requires additional fees under 37 C.F.R. 1.16 or 1.17, the Director is hereby authorized to charge such fees to Deposit Account 06-1205.

Applicants' undersigned attorney may be reached in our Costa Mesa, California office by telephone at (714) 540-8700. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,

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A System to Interface Internet Protocol (IP) Based Wireless Devices with Optical and Other  
Networks for Improved Flexibility, Performance, and Data Transfer

By:

Sunil K. Rao

5

Sanjay K. Rao

Raman K. Rao

CROSS REFERENCE TO RELATED APPLICATIONS

10

[0001] The present application is a continuation and claims the priority benefit of co-pending U.S. Patent Application No. 12/912,607, filed October, 26, 2010, which is a continuation of Patent Application No. 10/940,428, filed September 13, 2004, now Patent No. 7,848,300, which is a continuation of Patent Application No. 09/617,608, filed on July 17, 2000 now Patent No. 7, 286,502, which is a continuation-in-part of Patent Application No. 09/281,739, now Patent No. 6,169,789, filed June 4, 1999, which is a continuation-in-part application of a now abandoned Patent Application No. 08/764,903 filed December 16, 1996. The present application claims priority to the above referenced applications and patents.

15

BACKGROUND OF THE INVENTION

[0002] ABBREVIATIONS: Cellular Telephone as CT. Mobile Device as MD. Non-  
Wireless Device as NWD. Internet Protocol as IP. The typical cellular telephone/mobile device  
5 (CT/MD) today has a single antenna, which is directly connected to a single receiver. While  
spread spectrum techniques often used in the CT/MD use a broad band of frequencies, at any  
specific point in time, only a single frequency connected to one receiver is used. While spread  
spectrum techniques greatly increase the reliability and stability of the transmission, signal  
"fade" and communication disconnects are often encountered. Some communications systems  
10 may rely on two separate systems; one at a high frequency and preferably using spread spectrum  
transmissions for clarity and reliability, and another providing a different set of frequencies, such  
as lower frequencies. The secondary system is used when signal fade is a problem in the main  
system. These are two separate, complementary systems, each devoted to solving a separate,  
distinguishable problem.

15

SUMMARY OF THE INVENTION

5 [0003] It is an object of the present invention to provide wireless enhancements to IP based cellular telephones/mobile wireless devices (CT/MD). The same enhancements are applied to IP based and locally based network switch boxes.

[0004] The typical CT/MD has one transmitter and one receiver (T/R), with one antenna. An unfulfilled need exists for multiple T/R in a CT/MD, providing enhanced capabilities, and the multiple T/R capabilities will often be best met with multiple antennas. The present invention is possible due to advances in the art which allow the necessary components to be integrated, with the size shrunk to achieve the package, performance, and cost desired. The multiple T/R capability allows the single CT/MD to perform tasks in different environments – each T/R being specifically designed or configured for that specific purpose.

10 [0005] Other objects, features and advantages of the present invention will become apparent from the following detailed description when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

[0006] The accompanying drawings, being incorporated in and forming a part of this specification, illustrate embodiments of the invention and, together with the description, serve to explain the principles of the present invention:

5 [0007] FIG. 1A illustrates characteristics of a cellular telephone (CT/MD) of the prior art as opposed to a desired CT/MD of the present invention. FIG. 1B shows the CT/MD has three transmit frequencies and three receive frequencies.

[0008] FIG. 2 illustrates an embodiment of the present invention for a communication system with data being transferred from computer to computer.

10 [0009] FIG. 3 illustrates characteristics of the prior art showing a computer to computer data path with one channel.

[0010] FIG. 4 illustrates a dual antenna, dual transmit/receive (T/R) unit in the CT/MD of the present invention in a dual band system.

15 [0011] FIG. 5A illustrates a dual antenna, dual T/R unit in a CT/MD interfacing with a dual processor in the present invention in a dual band system.

[0012] FIG. 5B illustrates a wide band network switch box system that is capable of operating in a number of network environments sequentially or simultaneously.

[0013] FIG. 6 is an embodiment of the present invention showing a wired interface system for wireless or non-wireless devices and including a wireless cradle adapter.

[0014] FIG. 7 is an embodiment of the present invention showing a CT/MD with multiple T/R units and multiple antennas in a communication system connecting to a Server C through a wireless connection.

5 [0015] FIG. 8 is an embodiment of the present invention illustrating the connection of multiple wireless signals to an optical network for connection to a wide area network (WAN) or local area network (LAN) or to the Internet.

[0016] FIG. 9 is an embodiment of the present invention showing a multiple processing system.

10 [0017] FIG. 10 is an embodiment of the present invention showing a data system with three data streams.

[0018] FIG. 11 is an embodiment of the present invention showing a data system with three data streams.

[0019] FIG. 12 is an embodiment of the present invention showing a Virtual Private Network (VPN).

15 [0020] FIG. 13 is an embodiment of the present invention showing how Virtual Private Network or Networks (VPN) system may be provided.



DETAILED DESCRIPTION OF THE INVENTION

[0021] Reference will now be made in detail to preferred embodiments of the invention, with examples illustrated in the accompanying drawings. The invention is described in conjunction with the preferred embodiments, however, it will be understood that the preferred embodiments are not intended to limit the invention. The invention is intended to cover alternatives, modifications and equivalents included, now or later, within the spirit and scope of the present invention as defined by the appended claims.

[0022] In the present invention, one or more antennas and T/R units in a CT/MD will provide better tuning and greater bandwidth for a given frequency/application. For example, consider an embodiment of a cell phone, CB radio, and wireless phone, all in a single CT/MD for improving the data rates of a wireless device/network:

[0023] It is seen that the data rate of the CT/MD is increased. Currently the CT/MD data rates are very low and pose a severe limitation for high speed wireless data networking. 14.4 KBPS (kilobits per second) is probably the best reliable speed for a wireless network that is commercially available. The speed at which RF waves are transmitted from point A to point B is a physical property based on the frequency of transmission and reception in a given medium such as air. The signal speed is determined by the frequency and the signal strength is determined by the power, line of sight, interference, etc. In a given assigned frequency band, the data speed is fixed but the power may be varied. The rate at which data may be transmitted over

a wireless network is also determined by the ability to encode and decode the signal at the T/R ends using the electronics and computing power resident at each end.

[0024] Data transferred to a CT/MD over a wireless network comes in encoded form and must be decoded at the CT/MD after the data is received, such as by a receiver. The ability to encode and decode the data is a function of the number of encoders/decoders available and assigned to the task at the CT/MD or at a network switch box. It will be appreciated that while a CT/MD and a network switch box are very similar in many ways, they are completely different functional units, with the CT/MD providing personal services and the network switch box providing system services. The ability to encode and decode the data is also a function of the speed at which the encoder/decoder electronics operate at the T/R ends. Of course, each encoder/decoder must be associated with appropriate electronics to effect this task when more than one encoder/decoder is used.

[0025] FIG. 1A illustrates characteristics of a cellular telephone/mobile device (CT/MD) of the prior art as opposed to a desired CT/MD of the present invention having multiple transmit/receive (T/R) units and multiple antennas. In FIG. 1A, Cellphone 102, CB Radio 104, and Wireless 106 of the prior art all have a single transmit frequency and a single receive frequency. In contrast, the CT/MD 108 of FIG. 1B of this embodiment of the present invention has three transmit frequencies and three receive frequencies.

[0026] FIG. 2 illustrates an embodiment of the present invention for a communication system 200 with data being transferred from computer 202 to computer 204. In FIG. 2,

computer 202 communicates through a system of T/R units 206, located within or in proximity to computer system 202, with computer system 204 through T/R unit 208. T/R 208 may be located within computer system 204 or in close proximity to computer system 204 to route the data to computer 204 or alternatively to a network server 204, as required. The rate at which data from system 202 to system 204 is transferred is gated by the speed of the transmit and receive units is improved by the parallel paths provided by the present invention. The signal is sampled and may be multiplexed at each end, at a rate that assures accuracy.

[0027] FIG. 3 is an embodiment of the prior art showing a computer to computer data path with a single channel 300. In FIG. 3, using a single antenna and a single T/R unit the signal is processed through the internal electronics module 308 of the CT/MD 302, said module 308, which is shown separate from CT/MD 302 for illustrative purposes only but is normally included within CT/MD 302. Module 308 contains RF/IF 304 and A/D, D/A converter 306, as well as processor 310, memory 312, control electronics 314, and other electronics such as display electronics 316 and special interface circuitry 318, such as for driving the output 320. It should be clear that output 320 can also be an input/output for the CT/MD 302. This is also true for a network switch box such as network switch box 552 with the functionality of CT/MD 302. The module 308 and elements 310 through 318 are included within CT/MD 302 or network switch box 552. All of these components or systems are normally contained within CT/MD 302. Since there is only one path, however, it is clear that this system does not form an efficient, convenient

interface. The transmission data rate is limited by antenna 322 of CT/MD 302, which has only one antenna 322.

[0028] The antenna 322 is capable of receiving only a limited frequency band due to its design limitations, which are common to single antennas used for this purpose.

5 [0029] Adding additional antennas gives the CT/MD (by extension the same is true for the network switch box) enhanced capabilities to differentiate between various signals or to combine multiple paths into a single communication channel. As an example, the design considerations for receiving cellular telephone frequencies may be totally different from those for streaming video or data signals, and with the present invention both can be combined into the  
10 CT/MD.

[0030] FIG. 4 illustrates a dual antenna, dual T/R unit in the CT/MD of the present invention in a dual band system 400. In FIG. 4, this scheme with CT/MD 402 transmitting on the dual T/R unit 404 allows the internal processor 406 to independently process the two incoming signal streams separately and optimally, causing the appropriate output to be delivered  
15 on the desired output port. In FIG. 4 the processor 406 is shown as a single processor, however, the processor 406 is not limited to only one processor and may contain multiple processors. Alternately, the single processor may have multiple channels for parallel processing of each data stream to process accurately two distinct signals 408 that were more optimally received by two dedicated antennas and two separate T/R units contained within the CT/MD to improve

performance and quality of output. An example is a CT/MD 402 which is optimized for video and voice.

[0031] Having more than one T/R unit gives a performance edge as each signal can be better processed and tuned to the specific frequency band of the signal. Thus better quality of output can be achieved for each type of signal and application. As an example, by having each of the data streams sampled at differing clock frequencies the performance can be better optimized.

[0032] FIG. 5A illustrates a dual antenna, dual T/R unit 504 in a CT/MD 502 interfacing with a dual processor 506 in the present invention in a dual band system 500. In FIG. 5A, in addition to multiple antennas 508 and multiple T/R units 504 the figure also shows multiple processors 506 in a process unit functional block in a CT/MD. The system may communicate through an output or outputs 510. For example, these outputs may be fibre optic channel, ethernet, cable, telephone, or other. By extension the feature of multiple antennas, multiple T/R units and multiple processors is extendable to the network switch box or network switch boxes that form a local, wide area, Virtual private network or connect to the Internet.

[0033] Server C controls the communication protocols in conjunction with the network switching box or other devices, such as CT/MD 502. The multiple processors 506 allow for parallel and custom processing of each signal or data stream to achieve higher speed and better quality of output. This can also be done with a single processor that has the parallelism and pipeline capability built in for handling one or more data streams simultaneously. Processor 506 is the complete electronics inclusive of DSP, CPU, memory controller, and other elements

essential to process various types of signals. These can be defined as, for example, either single chip or multichip solutions. The processor contained within the CT/MD 502 is further capable of delivering the required outputs to a number of different ports such as optical, USB, cable and others such as 1202 to 1210. The CT/MD 502 is also capable of taking different inputs, as well  
5 as wireless, for the appropriate processing to be done on these signals within the CT/MD 502 and outputting the desired signal on a designated port or ports. Thus the CT/MD 502 has universal connectivity in addition to having a wide range of functionality made possible through the features of multiple antennas, multiple T/R units 504 and processors 506 in this invention. These features may also exist in a network switch box, such as network switch box 552.

10 [0034] FIG. 5B illustrates a wide band network switch box system 550 that is capable of operating in a number of network environments sequentially or simultaneously. The network switch box is configured with multiple processors, multiple antennas and multiple T/R units that can be multiplexed to process incoming and outgoing wireless signals. In addition to wireless signals there is a need to process other types of input/output signals such as optical, cable, USB  
15 etc. to fully interface with other types of devices and networks. The network switch box is normally a fixed part of a network, whereas the CT/MD is portable. However, the network switch box may be portable and may be used in the wireless mode only in a wireless network or it may also be connected to one or more networks by wired and wireless means to fully leverage all the input/output ports.

[0035] In FIG. 5B, network switch box 552 that is limited in quality because of the limitations of wireless may fully leverage the networks, including fibre optic networks, such as by multiple antennas 554 and multiple I/O ports 556. As an example, the ability to view streaming video on a network switch box 552 may be limited by the wireless signal quality due to the need for compression. This is due to transmissions that are inherently impaired in air as opposed to fibre optic cable. A prior art network switch box while in the mobile mode may receive video of poorer quality. The network switch box 552, when at home or in the office, could be easily connected to the optical network directly or through I/O ports 556, such as by a cradle adapter. In this mode the best data, video or audio quality can be received using the same unit. This provides the network switch box 552 single unit to have universal applications since it can sequentially or simultaneously communicate optimally with other systems and networks to deliver quality/performance and speed tailored for each application.

[0036] The network switch box 552 as disclosed above executes substantially the same function as the CT/MD 502. However, the network switch box 552 operates at a network system level capable of coordinating the operations of a number of mobile and other devices in one or more networks, while the CT/MD 502 performs at a personal level.

[0037] FIG. 6 is an embodiment of the present invention showing a wired interface system 600 for wireless or non-wireless devices. In FIG. 6, a wireless device, CT/MD 602 with I/O ports 610 and CT/MD 612 with the ability to interface through a cradle adapter 604 having both wireless and wired connections 606 interfacing with multiple input/output (I/O) ports 608 is

shown. One, all, or some of the connections may be used simultaneously or sequentially for combining multiple data paths into a single path. Whether to combine all the paths into a single data channel or use separate data channels for simultaneous operations will be based on the needs of the application. Examples of inputs/outputs are, for example, standard telephone, coaxial cable, Ethernet, twisted pair, wireless, optical, and USB. In addition to the multiple I/O ports 610 shown on the CT/MD 602 and the ports 608 shown for connecting the CT/MD 612 to cradle adapter 604, the present invention anticipates a universal port and a universal connector. By having the signal path selection done by user defined menu driven software and multiplexing the signals onto a universal input/output port as opposed to the multiple ports 608, 610 or wired connections 606, the desired signals are delivered to the universal port.

[0038] Note that the cradle adapter 604 connection also allows I/O contacts 608 between a non-wireless device (NWD) 613 and a wireless cradle adapter 604 or similar wireless enabling attachment. The enabling attachment can make any non-wireless device (NWD) unit 613 wireless enabled while being plugged into the cradle adapter 604, as shown for CT/MD 612, to access a number of wired, optical or wireless communication paths through the ports 608. The cradle adapter itself may have multiple antennas, multiple T/R units and multiple processors built-in to deliver full functionality. The cradle adapter 604 may also accommodate multiple wired or wireless devices to be plugged in at the same time. The cradle adapter may also contain power ports for the individual devices in addition to the I/O ports. The cradle adapter 604 may be a passive pass through connection enabling device or may have internal electronic smarts to



perform certain server functions to control data traffic. Alternately, a Server C located on a LAN, WAN or the Internet can be the control vehicle.

[0039] FIG. 7 is an embodiment of the present invention showing a CT/MD 702 having multiple T/R units internally and with multiple antennas 710 in a communication system 700 connecting to a Server C 706 through a wireless connection 704. Server C 706 then communicates with a network such as the Internet or other path to data such as a local WAN/LAN line, etc., through connection 708. The multiple T/R units and antennas 710 allow multiple simultaneous communication paths over connection 704 between the CT/MD and the Server C such that the communication rate is increased.

[0040] FIG. 8 is an embodiment of the present invention illustrating the connection of multiple wireless signals to an optical network for connection to a wide area network (WAN) or local area network (LAN) or to the Internet. In FIG. 8, a CT/MD 802 communicates through internal electronic interfaces, such as an RF/IF module 804 and an AD/DA unit 806 in a T/R block 808 with a processor 810. Processor 810 then provides an electrical signal generated by the T/R block 808 and processed by processor 810 to an optical converter (OC) 812. OC 812 then delivers the optical signal to fibre optic cable 814 for delivery to, for example, a network such as a WAN/LAN or the Internet.

[0041] This avoids delay in processing the signal and improves quality/performance. Similar conversions can be done by the processor for other input/output protocols or systems such as universal serial bus (USB) or Ethernet either locally or in conjunction with a server such

as Server C 706 to receive/deliver input output signals as needed. By extension, the same features are possible for the network switch box such as network switch box 552.

[0042] Some unique features of the present invention, which apply to either a CT/MD such as CT/MD 802 or to a network switch box such as network switch box 552, are:

- 5 Multiple antennas for greater signal range and bandwidth.
- Multiple T/R units so that paths or tasks can be paralleled.
- Multiple internal signal processors, or one or more processors that execute in parallel.
- Multiple built in input/outputs for universal connectivity to different network environments.

10 Capability to interface wired and wireless devices through a cradle adapter to achieve universal connectivity.

Parallel processing of signals and data streams at a system level using hardware and software on a server such as Server C 706.

[0043] FIG. 9 is an embodiment of the present invention showing a multiple processing system 900. In FIG. 9, computer 902 and computer 908 need to exchange data streams at very fast rates. Having a single channel for T/R with a single antenna or a single processor would cause a limitation in data transfer rates, so multiple channels 912 are provided. Server C 910 polls the tasks by communicating with computer 902 and computer 908, and through computer 902 and computer 908 control the wireless units 904 and 906, such as CT/MDs or wireless boxes, by optimally allocating channels and transfers of the data. Having multiple channels 912

enhances the data transfer rate compared to a single channel or communication path. Server C 910 oversees the allocation of data to the different channels and keeps the process under control. In addition the multiple channels 912 help overcome the RF to digital electronic conversion rate problem. The rate at which the sampling and conversion takes place is a function of, for  
5 example, the A/D and D/A 806 conversion rates and limitations in the other electronics components such as processor 810. Consequently having the data partitioned by the Server C 910 and assigned to multiple channels 912 enables parallel processing of the communications, and having parallel processing of wireless data streams where the data streams coexist, as in the present invention, increases the data transfer rate.

10 [0044] FIG. 10 is an embodiment of the present invention showing a data system 1000 with three data streams DS1 1002, DS2 1004 and DS3 1006. In FIG. 10, three wireless T/R units 1008, 1010, and 1012 are shown. The three data streams 1002, 1004, and 1006 are processed by the three T/R units 1008, 1010 and 1012, converted by converters 1014, 1016, and 1018, and presented to processors 1020, 1022, and 1024 under the control of controller 1026. The data  
15 streams may be interfaced separately with server C 1030 or combined into data stream 1028 and interfaced to Server C 1030. The processor or CPU speed is seldom a limiting factor, so the improvement in speed by providing multiple data paths is fully realized by the present invention. Each subtask being processed can be assigned to a separate channel. The rate at which the data is acquired, processed and converted is dependent on the type of electronic components.

20 Therefore, component limitations can be overcome in a straightforward and convenient way by

parallel processing. In such cases, the processor speed is seldom a limitation, and conversion speed of RF to electrical and electrical to RF, becomes the primary bottleneck in data transfers for wireless systems. By providing, for example, a single chip, multichip, or hybrid converter for parallel conversions in accordance with the present invention under the supervision of the Server C 910, this bottleneck is avoided. Each channel may be sampled and clocked individually as necessary to optimally process each data stream and combine the individual data packets.

[0045] FIG. 11 is an embodiment of the present invention showing a data system 1100 with three data streams DS1 1102, DS2 1104 and DS3 1106. In FIG. 11, three fibre optic channel units 1108, 1110, and 1112 are shown. The three data streams 1102, 1104, and 1106 are processed by the three fibre optic channel units 1108, 1110 and 1112, converted by converters 1114, 1116, and 1118, and presented to processors 1120, 1122, and 1124 under the control of controller 1126. The data streams are combined into data stream 1128 and interfaced to Server C 1130. The processor or CPU speed is seldom a limiting factor, and can be overcome by providing multiple processors as shown, including for Server C 1130, so the improvement in speed is fully realized by the present invention. Each subtask being processed can be assigned to a separate optical fibre optic channel. The rate at which the data is acquired, processed and converted is limited by the components used for conversion of optical to electrical and electrical to optical signals. Therefore, component limitations can be overcome in a straightforward and convenient way by parallel processing. This can be especially important with fibre optic transmissions, where fibre optic to electrical and electrical to fibre optic conversions can create

significant communications limitations. In such cases, the processor speed is seldom a limitation or can be overcome with parallel processors, and conversion speed becomes the primary bottleneck in data transfers for optical systems. As discussed before, by providing, for example, a single chip, multichip, or hybrid converter for parallel conversions in accordance with the present invention under the supervision of a Server C, such as Server C 1130, the fibre optic channel conversion bottleneck is avoided.

[0046] FIG. 12 is an embodiment of the present invention showing a Virtual Private Network (VPN) communication path 1200. In FIG. 12, multiple communications channels such as USB 1202, telephone 1204, cable 1206, fibre optic channel 1208, and wireless 1210 are all employed to communicate data relating to tasks and subtasks from data path 1212, such as from Server C 1130, to data path 1214. Data path 1214 may be connected to, for example, another Server C 1030 or similarly. The result is that multiple communication environments are enabled by the data paths 1200, the environments having, for example, devices such as multiple CT/MDs, network switch boxes, and combinations for forming a VPN, such as VPN 1302. This is true even where the individual units belong to another VPN. The VPN, such as VPN 1302, or several VPNs, such as VPNs 1300, can be under the control of a single or multiple Server C, such as Server C 1130, machines. Each device in a VPN such as VPN 1300 may operate wireless or wired devices such as the devices in VPN 1302 connected to other wired or wireless networks, including fibre optic channel networks. The devices in a VPN, such as VPN 1302 of the present invention can be multiplexed or multitasked by a Server C, such as Server C 1130. This allows

many such devices to be under the supervision and control of a Server C 1130 or multiple Server C machines such as Server C 1030, 1130.

[0047] FIG. 13 is an embodiment of the present invention showing how Virtual Private Network or Networks (VPN) system 1300 may be provided. In FIG. 13, VPN 1302, 1306, and 1310 are connected through a wide area network (WAN) or local area network (LAN) to wireless network 1304, optical network, such as a fibre optic channel 1308, and cable network 1312. Other networks could be used as well, the embodiment is not intended to restrict the present invention. All the VPNs such as VPN 1302 and optionally the connections may be under the supervision of a Server C 1314 or many servers. VPN 1302 is shown with a network switch box 1316, server 1318, and a CT/MD 1320, which allows multipath communication through the network switch box 1316 to server 1318. This allows communication from/to the network switch box or from/to an outside source, such as a CT/MD service provider, to CT/MD 1320. The CT/MD 1320 can communicate simultaneously with the network switch box 1316 and an outside source as well.

[0048] VPN 1306 shows network switch box 1322 communicating with a server 1324 and optionally with CT/MD 1326. As shown, the VPN 1302 and the VPN 1306 operate in parallel, and may both be under the supervision and control of server 1314, which acts as a sort of executive level supervisor.

[0049] VPN 1310 shows network switch box 1328 and server 1330, with both CT/MD 1332 and CT/MD 1334 in the VPN 1310. Network box 1328 may communicate with either or

both CT/MD 1332 and 1334, and CT/MD 1332 and CT/MD 1334 may intercommunicate as well. VPN 1310 may also be under the supervision and control of server 1314. The server 1314 may also control and supervise VPN 1302 and 1306.

[0050] The present invention includes the following features:

5 [0051] (1) A cellular telephone/mobile device (CT/MD) with two or more antennas as opposed to the current state of the art in a single antenna system. Each antenna may be specifically designed for a specific frequency or application or may be multiplexed for different uses.

10 [0052] (2) A CT/MD with two or more transmit/receive (T/R) units as opposed to the prior art single T/R unit. Each T/R unit in the CT/MD may be designed for a specific frequency or application or may be multiplexed for different uses.

15 [0053] (3) A CT/MD with two or more processor units (or a single processor unit with built in parallelism to execute same, different and or custom applications) as opposed to the prior art of a single processor unit. Each processor unit in the CT/MD may be designed for a specific application or may be multiplexed for different uses. As an example one processor may be specifically designed to handle voice, another for data, another for high quality audio and yet another for streaming video.

20 [0054] (4) A CT/MD that has multiple input/output ports as opposed to a single input/output (I/O) port as in the prior art. The CT/MD may have a universal serial bus (USB) port, a coaxial cable port, a standard telephone (POTS) port, a twisted pair port, Ethernet port,

and most importantly an optical port. The CT/MD thus can fully interface and interact with different environments sequentially or simultaneously. The feature is more than one port being available with variations in the number of ports (I/O) from one to N.

5 [0055] (5) A network switch box with two or more antennas as opposed to the prior art of a single antenna system. Each antenna may be specifically designed for an assigned frequency or application or may be multiplexed for different uses.

[0056] (6) A network switch box with two or more T/R units within it as opposed to the prior art of a single T/R unit. Each T/R unit may be designed for an assigned frequency or application or may be multiplexed for different uses.

10 [0057] (7) A network switch box with two or more processor units (or a single processor unit with built in parallelism to execute same, different and or custom applications) as opposed to the prior art of a single processor unit. Each processor unit in the network box may be designed for a specific application or may be multiplexed for different uses. As an example one processor may be specifically designed to handle voice, another for data, another for high quality audio and yet another for streaming video.

15 [0058] (8) A network switch box has multiple input/output ports as opposed to a single input/output (I/O) port as in the prior art. The network switch box may have a universal serial bus (USB) port, a coaxial cable port, a standard telephone (POTS) port, a twisted pair port, Ethernet port, and most importantly an optical port. The network switch box thus can fully



interface and interact with different environments sequentially or simultaneously. The feature is more than one port being available with variations in the number of ports (I/O) from one to N.

[0059] (9) The ability to use the same CT/MD in different environments and applications and the ability to quickly interface to various inputs and outputs by a quick and easy plug in method into a receptacle or socket or by wired or wireless means such as a docking station.

[0060] (10) The ability to use the same network switch box in different environments and applications and the ability to quickly interface to various inputs and outputs by a quick and easy plug in method into a receptacle or socket or by wired or wireless means such as a docking station.

[0061] (11) The CT/MD and the network switch box may be used for communication, control, command, compute, entertainment, gaming, or other applications that may be defined in the future for both wireless and wired equipment.

[0062] (12) The unique feature that allows one or more antennas, one or more T/R units, one or more processors and one or more input/outputs to coexist in totality or as subsets of any combination of the above in one single CT/MD or a network switch box.

[0063] (13) The feature described in item 10 above and this invention allows parallel processing of the signals and data streams through the antennas, through the T/R units, through the multiple processors and through the I/O. This allows the present invention to achieve faster data rates with flexible connections for making multiple applications sequentially or simultaneously available using the same CT/MD or network switch box. As an example, video,

audio and other uses can be accessed simultaneously with performance optimized for each through dedicated or multiplexed antenna paths, T/R paths, through multiple processors and I/O paths.

5 [0064] (14) The internal electronics of a CT/MD or a network switch box other than the antenna, T/R and I/O may be shared or separate. For example, the processor, memory, etc. may be common or may be separate as defined by the application, cost, and site, etc.

10 [0065] (15) The ability to have an internal IP based web server function within the CT/MD and the network switch box or an external server C connected by wired or wireless means to keep track of all the communication protocols within the unit and with the outside world and other units.

[0066] (16) The electronics that converts wireless to optical signals directly, to efficiently interface wireless and optical signals and systems without intermediate transport.

[0067] (17) The ability to process in parallel signals derived from optical signals such as at a much higher frequency.

15 [0068] (18) The attachment that makes a non-wireless device fully wireless (see figure 6).

20 [0069] (19) The ability to form many concentric/overlying networks and have the CT/MD exist in one or more wired or wireless networks simultaneously. Thus one single CT/MD can, at the same time, be part of one or more wired or wireless VPN (virtual private networks) or of a public network. Thus a mixed network, a mixed VPN, is dynamically made possible under the supervision of server C. In this mixed VPN one or more network boxes from

different networks, different CT/MDs and base stations coexist in a new virtual network. All of these VPNs, mixed VPNs and public networks being accessible by the CT/MD through the supervision of the central server C located on a LAN, WAN, or the Internet.

5 [0070] (20) The ability for a CT/MD to communicate with one or more CT/MDs and other wired or wireless devices in one or more VPNs and public networks directly allowing for paging and data transmission and communication between one or more CT/MDs. This is accomplished with all the VPNs being under the control of Server C located on a LAN, WAN or the Internet.

10 [0071] (21) The network box may also operate as a wireless base station, with the characteristics enumerated for the network box, such as multiple antennas, multiple T/R units, multiple processors and multiple I/O ports. The base station may receive inputs from one type of network and transmit to another type of network seamlessly. For example, an optical network input may be transmitted as a wireless RF output over the wireless network. In reverse the wireless input to base station may be seamlessly converted into optical output for transmission  
15 over an optical network.

[0072] (22) In either the base station configuration or the network box configuration, the units have the ability to take optical data and multiplex the data for wireless transmission over one or more channels, at one or more frequencies and power levels. The base station, the network box or the CT/MD may use one or more transmission protocols as deemed optimal and  
20 appropriate by the local server C or the super server C located in a LAN, WAN or the Internet.

Thus the base station unit, the network box and the CT/MD determines the required frequency spectrum, other wireless parameters such as power and signal to noise ratio to optimally transmit the data. In addition the units have the ability to multiplex between one or more transmission protocols such as CDMA, TDMA to ensure that the fast data rates of the optical network or  
5 matched closely in a wireless network to minimize the potential data transmission speed degradation of a wireless network. As an example, the data path between two optical networks may involve a wireless hop due to physical constraints. In such a case the wireless hop transmission speed is likely to be a bottleneck. The base station or the network box, configured as described in the present invention at the hardware level offers universal functionality. In  
10 addition the software capability that is resident internally to the unit, at the local server C level or network server C level, is capable of dynamically determining a number of factors for best data transfer. As an example, the unit can determine the best transmission frequencies and protocols, determine the best error correction and channel coding algorithms and multiplexes the transmission paths and tasks. Thus it is possible that various optical and wireless protocols can  
15 co-exist in a network.

[0073] (23) The network box or network boxes may also be used to configure a predominantly optical network that has wireless capability as an adjunct or a predominantly wireless network that has optical capability as an adjunct. Other combinations are possible by extension with or without multiplexing. The optical to wireless multiplexer, can be part of a  
20 wireless ethernet or optical ethernet. Similarly other types of conversion and transmission

multiplexers could be defined to be incorporated into the CT/MD, the network box or the base station to optimally and seamlessly transfer data between networks or within a network.

[0074] The foregoing descriptions of specific embodiments of the present invention have been presented for purposes of illustration and description. They are not intended to be exhaustive or to limit the invention to the precise forms disclosed, and it should be understood that many modifications and variations are possible in light of the above teaching. The embodiments were chosen and described in order to best explain the principles of the present invention and its practical application, to thereby enable others skilled in the art to best utilize the present invention and various embodiments, with various modifications, as are suited to the particular use contemplated.

It is intended that the scope of the invention be defined by the Claims appended hereto and their equivalents.

WHAT IS CLAIMED IS:

1. A method for Internet Protocol (IP) based wireless data transmission between a wireless device and server comprising the steps of:
  - 5 (a) providing a plurality of ports on a wireless device,
  - (b) providing a plurality of ports on a server,
  - (c) transmitting a first data stream from the wireless device to the server on a first port and concurrently transmitting a second data stream from the wireless device to the server on a second port and
  - 10 (d) configuring the first port on the wireless device for an Ethernet connection.

## ABSTRACT OF THE INVENTION

A method and apparatus in which multiple Internet Protocol (IP) based wireless data transmissions are simultaneously provided between a wireless device and a server, including providing multiple antennas, multiple T/R units, multiple processors and multiple I/O ports on the wireless device. The method includes receiving multiple IP data packets on the I/O ports at substantially the same time, and sending multiple data packets from the wireless device to the server, whereby the transmission rate between the wireless device and the server is increased.

A System to Interface Internet Protocol (IP) Based Wireless Devices with Optical and Other  
Networks for Improved Flexibility, Performance, and Data Transfer

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CROSS REFERENCE TO RELATED APPLICATIONS

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[0001] The present application is a continuation and claims the priority benefit of co-pending U.S. Patent Application No. 12/912,607, filed October, 26, 2010, which is a continuation of Patent Application No. 10/940,428, filed September 13, 2004, now Patent No. 7,848,300, which is a continuation of Patent Application No. 09/617,608, filed on July 17, 2000 now Patent No. 7, 286,502, which is a continuation-in-part of Patent Application No. 09/281,739, now Patent No. 6,169,789, filed June 4, 1999, which is a continuation-in-part application of a now abandoned Patent Application No. 08/764,903 filed December 16, 1996. The present application claims priority to the above referenced applications and patents.

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BACKGROUND OF THE INVENTION

[0002] ABBREVIATIONS: Cellular Telephone as CT. Mobile Device as MD. Non-  
Wireless Device as NWD. Internet Protocol as IP. The typical cellular telephone/mobile device  
5 (CT/MD) today has a single antenna, which is directly connected to a single receiver. While  
spread spectrum techniques often used in the CT/MD use a broad band of frequencies, at any  
specific point in time, only a single frequency connected to one receiver is used. While spread  
spectrum techniques greatly increase the reliability and stability of the transmission, signal  
"fade" and communication disconnects are often encountered. Some communications systems  
10 may rely on two separate systems; one at a high frequency and preferably using spread spectrum  
transmissions for clarity and reliability, and another providing a different set of frequencies, such  
as lower frequencies. The secondary system is used when signal fade is a problem in the main  
system. These are two separate, complementary systems, each devoted to solving a separate,  
distinguishable problem.

15

SUMMARY OF THE INVENTION

5 [0003] It is an object of the present invention to provide wireless enhancements to IP based cellular telephones/mobile wireless devices (CT/MD). The same enhancements are applied to IP based and locally based network switch boxes.

[0004] The typical CT/MD has one transmitter and one receiver (T/R), with one antenna. An unfulfilled need exists for multiple T/R in a CT/MD, providing enhanced capabilities, and the multiple T/R capabilities will often be best met with multiple antennas. The present invention is possible due to advances in the art which allow the necessary components to be integrated, with the size shrunk to achieve the package, performance, and cost desired. The multiple T/R capability allows the single CT/MD to perform tasks in different environments – each T/R being specifically designed or configured for that specific purpose.

10 [0005] Other objects, features and advantages of the present invention will become apparent from the following detailed description when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

[0006] The accompanying drawings, being incorporated in and forming a part of this specification, illustrate embodiments of the invention and, together with the description, serve to explain the principles of the present invention:

5 [0007] FIG. 1A illustrates characteristics of a cellular telephone (CT/MD) of the prior art as opposed to a desired CT/MD of the present invention. FIG. 1B shows the CT/MD has three transmit frequencies and three receive frequencies.

[0008] FIG. 2 illustrates an embodiment of the present invention for a communication system with data being transferred from computer to computer.

10 [0009] FIG. 3 illustrates characteristics of the prior art showing a computer to computer data path with one channel.

[0010] FIG. 4 illustrates a dual antenna, dual transmit/receive (T/R) unit in the CT/MD of the present invention in a dual band system.

15 [0011] FIG. 5A illustrates a dual antenna, dual T/R unit in a CT/MD interfacing with a dual processor in the present invention in a dual band system.

[0012] FIG. 5B illustrates a wide band network switch box system that is capable of operating in a number of network environments sequentially or simultaneously.

[0013] FIG. 6 is an embodiment of the present invention showing a wired interface system for wireless or non-wireless devices and including a wireless cradle adapter.

[0014] FIG. 7 is an embodiment of the present invention showing a CT/MD with multiple T/R units and multiple antennas in a communication system connecting to a Server C through a wireless connection.

[0015] FIG. 8 is an embodiment of the present invention illustrating the connection of multiple wireless signals to an optical network for connection to a wide area network (WAN) or local area network (LAN) or to the Internet.

[0016] FIG. 9 is an embodiment of the present invention showing a multiple processing system.

[0017] FIG. 10 is an embodiment of the present invention showing a data system with three data streams.

[0018] FIG. 11 is an embodiment of the present invention showing a data system with three data streams.

[0019] FIG. 12 is an embodiment of the present invention showing a Virtual Private Network (VPN).

[0020] FIG. 13 is an embodiment of the present invention showing how Virtual Private Network or Networks (VPN) system may be provided.

DETAILED DESCRIPTION OF THE INVENTION

[0021] Reference will now be made in detail to preferred embodiments of the invention, with examples illustrated in the accompanying drawings. The invention is described in conjunction with the preferred embodiments, however, it will be understood that the preferred embodiments are not intended to limit the invention. The invention is intended to cover alternatives, modifications and equivalents included, now or later, within the spirit and scope of the present invention as defined by the appended claims.

[0022] In the present invention, one or more antennas and T/R units in a CT/MD will provide better tuning and greater bandwidth for a given frequency/application. For example, consider an embodiment of a cell phone, CB radio, and wireless phone, all in a single CT/MD for improving the data rates of a wireless device/network:

[0023] It is seen that the data rate of the CT/MD is increased. Currently the CT/MD data rates are very low and pose a severe limitation for high speed wireless data networking. 14.4 KBPS (kilobits per second) is probably the best reliable speed for a wireless network that is commercially available. The speed at which RF waves are transmitted from point A to point B is a physical property based on the frequency of transmission and reception in a given medium such as air. The signal speed is determined by the frequency and the signal strength is determined by the power, line of sight, interference, etc. In a given assigned frequency band, the data speed is fixed but the power may be varied. The rate at which data may be transmitted over

a wireless network is also determined by the ability to encode and decode the signal at the T/R ends using the electronics and computing power resident at each end.

[0024] Data transferred to a CT/MD over a wireless network comes in encoded form and must be decoded at the CT/MD after the data is received, such as by a receiver. The ability to encode and decode the data is a function of the number of encoders/decoders available and assigned to the task at the CT/MD or at a network switch box. It will be appreciated that while a CT/MD and a network switch box are very similar in many ways, they are completely different functional units, with the CT/MD providing personal services and the network switch box providing system services. The ability to encode and decode the data is also a function of the speed at which the encoder/decoder electronics operate at the T/R ends. Of course, each encoder/decoder must be associated with appropriate electronics to effect this task when more than one encoder/decoder is used.

[0025] FIG. 1A illustrates characteristics of a cellular telephone/mobile device (CT/MD) of the prior art as opposed to a desired CT/MD of the present invention having multiple transmit/receive (T/R) units and multiple antennas. In FIG. 1A, Cellphone 102, CB Radio 104, and Wireless 106 of the prior art all have a single transmit frequency and a single receive frequency. In contrast, the CT/MD 108 of FIG. 1B of this embodiment of the present invention has three transmit frequencies and three receive frequencies.

[0026] FIG. 2 illustrates an embodiment of the present invention for a communication system 200 with data being transferred from computer 202 to computer 204. In FIG. 2,

computer 202 communicates through a system of T/R units 206, located within or in proximity to computer system 202, with computer system 204 through T/R unit 208. T/R 208 may be located within computer system 204 or in close proximity to computer system 204 to route the data to computer 204 or alternatively to a network server 204, as required. The rate at which data from system 202 to system 204 is transferred is gated by the speed of the transmit and receive units is improved by the parallel paths provided by the present invention. The signal is sampled and may be multiplexed at each end, at a rate that assures accuracy.

[0027] FIG. 3 is an embodiment of the prior art showing a computer to computer data path with a single channel 300. In FIG. 3, using a single antenna and a single T/R unit the signal is processed through the internal electronics module 308 of the CT/MD 302, said module 308, which is shown separate from CT/MD 302 for illustrative purposes only but is normally included within CT/MD 302. Module 308 contains RF/IF 304 and A/D, D/A converter 306, as well as processor 310, memory 312, control electronics 314, and other electronics such as display electronics 316 and special interface circuitry 318, such as for driving the output 320. It should be clear that output 320 can also be an input/output for the CT/MD 302. This is also true for a network switch box such as network switch box 552 with the functionality of CT/MD 302. The module 308 and elements 310 through 318 are included within CT/MD 302 or network switch box 552. All of these components or systems are normally contained within CT/MD 302. Since there is only one path, however, it is clear that this system does not form an efficient, convenient

interface. The transmission data rate is limited by antenna 322 of CT/MD 302, which has only one antenna 322.

[0028] The antenna 322 is capable of receiving only a limited frequency band due to its design limitations, which are common to single antennas used for this purpose.

5 [0029] Adding additional antennas gives the CT/MD (by extension the same is true for the network switch box) enhanced capabilities to differentiate between various signals or to combine multiple paths into a single communication channel. As an example, the design considerations for receiving cellular telephone frequencies may be totally different from those for streaming video or data signals, and with the present invention both can be combined into the  
10 CT/MD.

[0030] FIG. 4 illustrates a dual antenna, dual T/R unit in the CT/MD of the present invention in a dual band system 400. In FIG. 4, this scheme with CT/MD 402 transmitting on the dual T/R unit 404 allows the internal processor 406 to independently process the two incoming signal streams separately and optimally, causing the appropriate output to be delivered  
15 on the desired output port. In FIG. 4 the processor 406 is shown as a single processor, however, the processor 406 is not limited to only one processor and may contain multiple processors. Alternately, the single processor may have multiple channels for parallel processing of each data stream to process accurately two distinct signals 408 that were more optimally received by two dedicated antennas and two separate T/R units contained within the CT/MD to improve



performance and quality of output. An example is a CT/MD 402 which is optimized for video and voice.

[0031] Having more than one T/R unit gives a performance edge as each signal can be better processed and tuned to the specific frequency band of the signal. Thus better quality of output can be achieved for each type of signal and application. As an example, by having each of the data streams sampled at differing clock frequencies the performance can be better optimized.

[0032] FIG. 5A illustrates a dual antenna, dual T/R unit 504 in a CT/MD 502 interfacing with a dual processor 506 in the present invention in a dual band system 500. In FIG. 5A, in addition to multiple antennas 508 and multiple T/R units 504 the figure also shows multiple processors 506 in a process unit functional block in a CT/MD. The system may communicate through an output or outputs 510. For example, these outputs may be fibre optic channel, ethernet, cable, telephone, or other. By extension the feature of multiple antennas, multiple T/R units and multiple processors is extendable to the network switch box or network switch boxes that form a local, wide area, Virtual private network or connect to the Internet.

[0033] Server C controls the communication protocols in conjunction with the network switching box or other devices, such as CT/MD 502. The multiple processors 506 allow for parallel and custom processing of each signal or data stream to achieve higher speed and better quality of output. This can also be done with a single processor that has the parallelism and pipeline capability built in for handling one or more data streams simultaneously. Processor 506 is the complete electronics inclusive of DSP, CPU, memory controller, and other elements

essential to process various types of signals. These can be defined as, for example, either single chip or multichip solutions. The processor contained within the CT/MD 502 is further capable of delivering the required outputs to a number of different ports such as optical, USB, cable and others such as 1202 to 1210. The CT/MD 502 is also capable of taking different inputs, as well as wireless, for the appropriate processing to be done on these signals within the CT/MD 502 and outputting the desired signal on a designated port or ports. Thus the CT/MD 502 has universal connectivity in addition to having a wide range of functionality made possible through the features of multiple antennas, multiple T/R units 504 and processors 506 in this invention. These features may also exist in a network switch box, such as network switch box 552.

**[0034]** FIG. 5B illustrates a wide band network switch box system 550 that is capable of operating in a number of network environments sequentially or simultaneously. The network switch box is configured with multiple processors, multiple antennas and multiple T/R units that can be multiplexed to process incoming and outgoing wireless signals. In addition to wireless signals there is a need to process other types of input/output signals such as optical, cable, USB etc. to fully interface with other types of devices and networks. The network switch box is normally a fixed part of a network, whereas the CT/MD is portable. However, the network switch box may be portable and may be used in the wireless mode only in a wireless network or it may also be connected to one or more networks by wired and wireless means to fully leverage all the input/output ports.

[0035] In FIG. 5B, network switch box 552 that is limited in quality because of the limitations of wireless may fully leverage the networks, including fibre optic networks, such as by multiple antennas 554 and multiple I/O ports 556. As an example, the ability to view streaming video on a network switch box 552 may be limited by the wireless signal quality due to the need for compression. This is due to transmissions that are inherently impaired in air as opposed to fibre optic cable. A prior art network switch box while in the mobile mode may receive video of poorer quality. The network switch box 552, when at home or in the office, could be easily connected to the optical network directly or through I/O ports 556, such as by a cradle adapter. In this mode the best data, video or audio quality can be received using the same unit. This provides the network switch box 552 single unit to have universal applications since it can sequentially or simultaneously communicate optimally with other systems and networks to deliver quality/performance and speed tailored for each application.

[0036] The network switch box 552 as disclosed above executes substantially the same function as the CT/MD 502. However, the network switch box 552 operates at a network system level capable of coordinating the operations of a number of mobile and other devices in one or more networks, while the CT/MD 502 performs at a personal level.

[0037] FIG. 6 is an embodiment of the present invention showing a wired interface system 600 for wireless or non-wireless devices. In FIG. 6, a wireless device, CT/MD 602 with I/O ports 610 and CT/MD 612 with the ability to interface through a cradle adapter 604 having both wireless and wired connections 606 interfacing with multiple input/output (I/O) ports 608 is

shown. One, all, or some of the connections may be used simultaneously or sequentially for combining multiple data paths into a single path. Whether to combine all the paths into a single data channel or use separate data channels for simultaneous operations will be based on the needs of the application. Examples of inputs/outputs are, for example, standard telephone, coaxial cable, Ethernet, twisted pair, wireless, optical, and USB. In addition to the multiple I/O ports 610 shown on the CT/MD 602 and the ports 608 shown for connecting the CT/MD 612 to cradle adapter 604, the present invention anticipates a universal port and a universal connector. By having the signal path selection done by user defined menu driven software and multiplexing the signals onto a universal input/output port as opposed to the multiple ports 608, 610 or wired connections 606, the desired signals are delivered to the universal port.

[0038] Note that the cradle adapter 604 connection also allows I/O contacts 608 between a non-wireless device (NWD) 613 and a wireless cradle adapter 604 or similar wireless enabling attachment. The enabling attachment can make any non-wireless device (NWD) unit 613 wireless enabled while being plugged into the cradle adapter 604, as shown for CT/MD 612, to access a number of wired, optical or wireless communication paths through the ports 608. The cradle adapter itself may have multiple antennas, multiple T/R units and multiple processors built-in to deliver full functionality. The cradle adapter 604 may also accommodate multiple wired or wireless devices to be plugged in at the same time. The cradle adapter may also contain power ports for the individual devices in addition to the I/O ports. The cradle adapter 604 may be a passive pass through connection enabling device or may have internal electronic smarts to

perform certain server functions to control data traffic. Alternately, a Server C located on a LAN, WAN or the Internet can be the control vehicle.

[0039] FIG. 7 is an embodiment of the present invention showing a CT/MD 702 having multiple T/R units internally and with multiple antennas 710 in a communication system 700 connecting to a Server C 706 through a wireless connection 704. Server C 706 then communicates with a network such as the Internet or other path to data such as a local WAN/LAN line, etc., through connection 708. The multiple T/R units and antennas 710 allow multiple simultaneous communication paths over connection 704 between the CT/MD and the Server C such that the communication rate is increased.

[0040] FIG. 8 is an embodiment of the present invention illustrating the connection of multiple wireless signals to an optical network for connection to a wide area network (WAN) or local area network (LAN) or to the Internet. In FIG. 8, a CT/MD 802 communicates through internal electronic interfaces, such as an RF/IF module 804 and an AD/DA unit 806 in a T/R block 808 with a processor 810. Processor 810 then provides an electrical signal generated by the T/R block 808 and processed by processor 810 to an optical converter (OC) 812. OC 812 then delivers the optical signal to fibre optic cable 814 for delivery to, for example, a network such as a WAN/LAN or the Internet.

[0041] This avoids delay in processing the signal and improves quality/performance. Similar conversions can be done by the processor for other input/output protocols or systems such as universal serial bus (USB) or Ethernet either locally or in conjunction with a server such

as Server C 706 to receive/deliver input output signals as needed. By extension, the same features are possible for the network switch box such as network switch box 552.

[0042] Some unique features of the present invention, which apply to either a CT/MD such as CT/MD 802 or to a network switch box such as network switch box 552, are:

- 5 Multiple antennas for greater signal range and bandwidth.
- Multiple T/R units so that paths or tasks can be paralleled.
- Multiple internal signal processors, or one or more processors that execute in parallel.
- Multiple built in input/outputs for universal connectivity to different network environments.

10 Capability to interface wired and wireless devices through a cradle adapter to achieve universal connectivity.

Parallel processing of signals and data streams at a system level using hardware and software on a server such as Server C 706.

[0043] FIG. 9 is an embodiment of the present invention showing a multiple processing system 900. In FIG. 9, computer 902 and computer 908 need to exchange data streams at very fast rates. Having a single channel for T/R with a single antenna or a single processor would cause a limitation in data transfer rates, so multiple channels 912 are provided. Server C 910 polls the tasks by communicating with computer 902 and computer 908, and through computer 902 and computer 908 control the wireless units 904 and 906, such as CT/MDs or wireless boxes, by optimally allocating channels and transfers of the data. Having multiple channels 912

enhances the data transfer rate compared to a single channel or communication path. Server C 910 oversees the allocation of data to the different channels and keeps the process under control. In addition the multiple channels 912 help overcome the RF to digital electronic conversion rate problem. The rate at which the sampling and conversion takes place is a function of, for  
5 example, the A/D and D/A 806 conversion rates and limitations in the other electronics components such as processor 810. Consequently having the data partitioned by the Server C 910 and assigned to multiple channels 912 enables parallel processing of the communications, and having parallel processing of wireless data streams where the data streams coexist, as in the present invention, increases the data transfer rate.

10 [0044] FIG. 10 is an embodiment of the present invention showing a data system 1000 with three data streams DS1 1002, DS2 1004 and DS3 1006. In FIG. 10, three wireless T/R units 1008, 1010, and 1012 are shown. The three data streams 1002, 1004, and 1006 are processed by the three T/R units 1008, 1010 and 1012, converted by converters 1014, 1016, and 1018, and presented to processors 1020, 1022, and 1024 under the control of controller 1026. The data  
15 streams may be interfaced separately with server C 1030 or combined into data stream 1028 and interfaced to Server C 1030. The processor or CPU speed is seldom a limiting factor, so the improvement in speed by providing multiple data paths is fully realized by the present invention. Each subtask being processed can be assigned to a separate channel. The rate at which the data is acquired, processed and converted is dependent on the type of electronic components.

20 Therefore, component limitations can be overcome in a straightforward and convenient way by

parallel processing. In such cases, the processor speed is seldom a limitation, and conversion speed of RF to electrical and electrical to RF, becomes the primary bottleneck in data transfers for wireless systems. By providing, for example, a single chip, multichip, or hybrid converter for parallel conversions in accordance with the present invention under the supervision of the Server C 910, this bottleneck is avoided. Each channel may be sampled and clocked individually as necessary to optimally process each data stream and combine the individual data packets.

[0045] FIG. 11 is an embodiment of the present invention showing a data system 1100 with three data streams DS1 1102, DS2 1104 and DS3 1106. In FIG. 11, three fibre optic channel units 1108, 1110, and 1112 are shown. The three data streams 1102, 1104, and 1106 are processed by the three fibre optic channel units 1108, 1110 and 1112, converted by converters 1114, 1116, and 1118, and presented to processors 1120, 1122, and 1124 under the control of controller 1126. The data streams are combined into data stream 1128 and interfaced to Server C 1130. The processor or CPU speed is seldom a limiting factor, and can be overcome by providing multiple processors as shown, including for Server C 1130, so the improvement in speed is fully realized by the present invention. Each subtask being processed can be assigned to a separate optical fibre optic channel. The rate at which the data is acquired, processed and converted is limited by the components used for conversion of optical to electrical and electrical to optical signals. Therefore, component limitations can be overcome in a straightforward and convenient way by parallel processing. This can be especially important with fibre optic transmissions, where fibre optic to electrical and electrical to fibre optic conversions can create



significant communications limitations. In such cases, the processor speed is seldom a limitation or can be overcome with parallel processors, and conversion speed becomes the primary bottleneck in data transfers for optical systems. As discussed before, by providing, for example, a single chip, multichip, or hybrid converter for parallel conversions in accordance with the present invention under the supervision of a Server C, such as Server C 1130, the fibre optic channel conversion bottleneck is avoided.

[0046] FIG. 12 is an embodiment of the present invention showing a Virtual Private Network (VPN) communication path 1200. In FIG. 12, multiple communications channels such as USB 1202, telephone 1204, cable 1206, fibre optic channel 1208, and wireless 1210 are all employed to communicate data relating to tasks and subtasks from data path 1212, such as from Server C 1130, to data path 1214. Data path 1214 may be connected to, for example, another Server C 1030 or similarly. The result is that multiple communication environments are enabled by the data paths 1200, the environments having, for example, devices such as multiple CT/MDs, network switch boxes, and combinations for forming a VPN, such as VPN 1302. This is true even where the individual units belong to another VPN. The VPN, such as VPN 1302, or several VPNs, such as VPNs 1300, can be under the control of a single or multiple Server C, such as Server C 1130, machines. Each device in a VPN such as VPN 1300 may operate wireless or wired devices such as the devices in VPN 1302 connected to other wired or wireless networks, including fibre optic channel networks. The devices in a VPN, such as VPN 1302 of the present invention can be multiplexed or multitasked by a Server C, such as Server C 1130. This allows

many such devices to be under the supervision and control of a Server C 1130 or multiple Server C machines such as Server C 1030, 1130.

[0047] FIG. 13 is an embodiment of the present invention showing how Virtual Private Network or Networks (VPN) system 1300 may be provided. In FIG. 13, VPN 1302, 1306, and 1310 are connected through a wide area network (WAN) or local area network (LAN) to wireless network 1304, optical network, such as a fibre optic channel 1308, and cable network 1312. Other networks could be used as well, the embodiment is not intended to restrict the present invention. All the VPNs such as VPN 1302 and optionally the connections may be under the supervision of a Server C 1314 or many servers. VPN 1302 is shown with a network switch box 1316, server 1318, and a CT/MD 1320, which allows multipath communication through the network switch box 1316 to server 1318. This allows communication from/to the network switch box or from/to an outside source, such as a CT/MD service provider, to CT/MD 1320. The CT/MD 1320 can communicate simultaneously with the network switch box 1316 and an outside source as well.

[0048] VPN 1306 shows network switch box 1322 communicating with a server 1324 and optionally with CT/MD 1326. As shown, the VPN 1302 and the VPN 1306 operate in parallel, and may both be under the supervision and control of server 1314, which acts as a sort of executive level supervisor.

[0049] VPN 1310 shows network switch box 1328 and server 1330, with both CT/MD 1332 and CT/MD 1334 in the VPN 1310. Network box 1328 may communicate with either or

both CT/MD 1332 and 1334, and CT/MD 1332 and CT/MD 1334 may intercommunicate as well. VPN 1310 may also be under the supervision and control of server 1314. The server 1314 may also control and supervise VPN 1302 and 1306.

[0050] The present invention includes the following features:

5 [0051] (1) A cellular telephone/mobile device (CT/MD) with two or more antennas as opposed to the current state of the art in a single antenna system. Each antenna may be specifically designed for a specific frequency or application or may be multiplexed for different uses.

10 [0052] (2) A CT/MD with two or more transmit/receive (T/R) units as opposed to the prior art single T/R unit. Each T/R unit in the CT/MD may be designed for a specific frequency or application or may be multiplexed for different uses.

15 [0053] (3) A CT/MD with two or more processor units (or a single processor unit with built in parallelism to execute same, different and or custom applications) as opposed to the prior art of a single processor unit. Each processor unit in the CT/MD may be designed for a specific application or may be multiplexed for different uses. As an example one processor may be specifically designed to handle voice, another for data, another for high quality audio and yet another for streaming video.

20 [0054] (4) A CT/MD that has multiple input/output ports as opposed to a single input/output (I/O) port as in the prior art. The CT/MD may have a universal serial bus (USB) port, a coaxial cable port, a standard telephone (POTS) port, a twisted pair port, Ethernet port,

and most importantly an optical port. The CT/MD thus can fully interface and interact with different environments sequentially or simultaneously. The feature is more than one port being available with variations in the number of ports (I/O) from one to N.

5 [0055] (5) A network switch box with two or more antennas as opposed to the prior art of a single antenna system. Each antenna may be specifically designed for an assigned frequency or application or may be multiplexed for different uses.

[0056] (6) A network switch box with two or more T/R units within it as opposed to the prior art of a single T/R unit. Each T/R unit may be designed for an assigned frequency or application or may be multiplexed for different uses.

10 [0057] (7) A network switch box with two or more processor units (or a single processor unit with built in parallelism to execute same, different and or custom applications) as opposed to the prior art of a single processor unit. Each processor unit in the network box may be designed for a specific application or may be multiplexed for different uses. As an example one processor may be specifically designed to handle voice, another for data, another for high quality audio and yet another for streaming video.

15 [0058] (8) A network switch box has multiple input/output ports as opposed to a single input/output (I/O) port as in the prior art. The network switch box may have a universal serial bus (USB) port, a coaxial cable port, a standard telephone (POTS) port, a twisted pair port, Ethernet port, and most importantly an optical port. The network switch box thus can fully

interface and interact with different environments sequentially or simultaneously. The feature is more than one port being available with variations in the number of ports (I/O) from one to N.

[0059] (9) The ability to use the same CT/MD in different environments and applications and the ability to quickly interface to various inputs and outputs by a quick and easy plug in method into a receptacle or socket or by wired or wireless means such as a docking station.

[0060] (10) The ability to use the same network switch box in different environments and applications and the ability to quickly interface to various inputs and outputs by a quick and easy plug in method into a receptacle or socket or by wired or wireless means such as a docking station.

[0061] (11) The CT/MD and the network switch box may be used for communication, control, command, compute, entertainment, gaming, or other applications that may be defined in the future for both wireless and wired equipment.

[0062] (12) The unique feature that allows one or more antennas, one or more T/R units, one or more processors and one or more input/outputs to coexist in totality or as subsets of any combination of the above in one single CT/MD or a network switch box.

[0063] (13) The feature described in item 10 above and this invention allows parallel processing of the signals and data streams through the antennas, through the T/R units, through the multiple processors and through the I/O. This allows the present invention to achieve faster data rates with flexible connections for making multiple applications sequentially or simultaneously available using the same CT/MD or network switch box. As an example, video,

audio and other uses can be accessed simultaneously with performance optimized for each through dedicated or multiplexed antenna paths, T/R paths, through multiple processors and I/O paths.

5 [0064] (14) The internal electronics of a CT/MD or a network switch box other than the antenna, T/R and I/O may be shared or separate. For example, the processor, memory, etc. may be common or may be separate as defined by the application, cost, and site, etc.

10 [0065] (15) The ability to have an internal IP based web server function within the CT/MD and the network switch box or an external server C connected by wired or wireless means to keep track of all the communication protocols within the unit and with the outside world and other units.

[0066] (16) The electronics that converts wireless to optical signals directly, to efficiently interface wireless and optical signals and systems without intermediate transport.

[0067] (17) The ability to process in parallel signals derived from optical signals such as at a much higher frequency.

15 [0068] (18) The attachment that makes a non-wireless device fully wireless (see figure 6).

20 [0069] (19) The ability to form many concentric/overlying networks and have the CT/MD exist in one or more wired or wireless networks simultaneously. Thus one single CT/MD can, at the same time, be part of one or more wired or wireless VPN (virtual private networks) or of a public network. Thus a mixed network, a mixed VPN, is dynamically made possible under the supervision of server C. In this mixed VPN one or more network boxes from

different networks, different CT/MDs and base stations coexist in a new virtual network. All of these VPNs, mixed VPNs and public networks being accessible by the CT/MD through the supervision of the central server C located on a LAN, WAN, or the Internet.

5 [0070] (20) The ability for a CT/MD to communicate with one or more CT/MDs and other wired or wireless devices in one or more VPNs and public networks directly allowing for paging and data transmission and communication between one or more CT/MDs. This is accomplished with all the VPNs being under the control of Server C located on a LAN, WAN or the Internet.

10 [0071] (21) The network box may also operate as a wireless base station, with the characteristics enumerated for the network box, such as multiple antennas, multiple T/R units, multiple processors and multiple I/O ports. The base station may receive inputs from one type of network and transmit to another type of network seamlessly. For example, an optical network input may be transmitted as a wireless RF output over the wireless network. In reverse the wireless input to base station may be seamlessly converted into optical output for transmission  
15 over an optical network.

[0072] (22) In either the base station configuration or the network box configuration, the units have the ability to take optical data and multiplex the data for wireless transmission over one or more channels, at one or more frequencies and power levels. The base station, the network box or the CT/MD may use one or more transmission protocols as deemed optimal and  
20 appropriate by the local server C or the super server C located in a LAN, WAN or the Internet.

Thus the base station unit, the network box and the CT/MD determines the required frequency spectrum, other wireless parameters such as power and signal to noise ratio to optimally transmit the data. In addition the units have the ability to multiplex between one or more transmission protocols such as CDMA, TDMA to ensure that the fast data rates of the optical network or  
5 matched closely in a wireless network to minimize the potential data transmission speed degradation of a wireless network. As an example, the data path between two optical networks may involve a wireless hop due to physical constraints. In such a case the wireless hop transmission speed is likely to be a bottleneck. The base station or the network box, configured as described in the present invention at the hardware level offers universal functionality. In  
10 addition the software capability that is resident internally to the unit, at the local server C level or network server C level, is capable of dynamically determining a number of factors for best data transfer. As an example, the unit can determine the best transmission frequencies and protocols, determine the best error correction and channel coding algorithms and multiplexes the transmission paths and tasks. Thus it is possible that various optical and wireless protocols can  
15 co-exist in a network.

[0073] (23) The network box or network boxes may also be used to configure a predominantly optical network that has wireless capability as an adjunct or a predominantly wireless network that has optical capability as an adjunct. Other combinations are possible by extension with or without multiplexing. The optical to wireless multiplexer, can be part of a  
20 wireless ethernet or optical ethernet. Similarly other types of conversion and transmission



multiplexers could be defined to be incorporated into the CT/MD, the network box or the base station to optimally and seamlessly transfer data between networks or within a network.

[0074] The foregoing descriptions of specific embodiments of the present invention have been presented for purposes of illustration and description. They are not intended to be exhaustive or to limit the invention to the precise forms disclosed, and it should be understood that many modifications and variations are possible in light of the above teaching. The embodiments were chosen and described in order to best explain the principles of the present invention and its practical application, to thereby enable others skilled in the art to best utilize the present invention and various embodiments, with various modifications, as are suited to the particular use contemplated.

It is intended that the scope of the invention be defined by the Claims appended hereto and their equivalents.

WHAT IS CLAIMED IS:

1. A method for Internet Protocol (IP) based wireless data transmission between a wireless device and server comprising the steps of:
  - 5 (a) providing a plurality of ports on a wireless device,
  - (b) providing a plurality of ports on a server,
  - (c) transmitting a first data stream from the wireless device to the server on a first port and concurrently transmitting a second data stream from the wireless device to the server on a second port and
  - 10 (d) configuring the first port on the wireless device for an Ethernet connection.

## ABSTRACT OF THE INVENTION

A method and apparatus in which multiple Internet Protocol (IP) based wireless data transmissions are simultaneously provided between a wireless device and a server, including providing multiple antennas, multiple T/R units, multiple processors and multiple I/O ports on the wireless device. The method includes receiving multiple IP data packets on the I/O ports at substantially the same time, and sending multiple data packets from the wireless device to the server, whereby the transmission rate between the wireless device and the server is increased.

04245.001000.

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application No.: 13/621,294	)	
	:	
First Named Inventor:	)	
	:	Group Art Unit: 2642
SUNIL K. RAO, ET AL.	)	
	:	Confirmation No.: 5130
Filed: September 17, 2012	)	
	:	
For: A SYSTEM TO INTERFACE	)	
INTERNET PROTOCOL (IP)	:	
BASED WIRELESS DEVICES	)	
WITH OPTICAL AND OTHER	:	
NETWORKS FOR IMPROVED	)	
FLEXIBILITY, PERFORMANCE,	:	
AND DATA TRANSFER	)	December 19, 2013

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

SUBMISSION OF DECLARATIONS

Sir:

Submitted herewith are two additional Declarations for the above-identified application, for the following named inventors:

Sunil K. Rao  
Sanjay K. Rao

CERTIFICATE OF EFS-WEB TRANSMISSION  
I hereby certify that this correspondence is being filed electronically by  
EFS-Web transmission to the United States Patent Office on  
December 19, 2013  
\_\_\_\_\_  
(Date of Deposit)

Michael K. O'Neill, Reg. No. 32,622  
\_\_\_\_\_  
(Name of Attorney for Applicants)

\_\_\_\_\_  
/Michael K. O'Neill/  
Signature

\_\_\_\_\_  
December 19, 2013  
Date of Signature

The Declaration for the third named inventor has already been filed, as follows:

Raman K. Rao

It is believed that the surcharge fee for the late filing of the Declaration has not yet been charged by the Office. As such, the late surcharge filing fee of \$70.00 (small entity), under 37 C.F.R. § 1.16(f), is concurrently submitted herewith. If additional fees are required for processing of this paper, the Commissioner is authorized to charge them to Deposit Account No. 50-3939. Any overpayment should be credited to the same Deposit Account.

The Office is respectfully requested to acknowledge receipt of the attached Declaration(s), and fulfillment of all filing requirements.

Applicants' undersigned attorney may be reached in our Costa Mesa, California office by telephone at (714) 540-8700. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,

/Michael K. O'Neill/  
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## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	13621294				
<b>Filing Date:</b>	17-Sep-2012				
<b>Title of Invention:</b>	System to Interface Internet Protocol (IP) Based Wireless Devices with Optical and Other Networks for Improved Flexibility, Performance, and Data Transfer				
<b>First Named Inventor/Applicant Name:</b>	Sunil K. Rao				
<b>Filer:</b>	Michael K. O'Neill/Margaret Lee				
<b>Attorney Docket Number:</b>	HMTR3				
Filed as Small Entity					
<b>Utility under 35 USC 111(a) Filing Fees</b>					
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>	
<b>Basic Filing:</b>					
<b>Pages:</b>					
<b>Claims:</b>					
<b>Miscellaneous-Filing:</b>					
Late Filing Fee for Oath or Declaration	2051	1	70	70	
<b>Petition:</b>					
<b>Patent-Appeals-and-Interference:</b>					
<b>Post-Allowance-and-Post-Issuance:</b>					
<b>Extension-of-Time:</b>					

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension - 4 months with \$0 paid	2254	1	1100	1100
<b>Miscellaneous:</b>				
<b>Total in USD (\$)</b>				<b>1170</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	17718157
<b>Application Number:</b>	13621294
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	5130
<b>Title of Invention:</b>	System to Interface Internet Protocol (IP) Based Wireless Devices with Optical and Other Networks for Improved Flexibility, Performance, and Data Transfer
<b>First Named Inventor/Applicant Name:</b>	Sunil K. Rao
<b>Customer Number:</b>	105481
<b>Filer:</b>	Michael K. O'Neill/Margaret Lee
<b>Filer Authorized By:</b>	Michael K. O'Neill
<b>Attorney Docket Number:</b>	HMTR3
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<b>Filing Date:</b>	17-SEP-2012
<b>Time Stamp:</b>	19:58:08
<b>Application Type:</b>	Utility under 35 USC 111(a)

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Payment Type	Deposit Account
Payment was successfully received in RAM	\$1170
RAM confirmation Number	8375
Deposit Account	503939
Authorized User	

### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
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1	Oath or Declaration filed	04245_001000_Declarations.pdf	224362 f4be485a363c02e8bfb8a5e4dd07e9d27f7b6b85b	no	2
<b>Warnings:</b>					
<b>Information:</b>					
2	Extension of Time	04245_001000_Ext_of_Time_12192013.pdf	55932 58aa681ae483e7ef4fcc601359042f04ed317f0e	no	2
<b>Warnings:</b>					
<b>Information:</b>					
3	Applicant Response to Pre-Exam Formalities Notice	04245_001000_Resp_to_Notice_to_File_Corr_App_Papers_12192013.pdf	58167 1bccce966d27be109a7b742209bb1c6c95a68b15	no	3
<b>Warnings:</b>					
<b>Information:</b>					
4	Specification	04245_001000_Sub_Spec_Clean_12192013.pdf	141739 a0c80b41c320680e903e2fac28f6eedb7b4ca59	no	28
<b>Warnings:</b>					
<b>Information:</b>					
5	Specification	04245_001000_Sub_Spec_Markings_12192013.pdf	142407 cc949706d5c71e188ad7c4ae4914d23db5e7bd7	no	28
<b>Warnings:</b>					
<b>Information:</b>					
6	Transmittal Letter	04245_001000_Submission_of_Declarations_12192013.pdf	56928 97df7d0d269e11f0cdf7b12587a58d2f0742588b	no	2
<b>Warnings:</b>					
<b>Information:</b>					
7	Fee Worksheet (SB06)	fee-info.pdf	32444 866cb96df8fc3317f4851df1fc638e11b1d3b95	no	2
<b>Warnings:</b>					
<b>Information:</b>					
<b>Total Files Size (in bytes):</b>			711979		

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**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.

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**DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)**

<b>Title of Invention</b>	<b>System to Interface Internet Protocol (IP) Based Wireless Devices with Optical and Other Networks for Improved Flexibility, Performance, and Data Transfer</b>
---------------------------	---

As the below named inventor, I hereby declare that:

This declaration is directed to:  The attached application, or  United States application or PCT international application number 13/621,294 filed on September 17, 2012.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

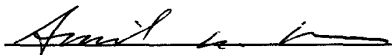
I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

**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.

**LEGAL NAME OF INVENTOR**

Inventor: Sunil K. Rao Date (Optional): 12/18/2013

Signature: 

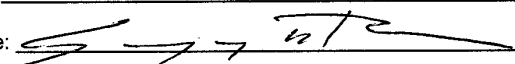
Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. 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 1 minute 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.

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## DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

<b>Title of Invention</b>	System to Interface Internet Protocol (IP) Based Wireless Devices with Optical and Other Networks for Improved Flexibility, Performance, and Data Transfer
<p>As the below named inventor, I hereby declare that:</p> <p>This declaration is directed to: <input type="checkbox"/> The attached application, or  <input checked="" type="checkbox"/> United States application or PCT international application number <u>13/621,294</u>  filed on <u>September 17, 2012</u></p> <p>The above-identified application was made or authorized to be made by me.</p> <p>I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.</p> <p>I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.</p> <p style="text-align: center;"><b>WARNING:</b></p> <p>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.</p>	
<p><b>LEGAL NAME OF INVENTOR</b></p> <p>Inventor: <u>Sanjay K. Rao</u> Date (Optional): <u>12/18/2013</u></p> <p>Signature: </p>	
<p>Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.</p>	

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. 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 1 minute 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.*

04245.001000.

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application No.: 13/621,294	)	
	:	
First Named Inventor:	)	
	:	Group Art Unit: 2642
SUNIL K. RAO, ET AL.	)	
	:	Confirmation No.: 5130
Filed: September 17, 2012	)	
	:	
For: A SYSTEM TO INTERFACE	)	
INTERNET PROTOCOL (IP)	:	
BASED WIRELESS DEVICES	)	
WITH OPTICAL AND OTHER	:	
NETWORKS FOR IMPROVED	)	
FLEXIBILITY, PERFORMANCE,	:	
AND DATA TRANSFER	)	December 19, 2013

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

PETITION FOR EXTENSION OF TIME  
UNDER 37 C.F.R. § 1.136(a)

Sir:

Applicants petition the Commissioner for Patents to extend the time for response to the Notice to File Corrected Application Papers dated June 20, 2013 for four months from August 20, 2013 to December 20, 2013.

CERTIFICATE OF EFS-WEB TRANSMISSION  
I hereby certify that this correspondence is being filed electronically by EFS-Web transmission to the United States Patent Office on  
December 19, 2013  
\_\_\_\_\_  
(Date of Deposit)

\_\_\_\_\_  
Michael K. O'Neill, Reg. No. 32,622  
(Name of Attorney for Applicants)

\_\_\_\_\_  
/Michael K. O'Neill/  
Signature

\_\_\_\_\_  
December 20, 2013  
Date of Signature

The \$1,100.00 fee (small entity) for this extension is being charged to Deposit Account No. 50-3939. The Director is authorized to charge any deficiency in this fee, or to credit any overpayment therein, to Deposit Account No. 06-1205.

Applicants' undersigned attorney may be reached in our Costa Mesa, California office by telephone at (714) 540-8700. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,

/Michael K. O'Neill/  
Michael K. O'Neill  
Attorney for Applicants  
Registration No. 32,622

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01 FC : 2051 70.00 CR

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## TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	13/621,294
Filing Date	September 17, 2012
First Named Inventor	SUNIL K. RAO, ET AL.
Title	SYSTEM TO INTERFACE INTERNET PROTOCOL (IP) BASED WIRELESS DEVICES WITH OPTICAL AND OTHER NETWORKS FOR IMPROVED FLEXIBILITY, PERFORMANCE, AND DATA TRANSFER
Art Unit	2642
Examiner Name	
Attorney Docket Number	04245.001000.

SIGNATURE of Applicant or Patent Practitioner			
Signature	/Michael K. O'Neill/	Date (Optional)	December 17, 2013
Name	Michael K. O'Neill	Registration Number	32,622
Title (if Applicant is a juristic entity)			
Applicant Name (if Applicant is a juristic entity)			

**NOTE:** This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.

\*Total of 5 pages forms are submitted.

This collection of information is required by 37 CFR 1.131, 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.

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## POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

<b>Application Number</b>	<b>Filing Date</b>
13/621,294	September 17, 2012

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)

- I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above: 05514
- OR**
- I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

**Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above to:**

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- OR**
- The address associated with Customer Number: 05514
- OR**

Firm or Individual Name			
Address			
City	State	Zip	
Country			
Telephone	Email		

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

- Inventor or Joint Inventor (title not required below)
- Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)
- Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)
- Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

### SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature		Date (Optional)	
Name	Sunil K. Rao		
Title			

**NOTE:** Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

Total of \_\_\_\_\_ forms are submitted.

This collection of information is required by 37 CFR 1.131, 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.

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## POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

<b>Application Number</b>	<b>Filing Date</b>
13/621,294	September 17, 2012

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)

- I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above: 05514
- OR**
- I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

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- OR**
- The address associated with Customer Number: 05514
- OR**

Firm or Individual Name			
Address			
City	State	Zip	
Country			
Telephone	Email		

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

- Inventor or Joint Inventor (title not required below)
- Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)
- Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)
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**SIGNATURE of Applicant for Patent**

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature	Date (Optional)
Name	Sanjay K. Rao
Title	

**NOTE:** Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

Total of \_\_\_\_\_ forms are submitted.

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## POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

<b>Application Number</b>	<b>Filing Date</b>
13/621,294	September 17, 2012

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)

- I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above: 05514
- OR**
- I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

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- The address associated with Customer Number: 05514
- OR**

Firm or Individual Name			
Address			
City	State	Zip	
Country			
Telephone	Email		

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

- Inventor or Joint Inventor (title not required below)
- Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)
- Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)
- Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

### SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature	<i>Rekha K. Rao</i>	Date (Optional)	12/16/2013
Name	Rekha K. Rao		
Title	Legal Representative of Inventor Raman K. Rao		

**NOTE:** Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

Total of \_\_\_\_\_ forms are submitted.

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## POWER OF ATTORNEY BY APPLICANT

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<b>Application Number</b>	<b>Filing Date</b>
13/621,294	September 17, 2012

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)

- I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above: 05514
- OR**
- I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

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- OR**
- The address associated with Customer Number: 05514
- OR**

Firm or Individual Name			
Address			
City	State	Zip	
Country			
Telephone	Email		

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

- Inventor or Joint Inventor (title not required below)
- Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)
- Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)
- Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

**SIGNATURE of Applicant for Patent**

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature	<i>Rekha K. Rao</i>	Date (Optional)	12/16/2013
Name	Rekha K. Rao		
Title	CEO, IP Holdings, Inc. (Assignee)		

**NOTE:** Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

Total of \_\_\_\_\_ forms are submitted.

This collection of information is required by 37 CFR 1.131, 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

<b>EFS ID:</b>	17689131
<b>Application Number:</b>	13621294
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	5130
<b>Title of Invention:</b>	System to Interface Internet Protocol (IP) Based Wireless Devices with Optical and Other Networks for Improved Flexibility, Performance, and Data Transfer
<b>First Named Inventor/Applicant Name:</b>	Sunil K. Rao
<b>Customer Number:</b>	105481
<b>Filer:</b>	Michael K. O'Neill/Margaret Lee
<b>Filer Authorized By:</b>	Michael K. O'Neill
<b>Attorney Docket Number:</b>	HMTR3
<b>Receipt Date:</b>	17-DEC-2013
<b>Filing Date:</b>	17-SEP-2012
<b>Time Stamp:</b>	19:51:08
<b>Application Type:</b>	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	Power of Attorney	04245_001000_POA_12172013.pdf	828485 52a8ff5aeb274605c48f9343002258e263cde5b	no	5

### Warnings:

### Information:

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.

<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875	Application or Docket Number 13/621,294
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APPLICATION AS FILED - PART I			SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
	(Column 1)	(Column 2)					
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)		RATE(\$)	FEE(\$)
BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>	N/A	N/A	N/A	70		N/A	
SEARCH FEE <small>(37 CFR 1.16(k), (j), or (m))</small>	N/A	N/A	N/A	300		N/A	
EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>	N/A	N/A	N/A	360		N/A	
TOTAL CLAIMS <small>(37 CFR 1.16(i))</small>	1	minus 20 = *	x 40 =	0.00	OR		
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>	1	minus 3 = *	x 210 =	0.00			
APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small>	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 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).			0.00			
MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small>				0.00			
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	730		TOTAL	

APPLICATION AS AMENDED - PART II					SMALL ENTITY		OR	OTHER THAN SMALL ENTITY		
	(Column 1)	(Column 2)	(Column 3)							
AMENDMENT A		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)	
	Total <small>(37 CFR 1.16(i))</small>	*	Minus	**	=	x	=	OR	x	=
	Independent <small>(37 CFR 1.16(h))</small>	*	Minus	***	=	x	=	OR	x	=
	Application Size Fee <small>(37 CFR 1.16(s))</small>							OR		
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE		
AMENDMENT B		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)	
	Total <small>(37 CFR 1.16(i))</small>	*	Minus	**	=	x	=	OR	x	=
	Independent <small>(37 CFR 1.16(h))</small>	*	Minus	***	=	x	=	OR	x	=
	Application Size Fee <small>(37 CFR 1.16(s))</small>							OR		
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE		
<p>* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.</p> <p>** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".</p> <p>*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".</p> <p>The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.</p>										



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
13/621,294	09/17/2012	Sunil K. Rao	HMTR3

**CONFIRMATION NO. 5130**

**WITHDRAWAL NOTICE**

105481  
Rekha Rao  
3087 Alexis Drive  
Palo Alto, CA 94304



Date Mailed: 06/20/2013

**Letter Regarding a New Notice and/or the Status of the Application**

If a new notice or Filing Receipt is enclosed, applicant may disregard the previous notice mailed on 10/09/2012. The time period for reply runs from the mail date of the new notice. Within the time period for reply, applicant is required to file a reply in compliance with the requirements set forth in the new notice to avoid abandonment of the application.

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web.  
<https://portal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html>

For more information about EFS-Web please call the USPTO Electronic Business Center at **1-866-217-9197** or visit our website at <http://www.uspto.gov/ebc>.

If the reply is not filed electronically via EFS-Web, the reply must be accompanied by a copy of the new notice.

If the Office previously granted a petition to withdraw the holding of abandonment or a petition to revive under 37 CFR 1.137, the status of the application has been returned to pending status.

/zmoguss/

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

Table with 4 columns: APPLICATION NUMBER (13/621,294), FILING OR 371(C) DATE (09/17/2012), FIRST NAMED APPLICANT (Sunil K. Rao), ATTY. DOCKET NO./TITLE (HMTR3)

105481
Rekha Rao
3087 Alexis Drive
Palo Alto, CA 94304

CONFIRMATION NO. 5130
FORMALITIES LETTER



Date Mailed: 06/20/2013

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Filing Date Granted

An application number and filing date have been accorded to this application. The application is informal since it does not comply with the regulations for the reason(s) indicated below. Applicant is given TWO MONTHS from the date of this Notice within which to correct the informalities indicated below. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

The required item(s) identified below must be timely submitted to avoid abandonment:

- A substitute specification in compliance with 37 CFR 1.52, 1.121(b)(3), and 1.125, is required. The substitute specification must be submitted with markings and be accompanied by a clean version (without markings) as set forth in 37 CFR 1.125(c) and a statement that the substitute specification contains no new matter (see 37 CFR 1.125(b)). The specification, claims, and/or abstract page(s) submitted is not acceptable and cannot be scanned or properly stored because:
- The application contains drawings, but the specification does not contain a brief description of the several views of the drawings as required by 37 CFR 1.74 and 37 CFR 1.77(b)(7).
- Replacement drawings in compliance with 37 CFR 1.84 and 37 CFR 1.121(d) are required. The drawings submitted are not acceptable because:
- More than one figure is present and each figure is not labeled "Fig." with a consecutive Arabic numeral (1, 2, etc.) or an Arabic numeral and capital letter in the English alphabet (A, B, etc.)(see 37 CFR 1.84(u)(1)). See Figure(s) 1. A brief description of the several views of the drawings (see 37 CFR 1.74) should be added or amended to correspond to the corrected numbering of the figures. See also 37 CFR 1.77(b)(7).

Applicant is cautioned that correction of the above items may cause the specification and drawings page count to exceed 100 pages. If the specification and drawings exceed 100 pages, applicant will need to submit the required application size fee.

Items Required To Avoid Processing Delays:

Applicant is notified that the above-identified application contains the deficiencies noted below. No period for reply is set forth in this notice for correction of these deficiencies. However, if a deficiency relates to the inventor's oath or declaration, the applicant must file an oath or declaration in compliance with 37 CFR 1.63, or a substitute statement in compliance with 37 CFR 1.64, executed by or with respect to each actual inventor no later than the expiration of the time period set in the "Notice of Allowability" to avoid abandonment. See 37 CFR 1.53(f).

A new inventor's oath or declaration that identifies this application (e.g., by Application Number and filing date) is required. The inventor's oath or declaration does not comply with 37 CFR 1.63 in that it:

- does not state that the above-identified application was made or authorized to be made by the person executing the oath or declaration.

Sunil K. Rao  
Sanjay K. Rao

Replies must be received in the USPTO within the set time period or must include a proper Certificate of Mailing or Transmission under 37 CFR 1.8 with a mailing or transmission date within the set time period. For more information and a suggested format, see Form PTO/SB/92 and MPEP 512.

Replies should be mailed to:

Mail Stop Missing Parts  
Commissioner for Patents  
P.O. Box 1450  
Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web.  
<https://portal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html>

For more information about EFS-Web please call the USPTO Electronic Business Center at **1-866-217-9197** or visit our website at <http://www.uspto.gov/ebc>.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

*/zmoguss/*

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



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UNITED STATES DEPARTMENT OF COMMERCE
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Alexandria, Virginia 22313-1450
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Table with 7 columns: APPLICATION NUMBER, FILING or 371(c) DATE, GRP ART UNIT, FIL FEE REC'D, ATTY. DOCKET NO, TOT CLAIMS, IND CLAIMS. Row 1: 13/621,294, 09/17/2012, 2642, 600, HMTR3, 1, 1

CONFIRMATION NO. 5130

FILING RECEIPT

105481
Rekha Rao
3087 Alexis Drive
Palo Alto, CA 94304



Date Mailed: 06/20/2013

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections

Inventor(s)

Sunil K. Rao, Palo Alto, CA;
Sanjay K. Rao, Palo Alto, CA;
Raman K. Rao, Palo Alto, CA;

Applicant(s)

Sunil K. Rao, Palo Alto, CA;
Sanjay K. Rao, Palo Alto, CA;
Raman K. Rao, Palo Alto, CA;

Assignment For Published Patent Application

IP HOLDINGS, INC., Palo Alto, CA

Power of Attorney: The patent practitioners associated with Customer Number 105481

Domestic Priority data as claimed by applicant

This application is a CON of 12/912,607 10/26/2010
which is a CON of 10/940,428 09/13/2004 PAT 7848300
which is a CON of 09/617,608 07/17/2000 PAT 7286502
which is a CIP of 09/281,739 06/04/1999 PAT 6169789
which is a CIP of 08/764,903 12/16/1996 ABN

Foreign Applications for which priority is claimed (You may be eligible to benefit from the Patent Prosecution Highway program at the USPTO. Please see http://www.uspto.gov for more information.) - None.

Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

If Required, Foreign Filing License Granted: 10/03/2012

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 13/621,294**

**Projected Publication Date:** Request for Non-Publication Acknowledged

**Non-Publication Request:** Yes

**Early Publication Request:** No

**\*\* SMALL ENTITY \*\***

**Title**

System to Interface Internet Protocol (IP) Based Wireless Devices with Optical and Other Networks for Improved Flexibility, Performance, and Data Transfer

**Preliminary Class**

455

**Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications:**

### **PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES**

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

**LICENSE FOR FOREIGN FILING UNDER**  
**Title 35, United States Code, Section 184**  
**Title 37, Code of Federal Regulations, 5.11 & 5.15**

**GRANTED**

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

**NOT GRANTED**

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

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The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit <http://www.SelectUSA.gov> or call +1-202-482-6800.

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**SUBSTITUTE STATEMENT IN LIEU OF AN OATH OR DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (35 U.S.C. 115(d) AND 37 CFR 1.64)**

<b>Title of Invention</b>	System to Interface Internet Protocol (IP) Based Wireless Devices with Optical and Other Networks for Improved Flexibility, Performance, and Data Transfer		
This statement is directed to:			
<input type="checkbox"/> The attached application,			
OR			
<input checked="" type="checkbox"/> United States application or PCT international application number <u>13/621,294</u> filed on <u>9/17/2012</u> .			
<b>LEGAL NAME of inventor to whom this substitute statement applies:</b>			
(E.g., Given Name (first and middle (if any)) and Family Name or Surname)			
Raman K. Rao			
Residence (except for a deceased or legally incapacitated inventor):			
City	State	Country	
Palo Alto	CA	USA	
Mailing Address (except for a deceased or legally incapacitated inventor):			
City	State	Zip	Country
I believe the above-named inventor or joint inventor to be the original inventor or an original joint inventor of a claimed invention in the application.			
The above-identified application was made or authorized to be made by me.			
I hereby acknowledge that any willful false statement made in this statement is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.			
Relationship to the inventor to whom this substitute statement applies:			
<input checked="" type="checkbox"/> Legal Representative (for deceased or legally incapacitated inventor only),			
<input checked="" type="checkbox"/> Assignee,			
<input type="checkbox"/> Person to whom the inventor is under an obligation to assign,			
<input type="checkbox"/> Person who otherwise shows a sufficient proprietary interest in the matter (petition under 37 CFR 1.46 is required), or			
<input type="checkbox"/> Joint Inventor.			

[Page 1 of 2]

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. 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 1 minute 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.

## SUBSTITUTE STATEMENT

Circumstances permitting execution of this substitute statement:

- Inventor is deceased,  
 Inventor is under legal incapacity,  
 Inventor cannot be found or reached after diligent effort, or  
 Inventor has refused to execute the oath or declaration under 37 CFR 1.63.

If there are joint inventors, please check the appropriate box below:

- An application data sheet under 37 CFR 1.76 (PTO/AIA/14 or equivalent) naming the entire inventive entity has been or is currently submitted.

OR

- An application data sheet under 37 CFR 1.76 (PTO/AIA/14 or equivalent) has not been submitted. Thus, a Substitute Statement Supplemental Sheet (PTO/AIA/11 or equivalent) naming the entire inventive entity and providing inventor information is attached. See 37 CFR 1.64(b).

### 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.

### PERSON EXECUTING THIS SUBSTITUTE STATEMENT:

Name: <b>Rekha K. Rao</b>	Date (Optional):
---------------------------	------------------

Signature: **/Rekha K. Rao/**

Residence (unless provided in an application data sheet, PTO/AIA/14 or equivalent):

City <b>Palo Alto</b>	State <b>CA</b>	Country <b>USA</b>
-----------------------	-----------------	--------------------

Mailing Address (unless provided in an application data sheet, PTO/AIA/14 or equivalent)

**3087 Alexis Drive**

City <b>Palo Alto</b>	State <b>CA</b>	Zip <b>94304</b>	Country <b>US</b>
-----------------------	-----------------	------------------	-------------------

Note: Use an additional PTO/AIA/02 form for each inventor who is deceased, legally incapacitated, cannot be found or reached after diligent effort, or has refused to execute the oath or declaration under 37 CFR 1.63.

## 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 Patent Application Fee Transmittal

<b>Application Number:</b>	13621294			
<b>Filing Date:</b>	17-Sep-2012			
<b>Title of Invention:</b>	System to Interface Internet Protocol (IP) Based Wireless Devices with Optical and Other Networks for Improved Flexibility, Performance, and Data Transfer			
<b>First Named Inventor/Applicant Name:</b>	Sunil K. Rao			
<b>Filer:</b>	Rekha Kaliputnam Rao			
<b>Attorney Docket Number:</b>	HMTR3			
Filed as Small Entity				
<b>Utility under 35 USC 111(a) Filing Fees</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
Late Filing Fee for Oath or Declaration	2051	1	70	70
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
<b>Extension-of-Time:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension - 4 months with \$0 paid	2254	1	1100	1100
<b>Miscellaneous:</b>				
<b>Total in USD (\$)</b>				<b>1170</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	15476499
<b>Application Number:</b>	13621294
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	5130
<b>Title of Invention:</b>	System to Interface Internet Protocol (IP) Based Wireless Devices with Optical and Other Networks for Improved Flexibility, Performance, and Data Transfer
<b>First Named Inventor/Applicant Name:</b>	Sunil K. Rao
<b>Customer Number:</b>	105481
<b>Filer:</b>	Rekha Kaliputnam Rao
<b>Filer Authorized By:</b>	
<b>Attorney Docket Number:</b>	HMTR3
<b>Receipt Date:</b>	09-APR-2013
<b>Filing Date:</b>	17-SEP-2012
<b>Time Stamp:</b>	23:54:00
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$1170
RAM confirmation Number	6675
Deposit Account	
Authorized User	

### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
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1	Miscellaneous Incoming Letter	HMTR03_response.pdf	454976	no	2
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<b>Warnings:</b>					
<b>Information:</b>					
2	Extension of Time	sb0022_extensionofTime.pdf	186389	no	2
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<b>Warnings:</b>					
<b>Information:</b>					
3	Drawings-only black and white line drawings	REPLACEMENT_DRAWINGS.pdf	572030	no	15
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<b>Warnings:</b>					
<b>Information:</b>					
4	Oath or Declaration filed	aia0002_substitute_statement.pdf	219952	no	3
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<b>Warnings:</b>					
<b>Information:</b>					
5	Fee Worksheet (SB06)	fee-info.pdf	32368	no	2
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<b>Warnings:</b>					
<b>Information:</b>					
<b>Total Files Size (in bytes):</b>			1465715		
<p><b>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.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b>  <b>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.</b></p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b>  <b>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.</b></p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b>  <b>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.</b></p>					

I hereby certify that this correspondence is being electronically transmitted to the USPTO on the date shown below.

Date: 4/9/2013

Signature: \_\_\_\_\_ /Rekha K. Rao/ \_\_\_\_\_ (Rekha K. Rao)

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Application No.: 13/621,294  
Confirmation No.: 9836  
Filing Date: September 17, 2012  
Inventor(s): Sunil K. Rao  
Title: System to Interface Internet Protocol (IP) Based Wireless Devices with Optical and Other Networks for Improved Flexibility, Performance, and Data Transfer  
Examiner: Not Yet Assigned  
Group Art Unit: 2642

---

**RESPONSE TO NOTICE TO FILE CORRECTED APPLICATION PAPERS**

Mail Stop AF/RCE\*  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Examiner:

This is in response to the Notice to File Corrected Application Papers dated October 9, 2012, for which a response was due on December 9, 2012. Filed herewith is a Petition and fee for a 4-month extension of time, thereby extending the deadline for response to April 9, 2013. Accordingly, this response is timely filed. Reconsideration and allowance of the pending claims, in light of the Remarks presented herein are respectfully requested.

**Remarks** begin on page 2 of this paper.



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.

<b>PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)</b>		Docket Number (Optional) HMTR3																																				
Application Number <b>13/621,294</b>	Filed <b>September 17, 2012</b>																																					
For <b>System to Interface Internet Protocol (IP) Based Wireless ...</b>																																						
Art Unit <b>2642</b>	Examiner <b>Not Yet Assigned</b>																																					
<p>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.</p> <p>The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;"></th> <th style="text-align: center;"><u>Fee</u></th> <th style="text-align: center;"><u>Small Entity Fee</u></th> <th style="text-align: center;"><u>Micro Entity Fee</u></th> <th style="width: 10%;"></th> <th style="width: 10%;"></th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/> One month (37 CFR 1.17(a)(1))</td> <td style="text-align: center;">\$200</td> <td style="text-align: center;">\$100</td> <td style="text-align: center;">\$50</td> <td style="text-align: center;">\$</td> <td style="border-bottom: 1px solid black;"></td> </tr> <tr> <td><input type="checkbox"/> Two months (37 CFR 1.17(a)(2))</td> <td style="text-align: center;">\$600</td> <td style="text-align: center;">\$300</td> <td style="text-align: center;">\$150</td> <td style="text-align: center;">\$</td> <td style="border-bottom: 1px solid black;"></td> </tr> <tr> <td><input type="checkbox"/> Three months (37 CFR 1.17(a)(3))</td> <td style="text-align: center;">\$1,400</td> <td style="text-align: center;">\$700</td> <td style="text-align: center;">\$350</td> <td style="text-align: center;">\$</td> <td style="border-bottom: 1px solid black;"></td> </tr> <tr> <td><input checked="" type="checkbox"/> Four months (37 CFR 1.17(a)(4))</td> <td style="text-align: center;">\$2,200</td> <td style="text-align: center;">\$1,100</td> <td style="text-align: center;">\$550</td> <td style="text-align: center;">\$</td> <td style="text-align: center;"><b>1,100</b></td> </tr> <tr> <td><input type="checkbox"/> Five months (37 CFR 1.17(a)(5))</td> <td style="text-align: center;">\$3,000</td> <td style="text-align: center;">\$1,500</td> <td style="text-align: center;">\$750</td> <td style="text-align: center;">\$</td> <td style="border-bottom: 1px solid black;"></td> </tr> </tbody> </table> <p><input checked="" type="checkbox"/> Applicant asserts small entity status. See 37 CFR 1.27.</p> <p><input type="checkbox"/> Applicant certifies micro entity status. See 37 CFR 1.29. Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.</p> <p><input type="checkbox"/> A check in the amount of the fee is enclosed.</p> <p><input type="checkbox"/> Payment by credit card. Form PTO-2038 is attached.</p> <p><input type="checkbox"/> The Director has already been authorized to charge fees in this application to a Deposit Account.</p> <p><input type="checkbox"/> The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number _____.</p> <p><input checked="" type="checkbox"/> Payment made via EFS-Web.</p> <p><b>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.</b></p> <p>I am the</p> <p><input checked="" type="checkbox"/> applicant/inventor.</p> <p><input checked="" type="checkbox"/> assignee of record of the entire interest. See 37 CFR 3.71. 37 CFR 3.73(b) statement is enclosed (Form PTO/SB/96).</p> <p><input type="checkbox"/> attorney or agent of record. Registration number _____.</p> <p><input type="checkbox"/> attorney or agent acting under 37 CFR 1.34. Registration number _____.</p> <p><b>/Rekha K. Rao/</b> _____ <b>April 9 2013</b> _____ Signature Date</p> <p><b>Rekha K. Rao</b> _____ Typed or printed name Telephone Number</p> <p><b>NOTE:</b> This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.</p> <p><input checked="" type="checkbox"/> * Total of <u>1</u> forms are submitted.</p>				<u>Fee</u>	<u>Small Entity Fee</u>	<u>Micro Entity Fee</u>			<input type="checkbox"/> One month (37 CFR 1.17(a)(1))	\$200	\$100	\$50	\$		<input type="checkbox"/> Two months (37 CFR 1.17(a)(2))	\$600	\$300	\$150	\$		<input type="checkbox"/> Three months (37 CFR 1.17(a)(3))	\$1,400	\$700	\$350	\$		<input checked="" type="checkbox"/> Four months (37 CFR 1.17(a)(4))	\$2,200	\$1,100	\$550	\$	<b>1,100</b>	<input type="checkbox"/> Five months (37 CFR 1.17(a)(5))	\$3,000	\$1,500	\$750	\$	
	<u>Fee</u>	<u>Small Entity Fee</u>	<u>Micro Entity Fee</u>																																			
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<input type="checkbox"/> Five months (37 CFR 1.17(a)(5))	\$3,000	\$1,500	\$750	\$																																		

This collection of information is required by 37 CFR 1.136(a). 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 6 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.



REPLACEMENT SHEET

Title: System to Interface Internet Protocol (IP) Based Wireless Devices with Optical and Other Networks for Improved Flexibility, Performance, and Data Transfer

Applicants: Sunil K. Rao et al

Application No: 13/621,294

Docket No: HMTR3 Filing Date: September 17, 2012

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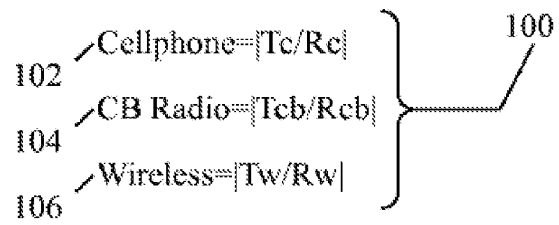


FIG. 1A

REPLACEMENT SHEET

Title: System to Interface Internet Protocol (IP) Based Wireless Devices with Optical and Other Networks for Improved Flexibility, Performance, and Data Transfer

Applicants: Sunil K. Rao et al

Application No: 13/621,294

Docket No: HMTR3 Filing Date: September 17, 2012

2/15

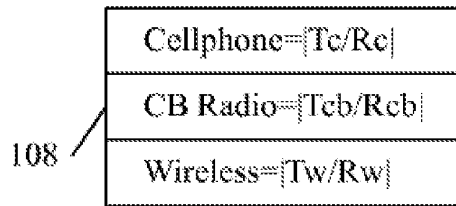


FIG. 1B

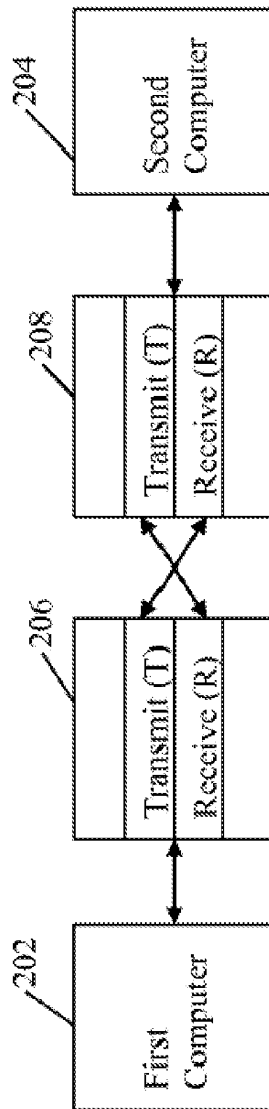


FIG. 2



REPLACEMENT SHEET

Title: System to Interface Internet Protocol (IP) Based Wireless Devices with Optical and Other Networks for Improved Flexibility, Performance, and Data Transfer

Applicants: Sunil K. Rao et al

Application No: 13/621,294

Docket No: HMTR3 Filing Date: September 17, 2012

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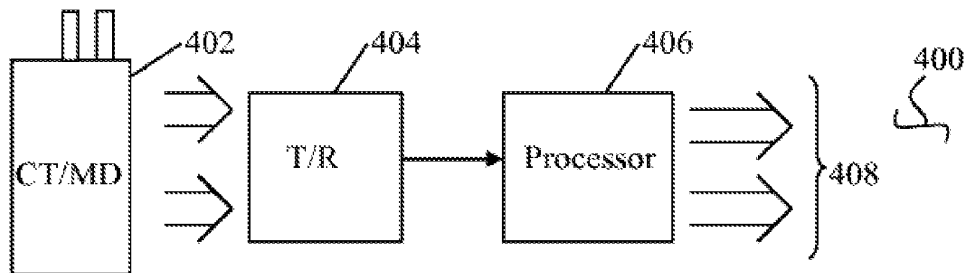


FIG. 4

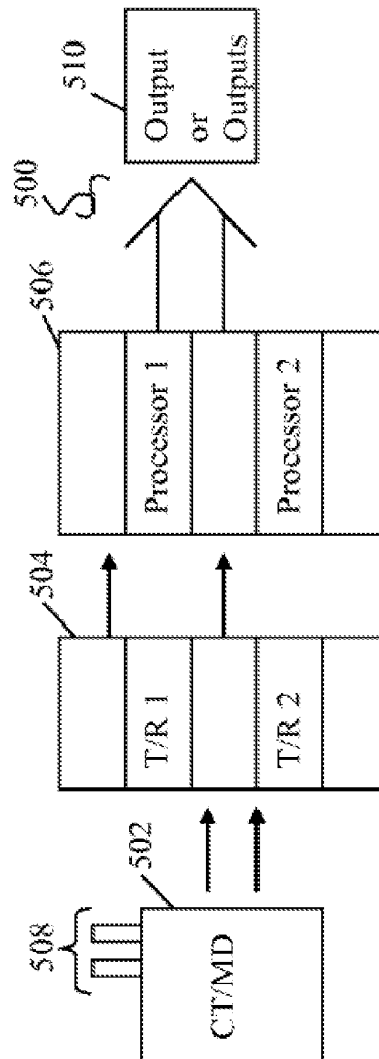


FIG. 5A

REPLACEMENT SHEET

Title: System to Interface Internet Protocol (IP) Based Wireless Devices with Optical and Other Networks for Improved Flexibility, Performance, and Data Transfer

Applicants: Sunil K. Rao et al

Application No: 13/621,294

Docket No: HMTR3 Filing Date: September 17, 2012

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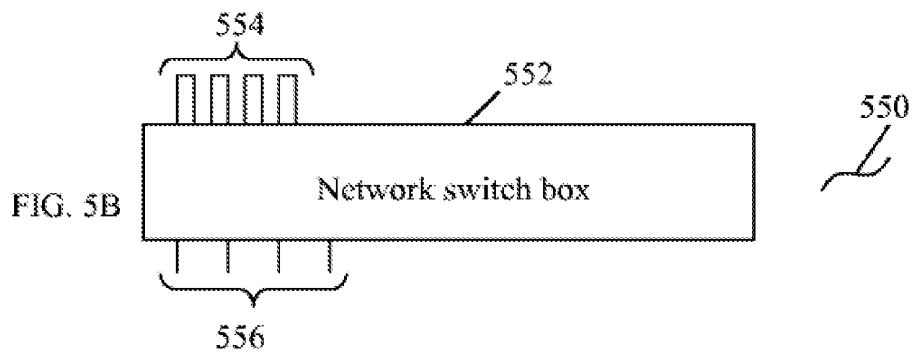
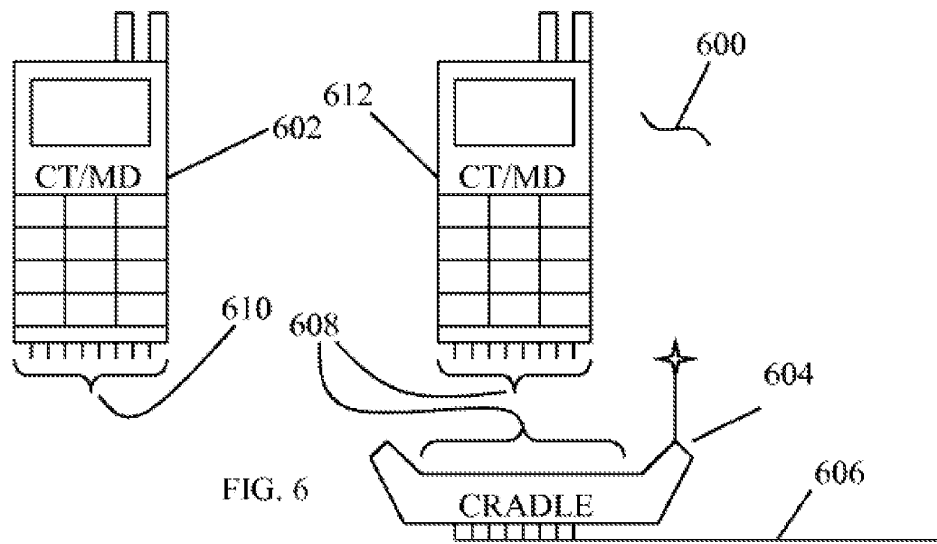


FIG. 5B





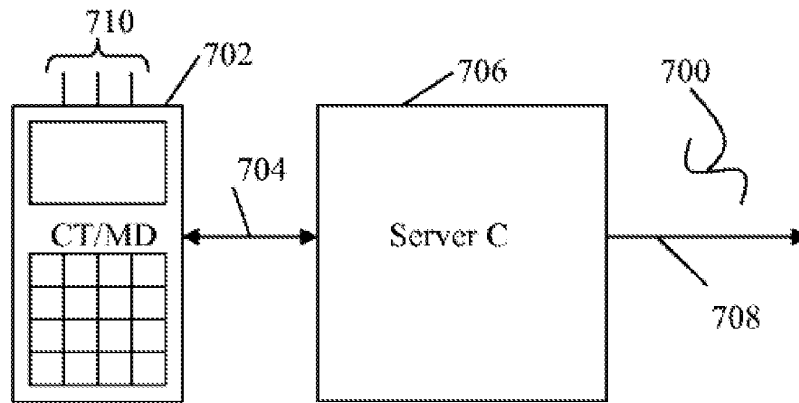


FIG. 7

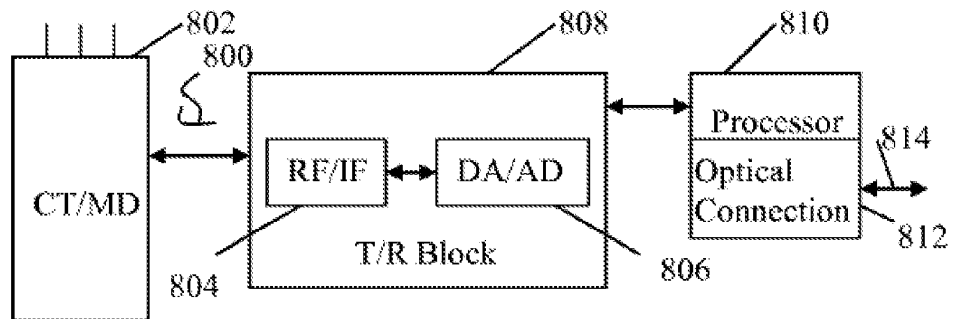


FIG. 8

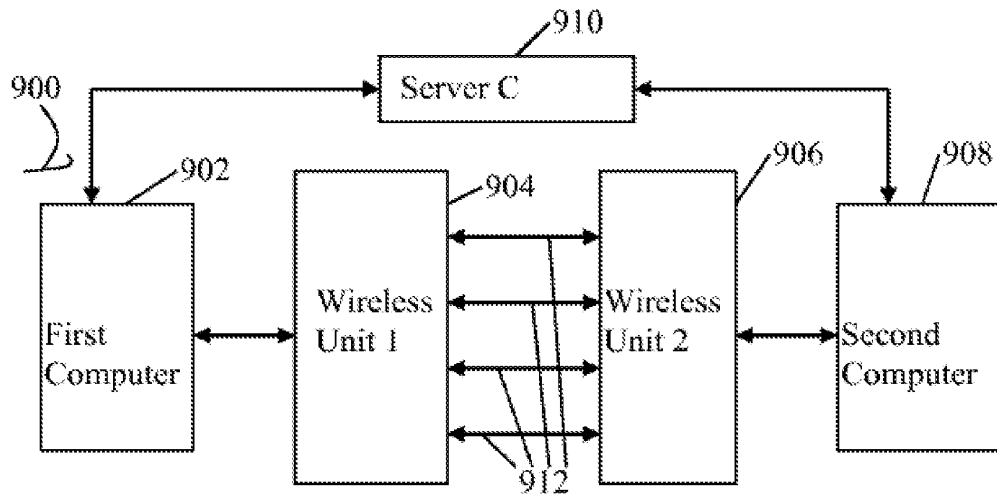
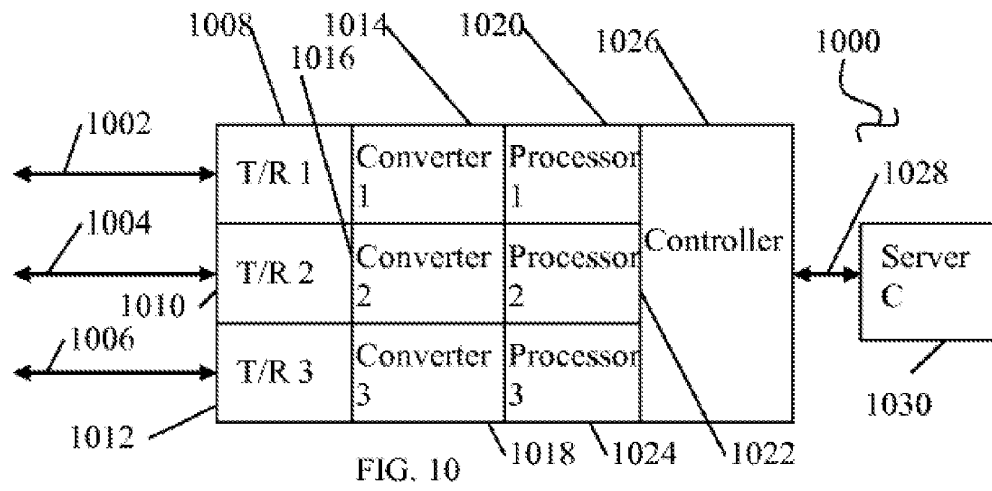
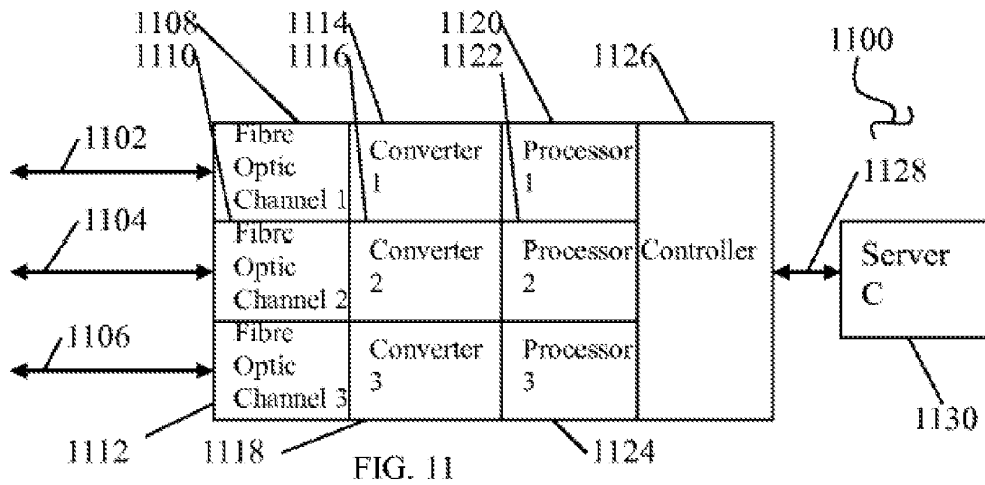


FIG. 9





REPLACEMENT SHEET

Title: System to Interface Internet Protocol (IP) Based Wireless Devices with Optical and Other Networks for Improved Flexibility, Performance, and Data Transfer

Applicants: Sunil K. Rao et al

Application No: 13/621,294

Docket No: HMTR3 Filing Date: September 17, 2012

14/15

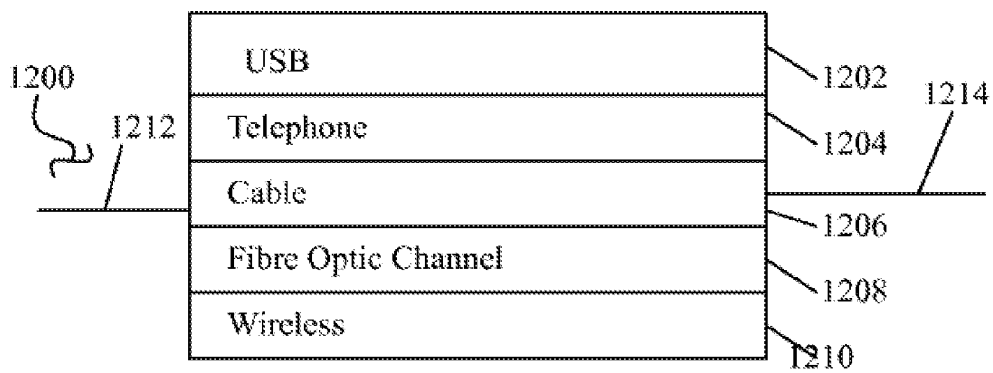


FIG. 12

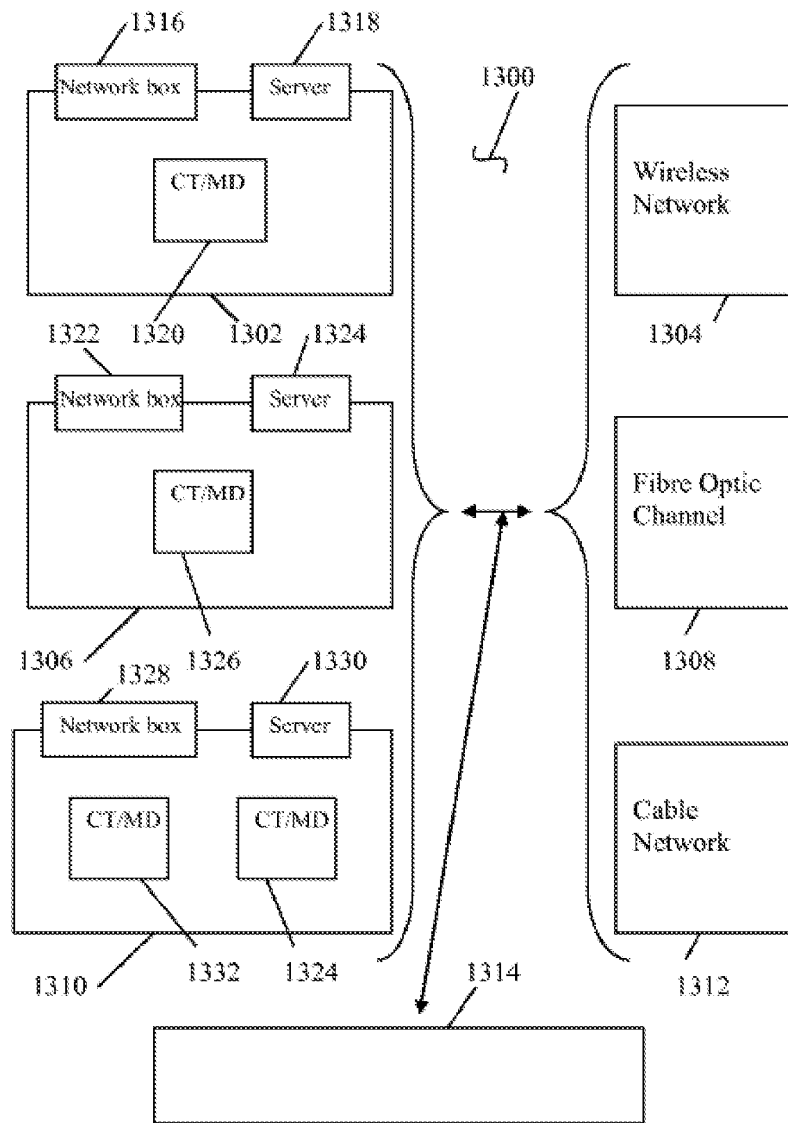


FIG. 13

Document code: WFEE

United States Patent and Trademark Office  
Sales Receipt for Accounting Date: 12/24/2013

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Seq No: 6675 Sales Acctg Dt: 04/10/2013 13621294  
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Table with 7 columns: APPLICATION NUMBER, FILING or 371(c) DATE, GRP ART UNIT, FIL FEE REC'D, ATTY. DOCKET NO, TOT CLAIMS, IND CLAIMS. Row 1: 13/621,294, 09/17/2012, 2617, 530, HMTR3, 1, 1

CONFIRMATION NO. 5130

FILING RECEIPT

105481
Rekha Rao
3087 Alexis Drive
Palo Alto, CA 94304



Date Mailed: 10/09/2012

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections

Inventor(s)

Sunil K. Rao, Palo Alto, CA;
Sanjay K. Rao, Palo Alto, CA;
Raman K. Rao, Palo Alto, CA;

Applicant(s)

Sunil K. Rao, Palo Alto, CA;
Sanjay K. Rao, Palo Alto, CA;
Raman K. Rao, Palo Alto, CA;

Assignment For Published Patent Application

IP HOLDINGS, INC., Palo Alto, CA

Power of Attorney: The patent practitioners associated with Customer Number 105481

Domestic Priority data as claimed by applicant

This application is a CON of 12/912,607 10/26/2010
which is a CON of 10/940,428 09/13/2004 PAT 7848300
which is a CON of 09/617,608 07/17/2000 PAT 7286502
which is a CIP of 09/281,739 06/04/1999 PAT 6169789
which is a CIP of 08/764,903 12/16/1996 ABN

Foreign Applications (You may be eligible to benefit from the Patent Prosecution Highway program at the USPTO. Please see http://www.uspto.gov for more information.)

If Required, Foreign Filing License Granted: 10/03/2012

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is US 13/621,294

**Projected Publication Date:** Request for Non-Publication Acknowledged

**Non-Publication Request:** Yes

**Early Publication Request:** No

**\*\* SMALL ENTITY \*\***

**Title**

System to Interface Internet Protocol (IP) Based Wireless Devices with Optical and Other Networks for Improved Flexibility, Performance, and Data Transfer

**Preliminary Class**

455

## **PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES**

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

**LICENSE FOR FOREIGN FILING UNDER**  
**Title 35, United States Code, Section 184**  
**Title 37, Code of Federal Regulations, 5.11 & 5.15**

**GRANTED**

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

**NOT GRANTED**

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

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<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875	Application or Docket Number 13/621,294
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APPLICATION AS FILED - PART I			SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
	(Column 1)	(Column 2)					
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)		RATE(\$)	FEE(\$)
BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>	N/A	N/A	N/A	98		N/A	
SEARCH FEE <small>(37 CFR 1.16(k), (l), or (m))</small>	N/A	N/A	N/A	310		N/A	
EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>	N/A	N/A	N/A	125		N/A	
TOTAL CLAIMS <small>(37 CFR 1.16(i))</small>	1	minus 20 = *	x 31 =	0.00	OR		
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>	1	minus 3 = *	x 125 =	0.00			
APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small>	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 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).			0.00			
MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small>				0.00			
			TOTAL	533		TOTAL	

\* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED - PART II					SMALL ENTITY		OR	OTHER THAN SMALL ENTITY		
	(Column 1)	(Column 2)	(Column 3)							
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)	
	Total <small>(37 CFR 1.16(i))</small>	*	Minus	**	=	x	=	OR	x	=
	Independent <small>(37 CFR 1.16(h))</small>	*	Minus	***	=	x	=	OR	x	=
	Application Size Fee <small>(37 CFR 1.16(s))</small>							OR		
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE		
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)	
	Total <small>(37 CFR 1.16(i))</small>	*	Minus	**	=	x	=	OR	x	=
	Independent <small>(37 CFR 1.16(h))</small>	*	Minus	***	=	x	=	OR	x	=
	Application Size Fee <small>(37 CFR 1.16(s))</small>							OR		
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L 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 found in the appropriate box in column 1.



UNITED STATES PATENT AND TRADEMARK OFFICE

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

Table with 4 columns: APPLICATION NUMBER (13/621,294), FILING OR 371(C) DATE (09/17/2012), FIRST NAMED APPLICANT (Sunil K. Rao), ATTY. DOCKET NO./TITLE (HMTR3)

CONFIRMATION NO. 5130

FORMALITIES LETTER

105481
Rekha Rao
3087 Alexis Drive
Palo Alto, CA 94304



Date Mailed: 10/09/2012

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Filing Date Granted

An application number and filing date have been accorded to this application. The application is informal since it does not comply with the regulations for the reason(s) indicated below. Applicant is given TWO MONTHS from the date of this Notice within which to correct the informalities indicated below. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

The required item(s) identified below must be timely submitted to avoid abandonment:

- A substitute specification in compliance with 37 CFR 1.52, 1.121(b)(3), and 1.125, is required. The substitute specification must be submitted with markings and be accompanied by a clean version (without markings) as set forth in 37 CFR 1.125(c) and a statement that the substitute specification contains no new matter (see 37 CFR 1.125(b)). The specification, claims, and/or abstract page(s) submitted is not acceptable and cannot be scanned or properly stored because:
- The application contains drawings, but the specification does not contain a brief description of the several views of the drawings as required by 37 CFR 1.74 and 37 CFR 1.77(b)(7).
- Replacement drawings in compliance with 37 CFR 1.84 and 37 CFR 1.121(d) are required. The drawings submitted are not acceptable because:
- More than one figure is present and each figure is not labeled "Fig." with a consecutive Arabic numeral (1, 2, etc.) or an Arabic numeral and capital letter in the English alphabet (A, B, etc.)(see 37 CFR 1.84(u)(1)). See Figure(s) 1. A brief description of the several views of the drawings (see 37 CFR 1.74) should be added or amended to correspond to the corrected numbering of the figures. See also 37 CFR 1.77(b)(7).

Applicant is cautioned that correction of the above items may cause the specification and drawings page count to exceed 100 pages. If the specification and drawings exceed 100 pages, applicant will need to submit the required application size fee.

Items Required To Avoid Processing Delays:

Applicant is notified that the above-identified application contains the deficiencies noted below. No period for reply is set forth in this notice for correction of these deficiencies. However, if a deficiency relates to the inventor's oath or declaration, the applicant must file an oath or declaration in compliance with 37 CFR 1.63, or a substitute statement in compliance with 37 CFR 1.64, executed by or with respect to each actual inventor no later than the expiration of the time period set in the "Notice of Allowability" to avoid abandonment. See 37 CFR 1.53(f).

A new inventor's oath or declaration that identifies this application (e.g., by Application Number and filing date) is required. The inventor's oath or declaration does not comply with 37 CFR 1.63 in that it:

- does not state that the above-identified application was made or authorized to be made by the person executing the oath or declaration.
- does not include an acknowledgement that any willful false statement made in such declaration or statement is punishable under section 1001 of title 18 by fine or imprisonment of not more than five (5) years, or both.

Replies should be mailed to:

Mail Stop Missing Parts  
Commissioner for Patents  
P.O. Box 1450  
Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web.

<https://portal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html>

For more information about EFS-Web please call the USPTO Electronic Business Center at **1-866-217-9197** or visit our website at <http://www.uspto.gov/ebc>.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

/atesfaye/

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

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.

<b>UTILITY PATENT APPLICATION TRANSMITTAL</b>  <i>(Only for new nonprovisional applications under 37 CFR 1.53(b))</i>	Attorney Docket No.	HMTR3
	First Inventor	Sunil Rao
	Title	A System to Interface Internet Pr..
	Express Mail Label No.	NA

<b>APPLICATION ELEMENTS</b> <i>See MPEP chapter 600 concerning utility patent application contents.</i>	<b>ADDRESS TO:</b> <b>Commissioner for Patents</b> <b>P.O. Box 1450</b> <b>Alexandria VA 22313-1450</b>
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<p>1. <input type="checkbox"/> <b>Fee Transmittal Form</b> (e.g., PTO/SB/17)</p> <p>2. <input checked="" type="checkbox"/> <b>Applicant claims small entity status.</b> See 37 CFR 1.27.</p> <p>3. <input checked="" type="checkbox"/> <b>Specification</b> [Total Pages <u>26</u>] Both the claims and abstract must start on a new page (For information on the preferred arrangement, see MPEP 608.01(a))</p> <p>4. <input checked="" type="checkbox"/> <b>Drawing(s)</b> (35 U.S.C. 113) [Total Sheets <u>5</u>]</p> <p>5. <b>Oath or Declaration</b> [Total Sheets _____]  a. <input type="checkbox"/> Newly executed (original or copy)  b. <input checked="" type="checkbox"/> A copy from a prior application (37 CFR 1.63(d))  <i>(for continuation/divisional with Box 18 completed)</i>  i. <input type="checkbox"/> <b>DELETION OF INVENTOR(S)</b>  Signed statement attached deleting inventor(s)  name in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).</p> <p>6. <input checked="" type="checkbox"/> <b>Application Data Sheet.</b> See 37 CFR 1.76</p> <p>7. <input type="checkbox"/> <b>CD-ROM or CD-R</b> in duplicate, large table or Computer Program (Appendix)  <input type="checkbox"/> Landscape Table on CD</p> <p>8. <b>Nucleotide and/or Amino Acid Sequence Submission</b>  <i>(if applicable, items a. – c. are required)</i>  a. <input type="checkbox"/> Computer Readable Form (CRF)  b. <input type="checkbox"/> Specification Sequence Listing on:  i. <input type="checkbox"/> CD-ROM or CD-R (2 copies); or  ii. <input type="checkbox"/> Paper  c. <input type="checkbox"/> Statements verifying identity of above copies</p>	<p style="text-align: center;"><b>ACCOMPANYING APPLICATION PARTS</b></p> <p>9. <input type="checkbox"/> <b>Assignment Papers</b> (cover sheet &amp; document(s))  Name of Assignee _____</p> <p>10. <input checked="" type="checkbox"/> <b>37 CFR 3.73(b) Statement</b> <input type="checkbox"/> <b>Power of Attorney</b>  <i>(when there is an assignee)</i></p> <p>11. <input type="checkbox"/> <b>English Translation Document</b> <i>(if applicable)</i></p> <p>12. <input type="checkbox"/> <b>Information Disclosure Statement</b> (PTO/SB/08 or PTO-1449)  <input type="checkbox"/> Copies of citations attached</p> <p>13. <input type="checkbox"/> <b>Preliminary Amendment</b></p> <p>14. <input type="checkbox"/> <b>Return Receipt Postcard</b> (MPEP 503)  <i>(Should be specifically itemized)</i></p> <p>15. <input type="checkbox"/> <b>Certified Copy of Priority Document(s)</b>  <i>(if foreign priority is claimed)</i></p> <p>16. <input checked="" type="checkbox"/> <b>Nonpublication Request</b> under 35 U.S.C. 122(b)(2)(B)(i).  Applicant must attach form PTO/SB/35 or equivalent.</p> <p>17. <input type="checkbox"/> Other: _____</p>
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18. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in the first sentence of the specification following the title, or in an Application Data Sheet under 37 CFR 1.76:

Continuation       Divisional       Continuation-in-part (CIP)      of prior application No.: .....

Prior application information:      Examiner Phirin Sam      Art Unit: 2476

### 19. CORRESPONDENCE ADDRESS

The address associated with Customer Number: 105481      OR       Correspondence address below

Name				
Address				
City	State	Zip Code		
Country	Telephone	Email		

Signature	/Rekha K. Rao/	Date	9/17/2012
Name (Print/Type)	Rekha K. Rao	Registration No. (Attorney/Agent)	

This collection of information is required by 37 CFR 1.53(b). 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: 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.



## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>				
<b>Filing Date:</b>				
<b>Title of Invention:</b>	A System to Interface Internet Protocol (IP) Based Wireless Devices with Optical and Other Networks for Improved Flexibility, Performance, and Data Transfer			
<b>First Named Inventor/Applicant Name:</b>	Sunil Rao			
<b>Filer:</b>	Rekha Kaliputnam Rao			
<b>Attorney Docket Number:</b>	HMTR3			
Filed as Small Entity				
<b>Utility under 35 USC 111(a) Filing Fees</b>				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Basic Filing:</b>				
Utility filing Fee (Electronic filing)	4011	1	95	95
Utility Search Fee	2111	1	310	310
Utility Examination Fee	2311	1	125	125
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Post-Allowance-and-Post-Issuance:</b>				
<b>Extension-of-Time:</b>				
<b>Miscellaneous:</b>				
<b>Total in USD (\$)</b>				<b>530</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	13759966
<b>Application Number:</b>	13621294
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	5130
<b>Title of Invention:</b>	A System to Interface Internet Protocol (IP) Based Wireless Devices with Optical and Other Networks for Improved Flexibility, Performance, and Data Transfer
<b>First Named Inventor/Applicant Name:</b>	Sunil Rao
<b>Customer Number:</b>	105481
<b>Filer:</b>	Rekha Kaliputnam Rao
<b>Filer Authorized By:</b>	
<b>Attorney Docket Number:</b>	HMTR3
<b>Receipt Date:</b>	17-SEP-2012
<b>Filing Date:</b>	
<b>Time Stamp:</b>	03:05:45
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$530
RAM confirmation Number	12869
Deposit Account	
Authorized User	

### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
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1	Application Data Sheet	2_applicationDataSheet.pdf	1421739	no	5
			38937749f52a368cd92acc10d9980f2ce864cb93		
<b>Warnings:</b>					
<b>Information:</b>					
2	Oath or Declaration filed	3_declaration.pdf	154551	no	3
			f824c95f57f642ee7e6f85d6742a8656c4f8844		
<b>Warnings:</b>					
<b>Information:</b>					
3		4_completeSpecification.pdf	290320	yes	26
			558f5fa7b171d808b2de10d6a85f468cd94daf61		
<b>Multipart Description/PDF files in .zip description</b>					
<b>Document Description</b>			<b>Start</b>	<b>End</b>	
Specification			1	24	
Claims			25	25	
Abstract			26	26	
<b>Warnings:</b>					
<b>Information:</b>					
4	Drawings-only black and white line drawings	5_Figures.pdf	253821	no	5
			d7e83077873b18c4a7b3f324c93af0364071a68		
<b>Warnings:</b>					
<b>Information:</b>					
5	Assignee showing of ownership per 37 CFR 3.73(b).	6_assignment_fromPrevious.pdf	95930	no	1
			6216ae2fc9f0d0d660559e23ab3575650903b8e7		
<b>Warnings:</b>					
<b>Information:</b>					
6	Nonpublication request from applicant.	7_nonpublication.pdf	133066	no	1
			b388f67d250082c00a1c3f158f79e30021df0338		
<b>Warnings:</b>					
<b>Information:</b>					
7	Transmittal Letter	8_LETTER_IDS.pdf	201511	no	2
			ec2d356b5a4bd21452ac136abaabad1bc7decdba		
<b>Warnings:</b>					
<b>Information:</b>					

8	Information Disclosure Statement (IDS) Form (SB08)	8_IDS_sb0008a.pdf	275045 27df2044cb4e86bfc37c544a2876cd1d96d7eb99	no	2
<b>Warnings:</b>					
<b>Information:</b>					
This is not an USPTO supplied IDS fillable form					
9	Transmittal of New Application	1_patentTransmittalForm.pdf	321342 e7975cab5927aa38572569a43b791e39291f1864	no	2
<b>Warnings:</b>					
<b>Information:</b>					
10	Fee Worksheet (SB06)	fee-info.pdf	33169 9d652f49037dbba3fe5e870a537ac5412aced98	no	2
<b>Warnings:</b>					
<b>Information:</b>					
<b>Total Files Size (in bytes):</b>			3180494		
<p><b>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.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b>  <b>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.</b></p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b>  <b>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.</b></p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b>  <b>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.</b></p>					

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.

<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	HMTR3
		Application Number	
Title of Invention	A System to Interface Internet Protocol (IP) Based Wireless Devices with Optical and Other Networks for Improved Flexibility, Performance, and Data Transfer		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

**Secrecy Order 37 CFR 5.2**

Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

**Applicant Information:**

<b>Applicant 1</b>					<input type="button" value="Remove"/>
<b>Applicant Authority</b>		<input checked="" type="radio"/> Inventor		<input type="radio"/> Legal Representative under 35 U.S.C. 117	<input type="radio"/> Party of Interest under 35 U.S.C. 118
<b>Prefix</b>	<b>Given Name</b>	<b>Middle Name</b>	<b>Family Name</b>	<b>Suffix</b>	
	Sunil	K.	Rao		
<b>Residence Information (Select One)</b> <input checked="" type="radio"/> US Residency <input type="radio"/> Non US Residency <input type="radio"/> Active US Military Service					
<b>City</b>	Palo Alto	<b>State/Province</b>	CA	<b>Country of Residence i</b>	US
<b>Citizenship under 37 CFR 1.41(b) i</b>		US			
<b>Mailing Address of Applicant:</b>					
<b>Address 1</b>					
<b>Address 2</b>					
<b>City</b>	Palo Alto	<b>State/Province</b>	CA		
<b>Postal Code</b>	94304	<b>Country i</b>	US		
<b>Applicant 2</b>					<input type="button" value="Remove"/>
<b>Applicant Authority</b>		<input checked="" type="radio"/> Inventor		<input type="radio"/> Legal Representative under 35 U.S.C. 117	<input type="radio"/> Party of Interest under 35 U.S.C. 118
<b>Prefix</b>	<b>Given Name</b>	<b>Middle Name</b>	<b>Family Name</b>	<b>Suffix</b>	
	Sanjay	K.	Rao		
<b>Residence Information (Select One)</b> <input checked="" type="radio"/> US Residency <input type="radio"/> Non US Residency <input type="radio"/> Active US Military Service					
<b>City</b>	Palo Alto	<b>State/Province</b>	CA	<b>Country of Residence i</b>	US
<b>Citizenship under 37 CFR 1.41(b) i</b>		US			
<b>Mailing Address of Applicant:</b>					
<b>Address 1</b>					
<b>Address 2</b>					
<b>City</b>	Palo Alto	<b>State/Province</b>	CA		
<b>Postal Code</b>		<b>Country i</b>			
<b>Applicant 3</b>					<input type="button" value="Remove"/>
<b>Applicant Authority</b>		<input checked="" type="radio"/> Inventor		<input type="radio"/> Legal Representative under 35 U.S.C. 117	<input type="radio"/> Party of Interest under 35 U.S.C. 118
<b>Prefix</b>	<b>Given Name</b>	<b>Middle Name</b>	<b>Family Name</b>	<b>Suffix</b>	
	Raman	K.	Rao		
<b>Residence Information (Select One)</b> <input checked="" type="radio"/> US Residency <input type="radio"/> Non US Residency <input type="radio"/> Active US Military Service					
<b>City</b>	Palo Alto	<b>State/Province</b>	CA	<b>Country of Residence i</b>	US

<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	HMTR3
		Application Number	
Title of Invention	A System to Interface Internet Protocol (IP) Based Wireless Devices with Optical and Other Networks for Improved Flexibility, Performance, and Data Transfer		
Citizenship under 37 CFR 1.41(b) i	US		
<b>Mailing Address of Applicant:</b>			
Address 1			
Address 2			
City		State/Province	
Postal Code		Country	
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the <b>Add</b> button.			<input type="button" value="Add"/>

### Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).			
<input type="checkbox"/> An Address is being provided for the correspondence information of this application.			
Customer Number	105481		
Email Address	patent@ipholdings.com	<input type="button" value="Add Email"/>	<input type="button" value="Remove Email"/>

### Application Information:

Title of the Invention	A System to Interface Internet Protocol (IP) Based Wireless Devices with Optical and Other Networks for Improved Flexibility, Performance, and Data Transfer		
Attorney Docket Number	HMTR3	Small Entity Status Claimed	<input checked="" type="checkbox"/>
Application Type	Nonprovisional		
Subject Matter			
Suggested Class (if any)		Sub Class (if any)	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)		Suggested Figure for Publication (if any)	

### Publication Information:

<input type="checkbox"/> Request Early Publication (Fee required at time of Request 37 CFR 1.219)
<input checked="" type="checkbox"/> <b>Request Not to Publish.</b> I hereby request that the attached application not be published under 35 U.S. C. 122(b) and certify that the invention disclosed in the attached application <b>has not and will not</b> be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

### Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Enter either Customer Number or complete the Representative Name section below. If both sections are completed the Customer Number will be used for the Representative Information during processing.			
Please Select One:	<input checked="" type="radio"/> Customer Number	<input type="radio"/> US Patent Practitioner	<input type="radio"/> Limited Recognition (37 CFR 11.9)

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.

<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	HMTR3
		Application Number	
Title of Invention	A System to Interface Internet Protocol (IP) Based Wireless Devices with Optical and Other Networks for Improved Flexibility, Performance, and Data Transfer		
Customer Number	105481		

**Domestic Benefit/National Stage Information:**

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.

Prior Application Status	Pending		<a href="#">Remove</a>		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)		
	Continuation of	12/912607	2010-10-26		
Prior Application Status	Patented		<a href="#">Remove</a>		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
12/912607	Continuation of	10/940428	2004-09-13	7848300	2010-12-07
Prior Application Status	Patented		<a href="#">Remove</a>		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
10/940428	Continuation of	09/617608	2000-07-17	7286502	2007-10-23
Prior Application Status	Patented		<a href="#">Remove</a>		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
09/617608	Continuation in part of	09/281739	1999-06-04	6169789	2001-01-02
Prior Application Status	Abandoned		<a href="#">Remove</a>		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)		
09/281739	Continuation in part of	08/764903	1996-12-16		
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the <b>Add</b> button.					<a href="#">Add</a>

**Foreign Priority Information:**

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(a).

<a href="#">Remove</a>			
Application Number	Country <sup>i</sup>	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
			<input checked="" type="radio"/> Yes <input type="radio"/> No
Additional Foreign Priority Data may be generated within this form by selecting the <b>Add</b> button.			<a href="#">Add</a>

**Assignee Information:**

Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office.

<b>Assignee 1</b>	<a href="#">Remove</a>
-------------------	------------------------



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<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	HMTR3	
		Application Number		
Title of Invention	A System to Interface Internet Protocol (IP) Based Wireless Devices with Optical and Other Networks for Improved Flexibility, Performance, and Data Transfer			
If the Assignee is an Organization check here. <input checked="" type="checkbox"/>				
Organization Name	IP Holdings, Inc.			
<b>Mailing Address Information:</b>				
Address 1				
Address 2				
City	Palo Alto	State/Province	CA	
Country <sup>i</sup>	US	Postal Code	94304	
Phone Number		Fax Number		
Email Address	patent@ipholdings.com			
Additional Assignee Data may be generated within this form by selecting the Add button.				<input type="button" value="Add"/>

**Signature:**

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature.				
Signature	/Rekha K. Rao/		Date (YYYY-MM-DD)	2012-09-17
First Name	Rekha	Last Name	Rao	Registration Number

This collection of information is required by 37 CFR 1.76. 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 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet 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.**

## 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 the Freedom of Information Act requires disclosure of these records.
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 inspections 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.

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 1449/PTO  <b>INFORMATION DISCLOSURE                  STATEMENT BY APPLICANT</b> (Use as many sheets as necessary)		<b>Complete if Known</b>	
		Application Number	Not Yet Assigned
		Filing Date	09/17/2012
		First Named Inventor	Sunil K. Rao
		Art Unit	2476
		Examiner Name	Phirin Sam
		Attorney Docket Number	HMTR3
Sheet	1	of	1

U. S. PATENT DOCUMENTS					
Examiner Initials*	Cite No. <sup>1</sup>	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code <sup>2</sup> (if known)			
	1	US- 5691974	11-25-1997	Zehavi	
	2	US- 4654867	03-31-1987	Labeledz	
	3	US- 6,108,314	08-22-2000	Jones et al.	
	4	US- 6,167,099	12-26-2000	Rader et al.	
	5	US- 6,570,871	05-27-2003	Schneider	
	6	US- 7,039,370	05-02-2006	Larota et al.	
	7	US- 7,848,300	12-07-2010	Rao et al.	
	8	US- 2002/0126745	09-12-2002	Prysbly et al.	
	9	US- 2006/002366	02-02-2006	Jalali et al.	
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FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No. <sup>1</sup>	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T <sup>6</sup>
		Country Code <sup>3</sup> -Number <sup>4</sup> -Kind Code <sup>5</sup> (if known)				

Examiner Signature		Date Considered	
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\*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. <sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> See Kinds Codes of USPTO Patent Documents at [www.uspto.gov](http://www.uspto.gov) or MPEP 901.04. <sup>3</sup> Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>4</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>5</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>6</sup> 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, 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 (1-800-786-9199) 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.

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.

<b>DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)</b>  <input checked="" type="checkbox"/> Declaration Submitted With Initial Filing <b>OR</b> <input type="checkbox"/> Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)	Attorney Docket Number	31
	First Named Inventor	RAO
	<i>COMPLETE IF KNOWN</i>	
	Application Number	Continuation-not known
	Filing Date	Continuation 9/13/04
	Art Unit	2661
Examiner Name	Ton Anthony T	

**I hereby declare that:**

Each inventor's residence, mailing address, and citizenship are as stated below next to their name.

I believe the inventor(s) named below to be the original and first inventor(s) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

A method and system to interface internet Protocol IP based wireless devices and wireless networks with optical and other networks for improved performance and data transfer.

*(Title of the Invention)*

the specification of which

is attached hereto

**OR**

was filed on (MM/DD/YYYY) 7/17/2000 as United States Application Number or PCT International

Application Number 09/617,608 and was amended on (MM/DD/YYYY) 9/10/2004 (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or (f), or 365(b) of any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent, inventor's or plant breeder's rights certificate(s), or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?	
				Yes	No
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

[Page 1 of 2]

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. 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 21 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.*

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.

## DECLARATION — Utility or Design Patent Application

Direct all correspondence to: <input type="checkbox"/> Customer Number: <input style="width: 100px;" type="text"/>				OR		<input checked="" type="checkbox"/> Correspondence address below	
<b>Name</b> RAMAN K. RAO							
<b>Address</b> 3099 ALEXIS DRIVE							
<b>City</b> PALO ALTO				<b>State</b> CA		<b>ZIP</b> 94304	
<b>Country</b> USA			<b>Telephone</b> 650 941 7096			<b>Fax</b> 650 618 1553	
I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.							
<b>NAME OF SOLE OR FIRST INVENTOR:</b>				<input type="checkbox"/> A petition has been filed for this unsigned inventor			
<b>Given Name</b> (first and middle [if any]) RAMAN K.				<b>Family Name</b> or Surname RAO			
<b>Inventor's Signature</b> 						<b>Date</b> 9.13.04	
<b>Residence: City</b> PALO ALTO		<b>State</b> CA		<b>Country</b> 94304		<b>Citizenship</b> USA	
<b>Mailing Address</b> 3099 ALEXIS DRIVE							
<b>City</b> PALO ALTO		<b>State</b> CA		<b>ZIP</b> 94304		<b>Country</b> USA	
<b>NAME OF SECOND INVENTOR:</b>				<input type="checkbox"/> A petition has been filed for this unsigned inventor			
<b>Given Name</b> (first and middle [if any]) SUNIL K.				<b>Family Name</b> or Surname RAO			
<b>Inventor's Signature</b> 						<b>Date</b>	
<b>Residence: City</b> PALO ALTO		<b>State</b> CA		<b>Country</b> USA		<b>Citizenship</b> USA	
<b>Mailing Address</b> 3099 ALEXIS DRIVE							
<b>City</b> PALO ALTO		<b>State</b> CA		<b>ZIP</b> 94304		<b>Country</b> USA	
<input checked="" type="checkbox"/> Additional inventors or a legal representative are being named on the 1 supplemental sheet(s) PTO/SB/02A or 02LR attached hereto.							

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.

<b>DECLARATION</b>	<b>ADDITIONAL INVENTOR(S)</b> Supplemental Sheet
	Page <u>1</u> of <u>1</u>

<b>Name of Additional Joint Inventor, if any:</b>		<input type="checkbox"/> A petition has been filed for this unsigned inventor	
Given Name (first and middle (if any))		Family Name or Surname	
SANJAY K. RAO		RAO	
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A System to Interface Internet Protocol (IP) Based Wireless Devices with Optical and Other  
Networks for Improved Flexibility, Performance, and Data Transfer

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CROSS REFERENCE TO RELATED APPLICATIONS

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[0001] The present application is a continuation and claims the priority benefit of co-  
pending U.S. Patent Application No. 12/912,607, filed October, 26, 2010, which is a  
continuation of Patent Application No. 10/940,428, filed September 13, 2004, now Patent No.  
7,848,300, which is a continuation of Patent Application No. 09/617,608, filed on July 17, 2000  
now Patent No. 7,286,502, which is a continuation-in-part of Patent Application No. 09/281,739,  
15 now Patent No. 6,169,789, filed June 4, 1999, which is a continuation-in-part application of a  
now abandoned Patent Application No. 08/764,903 filed December 16, 1996. The present  
application claims priority to the above referenced applications and patents.



BACKGROUND OF THE INVENTION

[0002] ABBREVIATIONS: Cellular Telephone as CT. Mobile Device as MD. Non-Wireless Device as NWD. Internet Protocol as IP. The typical cellular telephone/mobile device (CT/MD) today has a single antenna, which is directly connected to a single receiver. While spread spectrum techniques often used in the CT/MD use a broad band of frequencies, at any specific point in time, only a single frequency connected to one receiver is used. While spread spectrum techniques greatly increase the reliability and stability of the transmission, signal "fade" and communication disconnects are often encountered. Some communications systems may rely on two separate systems; one at a high frequency and preferably using spread spectrum transmissions for clarity and reliability, and another providing a different set of frequencies, such as lower frequencies. The secondary system is used when signal fade is a problem in the main system. These are two separate, complementary systems, each devoted to solving a separate, distinguishable problem.

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SUMMARY OF THE INVENTION

5 [0003] It is an object of the present invention to provide wireless enhancements to IP based cellular telephones/mobile wireless devices (CT/MD). The same enhancements are applied to IP based and locally based network switch boxes.

10 [0004] The typical CT/MD has one transmitter and one receiver (T/R), with one antenna. An unfulfilled need exists for multiple T/R in a CT/MD, providing enhanced capabilities, and the multiple T/R capabilities will often be best met with multiple antennas. The present invention is possible due to advances in the art which allow the necessary components to be integrated, with the size shrunk to achieve the package, performance, and cost desired. The multiple T/R capability allows the single CT/MD to perform tasks in different environments – each T/R being specifically designed or configured for that specific purpose.

15 [0005] Other objects, features and advantages of the present invention will become apparent from the following detailed description when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

[0006] The accompanying drawings, being incorporated in and forming a part of this specification, illustrate embodiments of the invention and, together with the description, serve to explain the principles of the present invention:

5 [0007] FIG. 1 illustrates characteristics of a cellular telephone (CT/MD) of the prior art as opposed to a desired CT/MD of the present invention.

[0008] FIG. 2 illustrates an embodiment of the present invention for a communication system with data being transferred from computer to computer.

10 [0009] FIG. 3 illustrates characteristics of the prior art showing a computer to computer data path with one channel.

[0010] FIG. 4 illustrates a dual antenna, dual transmit/receive (T/R) unit in the CT/MD of the present invention in a dual band system.

[0011] FIG. 5A illustrates a dual antenna, dual T/R unit in a CT/MD interfacing with a dual processor in the present invention in a dual band system.

15 [0012] FIG. 5B illustrates a wide band network switch box system that is capable of operating in a number of network environments sequentially or simultaneously.

[0013] FIG. 6 is an embodiment of the present invention showing a wired interface system for wireless or non-wireless devices and including a wireless cradle adapter.

20 [0014] FIG. 7 is an embodiment of the present invention showing a CT/MD with multiple T/R units and multiple antennas in a communication system connecting to a Server C through a wireless connection.

[0015] FIG. 8 is an embodiment of the present invention illustrating the connection of multiple wireless signals to an optical network for connection to a wide area network (WAN) or local area network (LAN) or to the Internet.

5 [0016] FIG. 9 is an embodiment of the present invention showing a multiple processing system.

[0017] FIG. 10 is an embodiment of the present invention showing a data system with three data streams.

[0018] FIG. 11 is an embodiment of the present invention showing a data system with three data streams.

10 [0019] FIG. 12 is an embodiment of the present invention showing a Virtual Private Network (VPN).

[0020] FIG. 13 is an embodiment of the present invention showing how Virtual Private Network or Networks (VPN) system may be provided.

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DETAILED DESCRIPTION OF THE INVENTION

[0021] Reference will now be made in detail to preferred embodiments of the invention, with examples illustrated in the accompanying drawings. The invention is described in conjunction with the preferred embodiments, however, it will be understood that the preferred embodiments are not intended to limit the invention. The invention is intended to cover alternatives, modifications and equivalents included, now or later, within the spirit and scope of the present invention as defined by the appended claims.

[0022] In the present invention, one or more antennas and T/R units in a CT/MD will provide better tuning and greater bandwidth for a given frequency/application. For example, consider an embodiment of a cell phone, CB radio, and wireless phone, all in a single CT/MD for improving the data rates of a wireless device/network:

[0023] It is seen that the data rate of the CT/MD is increased. Currently the CT/MD data rates are very low and pose a severe limitation for high speed wireless data networking. 14.4 KBPS (kilobits per second) is probably the best reliable speed for a wireless network that is commercially available. The speed at which RF waves are transmitted from point A to point B is a physical property based on the frequency of transmission and reception in a given medium such as air. The signal speed is determined by the frequency and the signal strength is determined by the power, line of sight, interference, etc. In a given assigned frequency band, the data speed is fixed but the power may be varied. The rate at which data may be transmitted over a wireless network is also determined by the ability to encode and decode the signal at the T/R ends using the electronics and computing power resident at each end.

[0024] Data transferred to a CT/MD over a wireless network comes in encoded form and must be decoded at the CT/MD after the data is received, such as by a receiver. The ability to encode and decode the data is a function of the number of encoders/decoders available and assigned to the task at the CT/MD or at a network switch box. It will be appreciated that while a CT/MD and a network switch box are very similar in many ways, they are completely different functional units, with the CT/MD providing personal services and the network switch box providing system services. The ability to encode and decode the data is also a function of the speed at which the encoder/decoder electronics operate at the T/R ends. Of course, each encoder/decoder must be associated with appropriate electronics to effect this task when more than one encoder/decoder is used.

[0025] FIG. 1 illustrates characteristics of a cellular telephone/mobile device (CT/MD) of the prior art as opposed to a desired CT/MD of the present invention having multiple transmit/receive (T/R) units and multiple antennas. In FIG. 1, Cellphone 102, CB Radio 104, and Wireless 106 of the prior art all have a single transmit frequency and a single receive frequency. In contrast, the CT/MD 108 of this embodiment of the present invention has three transmit frequencies and three receive frequencies.

[0026] FIG. 2 illustrates an embodiment of the present invention for a communication system 200 with data being transferred from computer 202 to computer 204. In FIG. 2, computer 202 communicates through a system of T/R units 206, located within or in proximity to computer system 202, with computer system 204 through T/R unit 208. T/R 208 may be located within computer system 204 or in close proximity to computer system 204 to route the data to computer 204 or alternatively to a network server 204, as required. The rate at which data from

system 202 to system 204 is transferred is gated by the speed of the transmit and receive units is improved by the parallel paths provided by the present invention. The signal is sampled and may be multiplexed at each end, at a rate that assures accuracy.

[0027] FIG. 3 is an embodiment of the prior art showing a computer to computer data path with a single channel 300. In FIG. 3, using a single antenna and a single T/R unit the signal is processed through the internal electronics module 308 of the CT/MD 302, said module 308, which is shown separate from CT/MD 302 for illustrative purposes only but is normally included within CT/MD 302. Module 308 contains RF/IF 304 and A/D, D/A converter 306, as well as processor 310, memory 312, control electronics 314, and other electronics such as display electronics 316 and special interface circuitry 318, such as for driving the output 320. It should be clear that output 320 can also be an input/output for the CT/MD 302. This is also true for a network switch box such as network switch box 552 with the functionality of CT/MD 302. The module 308 and elements 310 through 318 are included within CT/MD 302 or network switch box 552. All of these components or systems are normally contained within CT/MD 302. Since there is only one path, however, it is clear that this system does not form an efficient, convenient interface. The transmission data rate is limited by antenna 322 of CT/MD 302, which has only one antenna 322.

[0028] The antenna 322 is capable of receiving only a limited frequency band due to its design limitations, which are common to single antennas used for this purpose.

[0029] Adding additional antennas gives the CT/MD (by extension the same is true for the network switch box) enhanced capabilities to differentiate between various signals or to combine multiple paths into a single communication channel. As an example, the design

considerations for receiving cellular telephone frequencies may be totally different from those for streaming video or data signals, and with the present invention both can be combined into the CT/MD.

[0030] FIG. 4 illustrates a dual antenna, dual T/R unit in the CT/MD of the present invention in a dual band system 400. In FIG. 4, this scheme with CT/MD 402 transmitting on the dual T/R unit 404 allows the internal processor 406 to independently process the two incoming signal streams separately and optimally, causing the appropriate output to be delivered on the desired output port. In FIG. 4 the processor 406 is shown as a single processor, however, the processor 406 is not limited to only one processor and may contain multiple processors.

Alternately, the single processor may have multiple channels for parallel processing of each data stream to process accurately two distinct signals 408 that were more optimally received by two dedicated antennas and two separate T/R units contained within the CT/MD to improve performance and quality of output. An example is a CT/MD 402 which is optimized for video and voice.

[0031] Having more than one T/R unit gives a performance edge as each signal can be better processed and tuned to the specific frequency band of the signal. Thus better quality of output can be achieved for each type of signal and application. As an example, by having each of the data streams sampled at differing clock frequencies the performance can be better optimized.

[0032] FIG. 5A illustrates a dual antenna, dual T/R unit 504 in a CT/MD 502 interfacing with a dual processor 506 in the present invention in a dual band system 500. In FIG. 5A, in addition to multiple antennas 508 and multiple T/R units 504 the figure also shows multiple processors 506 in a process unit functional block in a CT/MD. The system may communicate



through an output or outputs 510. For example, these outputs may be fibre optic channel, ethernet, cable, telephone, or other. By extension the feature of multiple antennas, multiple T/R units and multiple processors is extendable to the network switch box or network switch boxes that form a local, wide area, Virtual private network or connect to the Internet.

5           **[0033]** Server C controls the communication protocols in conjunction with the network switching box or other devices, such as CT/MD 502. The multiple processors 506 allow for parallel and custom processing of each signal or data stream to achieve higher speed and better quality of output. This can also be done with a single processor that has the parallelism and pipeline capability built in for handling one or more data streams simultaneously. Processor 506  
10 is the complete electronics inclusive of DSP, CPU, memory controller, and other elements essential to process various types of signals. These can be defined as, for example, either single chip or multichip solutions. The processor contained within the CT/MD 502 is further capable of delivering the required outputs to a number of different ports such as optical, USB, cable and others such as 1202 to 1210. The CT/MD 502 is also capable of taking different inputs, as well  
15 as wireless, for the appropriate processing to be done on these signals within the CT/MD 502 and outputting the desired signal on a designated port or ports. Thus the CT/MD 502 has universal connectivity in addition to having a wide range of functionality made possible through the features of multiple antennas, multiple T/R units 504 and processors 506 in this invention. These features may also exist in a network switch box, such as network switch box 552.

20           **[0034]** FIG. 5B illustrates a wide band network switch box system 550 that is capable of operating in a number of network environments sequentially or simultaneously. The network switch box is configured with multiple processors, multiple antennas and multiple T/R units that

can be multiplexed to process incoming and outgoing wireless signals. In addition to wireless signals there is a need to process other types of input/output signals such as optical, cable, USB etc. to fully interface with other types of devices and networks. The network switch box is normally a fixed part of a network, whereas the CT/MD is portable. However, the network switch box may be portable and may be used in the wireless mode only in a wireless network or it may also be connected to one or more networks by wired and wireless means to fully leverage all the input/output ports.

[0035] In FIG. 5B, network switch box 552 that is limited in quality because of the limitations of wireless may fully leverage the networks, including fibre optic networks, such as by multiple antennas 554 and multiple I/O ports 556. As an example, the ability to view streaming video on a network switch box 552 may be limited by the wireless signal quality due to the need for compression. This is due to transmissions that are inherently impaired in air as opposed to fibre optic cable. A prior art network switch box while in the mobile mode may receive video of poorer quality. The network switch box 552, when at home or in the office, could be easily connected to the optical network directly or through I/O ports 556, such as by a cradle adapter. In this mode the best data, video or audio quality can be received using the same unit. This provides the network switch box 552 single unit to have universal applications since it can sequentially or simultaneously communicate optimally with other systems and networks to deliver quality/performance and speed tailored for each application.

[0036] The network switch box 552 as disclosed above executes substantially the same function as the CT/MD 502. However, the network switch box 552 operates at a network system

level capable of coordinating the operations of a number of mobile and other devices in one or more networks, while the CT/MD 502 performs at a personal level.

[0037] FIG. 6 is an embodiment of the present invention showing a wired interface system 600 for wireless or non-wireless devices. In FIG. 6, a wireless device, CT/MD 602 with I/O ports 610 and CT/MD 612 with the ability to interface through a cradle adapter 604 having both wireless and wired connections 606 interfacing with multiple input/output (I/O) ports 608 is shown. One, all, or some of the connections may be used simultaneously or sequentially for combining multiple data paths into a single path. Whether to combine all the paths into a single data channel or use separate data channels for simultaneous operations will be based on the needs of the application. Examples of inputs/outputs are, for example, standard telephone, coaxial cable, Ethernet, twisted pair, wireless, optical, and USB. In addition to the multiple I/O ports 610 shown on the CT/MD 602 and the ports 608 shown for connecting the CT/MD 612 to cradle adapter 604, the present invention anticipates a universal port and a universal connector. By having the signal path selection done by user defined menu driven software and multiplexing the signals onto a universal input/output port as opposed to the multiple ports 608, 610 or wired connections 606, the desired signals are delivered to the universal port.

[0038] Note that the cradle adapter 604 connection also allows I/O contacts 608 between a non-wireless device (NWD) 613 and a wireless cradle adapter 604 or similar wireless enabling attachment. The enabling attachment can make any non-wireless device (NWD) unit 613 wireless enabled while being plugged into the cradle adapter 604, as shown for CT/MD 612, to access a number of wired, optical or wireless communication paths through the ports 608. The cradle adapter itself may have multiple antennas, multiple T/R units and multiple processors

built-in to deliver full functionality. The cradle adapter 604 may also accommodate multiple wired or wireless devices to be plugged in at the same time. The cradle adapter may also contain power ports for the individual devices in addition to the I/O ports. The cradle adapter 604 may be a passive pass through connection enabling device or may have internal electronic smarts to perform certain server functions to control data traffic. Alternately, a Server C located on a LAN, WAN or the Internet can be the control vehicle.

[0039] FIG. 7 is an embodiment of the present invention showing a CT/MD 702 having multiple T/R units internally and with multiple antennas 710 in a communication system 700 connecting to a Server C 706 through a wireless connection 704. Server C 706 then communicates with a network such as the Internet or other path to data such as a local WAN/LAN line, etc., through connection 708. The multiple T/R units and antennas 710 allow multiple simultaneous communication paths over connection 704 between the CT/MD and the Server C such that the communication rate is increased.

[0040] FIG. 8 is an embodiment of the present invention illustrating the connection of multiple wireless signals to an optical network for connection to a wide area network (WAN) or local area network (LAN) or to the Internet. In FIG. 8, a CT/MD 802 communicates through internal electronic interfaces, such as an RF/IF module 804 and an AD/DA unit 806 in a T/R block 808 with a processor 810. Processor 810 then provides an electrical signal generated by the T/R block 808 and processed by processor 810 to an optical converter (OC) 812. OC 812 then delivers the optical signal to fibre optic cable 814 for delivery to, for example, a network such as a WAN/LAN or the Internet.

[0041] This avoids delay in processing the signal and improves quality/performance.

Similar conversions can be done by the processor for other input/output protocols or systems such as universal serial bus (USB) or Ethernet either locally or in conjunction with a server such as Server C 706 to receive/deliver input output signals as needed. By extension, the same

5 features are possible for the network switch box such as network switch box 552.

[0042] Some unique features of the present invention, which apply to either a CT/MD such as CT/MD 802 or to a network switch box such as network switch box 552, are:

Multiple antennas for greater signal range and bandwidth.

Multiple T/R units so that paths or tasks can be paralleled.

10 Multiple internal signal processors, or one or more processors that execute in parallel.

Multiple built in input/outputs for universal connectivity to different network environments.

Capability to interface wired and wireless devices through a cradle adapter to achieve universal connectivity.

15 Parallel processing of signals and data streams at a system level using hardware and software on a server such as Server C 706.

[0043] FIG. 9 is an embodiment of the present invention showing a multiple processing system 900. In FIG. 9, computer 902 and computer 908 need to exchange data streams at very fast rates. Having a single channel for T/R with a single antenna or a single processor would  
20 cause a limitation in data transfer rates, so multiple channels 912 are provided. Server C 910 polls the tasks by communicating with computer 902 and computer 908, and through computer 902 and computer 908 control the wireless units 904 and 906, such as CT/MDs or wireless

boxes, by optimally allocating channels and transfers of the data. Having multiple channels 912 enhances the data transfer rate compared to a single channel or communication path. Server C 910 oversees the allocation of data to the different channels and keeps the process under control. In addition the multiple channels 912 help overcome the RF to digital electronic conversion rate problem. The rate at which the sampling and conversion takes place is a function of, for example, the A/D and D/A 806 conversion rates and limitations in the other electronics components such as processor 810. Consequently having the data partitioned by the Server C 910 and assigned to multiple channels 912 enables parallel processing of the communications, and having parallel processing of wireless data streams where the data streams coexist, as in the present invention, increases the data transfer rate.

[0044] FIG. 10 is an embodiment of the present invention showing a data system 1000 with three data streams DS1 1002, DS2 1004 and DS3 1006. In FIG. 10, three wireless T/R units 1008, 1010, and 1012 are shown. The three data streams 1002, 1004, and 1006 are processed by the three T/R units 1008, 1010 and 1012, converted by converters 1014, 1016, and 1018, and presented to processors 1020, 1022, and 1024 under the control of controller 1026. The data streams may be interfaced separately with server C 1030 or combined into data stream 1028 and interfaced to Server C 1030. The processor or CPU speed is seldom a limiting factor, so the improvement in speed by providing multiple data paths is fully realized by the present invention. Each subtask being processed can be assigned to a separate channel. The rate at which the data is acquired, processed and converted is dependent on the type of electronic components. Therefore, component limitations can be overcome in a straightforward and convenient way by parallel processing. In such cases, the processor speed is seldom a limitation, and conversion

speed of RF to electrical and electrical to RF, becomes the primary bottleneck in data transfers for wireless systems. By providing, for example, a single chip, multichip, or hybrid converter for parallel conversions in accordance with the present invention under the supervision of the Server C 910, this bottleneck is avoided. Each channel may be sampled and clocked individually as  
5 necessary to optimally process each data stream and combine the individual data packets.

[0045] FIG. 11 is an embodiment of the present invention showing a data system 1100 with three data streams DS1 1102, DS2 1104 and DS3 1106. In FIG. 11, three fibre optic channel units 1108, 1110, and 1112 are shown. The three data streams 1102, 1104, and 1106 are processed by the three fibre optic channel units 1108, 1110 and 1112, converted by converters  
10 1114, 1116, and 1118, and presented to processors 1120, 1122, and 1124 under the control of controller 1126. The data streams are combined into data stream 1128 and interfaced to Server C 1130. The processor or CPU speed is seldom a limiting factor, and can be overcome by providing multiple processors as shown, including for Server C 1130, so the improvement in speed is fully realized by the present invention. Each subtask being processed can be assigned to  
15 a separate optical fibre optic channel. The rate at which the data is acquired, processed and converted is limited by the components used for conversion of optical to electrical and electrical to optical signals. Therefore, component limitations can be overcome in a straightforward and convenient way by parallel processing. This can be especially important with fibre optic transmissions, where fibre optic to electrical and electrical to fibre optic conversions can create  
20 significant communications limitations. In such cases, the processor speed is seldom a limitation or can be overcome with parallel processors, and conversion speed becomes the primary bottleneck in data transfers for optical systems. As discussed before, by providing, for example,

a single chip, multichip, or hybrid converter for parallel conversions in accordance with the present invention under the supervision of a Server C, such as Server C 1130, the fibre optic channel conversion bottleneck is avoided.

[0046] FIG. 12 is an embodiment of the present invention showing a Virtual Private  
5 Network (VPN) communication path 1200. In FIG. 12, multiple communications channels such as USB 1202, telephone 1204, cable 1206, fibre optic channel 1208, and wireless 1210 are all employed to communicate data relating to tasks and subtasks from data path 1212, such as from Server C 1130, to data path 1214. Data path 1214 may be connected to, for example, another Server C 1030 or similarly. The result is that multiple communication environments are enabled  
10 by the data paths 1200, the environments having, for example, devices such as multiple CT/MDs, network switch boxes, and combinations for forming a VPN, such as VPN 1302. This is true even where the individual units belong to another VPN. The VPN, such as VPN 1302, or several VPNs, such as VPNs 1300, can be under the control of a single or multiple Server C, such as Server C 1130, machines. Each device in a VPN such as VPN 1300 may operate wireless or  
15 wired devices such as the devices in VPN 1302 connected to other wired or wireless networks, including fibre optic channel networks. The devices in a VPN, such as VPN 1302 of the present invention can be multiplexed or multitasked by a Server C, such as Server C 1130. This allows many such devices to be under the supervision and control of a Server C 1130 or multiple Server C machines such as Server C 1030, 1130.

20 [0047] FIG. 13 is an embodiment of the present invention showing how Virtual Private Network or Networks (VPN) system 1300 may be provided. In FIG. 13, VPN 1302, 1306, and 1310 are connected through a wide area network (WAN) or local area network (LAN) to



wireless network 1304, optical network, such as a fibre optic channel 1308, and cable network 1312. Other networks could be used as well, the embodiment is not intended to restrict the present invention. All the VPNs such as VPN 1302 and optionally the connections may be under the supervision of a Server C 1314 or many servers. VPN 1302 is shown with a network switch box 1316, server 1318, and a CT/MD 1320, which allows multipath communication through the network switch box 1316 to server 1318. This allows communication from/to the network switch box or from/to an outside source, such as a CT/MD service provider, to CT/MD 1320. The CT/MD 1320 can communicate simultaneously with the network switch box 1316 and an outside source as well.

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10           **[0048]** VPN 1306 shows network switch box 1322 communicating with a server 1324 and optionally with CT/MD 1326. As shown, the VPN 1302 and the VPN 1306 operate in parallel, and may both be under the supervision and control of server 1314, which acts as a sort of executive level supervisor.

15           **[0049]** VPN 1310 shows network switch box 1328 and server 1330, with both CT/MD 1332 and CT/MD 1334 in the VPN 1310. Network box 1328 may communicate with either or both CT/MD 1332 and 1334, and CT/MD 1332 and CT/MD 1334 may intercommunicate as well. VPN 1310 may also be under the supervision and control of server 1314. The server 1314 may also control and supervise VPN 1302 and 1306.

**[0050]** The present invention includes the following features:

20           **[0051]** (1) A cellular telephone/mobile device (CT/MD) with two or more antennas as opposed to the current state of the art in a single antenna system. Each antenna may be

specifically designed for a specific frequency or application or may be multiplexed for different uses.

[0052] (2) A CT/MD with two or more transmit/receive (T/R) units as opposed to the prior art single T/R unit. Each T/R unit in the CT/MD may be designed for a specific frequency or application or may be multiplexed for different uses.

[0053] (3) A CT/MD with two or more processor units (or a single processor unit with built in parallelism to execute same, different and or custom applications) as opposed to the prior art of a single processor unit. Each processor unit in the CT/MD may be designed for a specific application or may be multiplexed for different uses. As an example one processor may be specifically designed to handle voice, another for data, another for high quality audio and yet another for streaming video.

[0054] (4) A CT/MD that has multiple input/output ports as opposed to a single input/output (I/O) port as in the prior art. The CT/MD may have a universal serial bus (USB) port, a coaxial cable port, a standard telephone (POTS) port, a twisted pair port, Ethernet port, and most importantly an optical port. The CT/MD thus can fully interface and interact with different environments sequentially or simultaneously. The feature is more than one port being available with variations in the number of ports (I/O) from one to N.

[0055] (5) A network switch box with two or more antennas as opposed to the prior art of a single antenna system. Each antenna may be specifically designed for an assigned frequency or application or may be multiplexed for different uses.

[0056] (6) A network switch box with two or more T/R units within it as opposed to the prior art of a single T/R unit. Each T/R unit may be designed for an assigned frequency or application or may be multiplexed for different uses.

5 [0057] (7) A network switch box with two or more processor units (or a single processor unit with built in parallelism to execute same, different and or custom applications) as opposed to the prior art of a single processor unit. Each processor unit in the network box may be designed for a specific application or may be multiplexed for different uses. As an example one processor may be specifically designed to handle voice, another for data, another for high quality audio and yet another for streaming video.

10 [0058] (8) A network switch box has multiple input/output ports as opposed to a single input/output (I/O) port as in the prior art. The network switch box may have a universal serial bus (USB) port, a coaxial cable port, a standard telephone (POTS) port, a twisted pair port, Ethernet port, and most importantly an optical port. The network switch box thus can fully interface and interact with different environments sequentially or simultaneously. The feature is more than one port being available with variations in the number of ports (I/O) from one to N.

15 [0059] (9) The ability to use the same CT/MD in different environments and applications and the ability to quickly interface to various inputs and outputs by a quick and easy plug in method into a receptacle or socket or by wired or wireless means such as a docking station.

20 [0060] (10) The ability to use the same network switch box in different environments and applications and the ability to quickly interface to various inputs and outputs by a quick and easy plug in method into a receptacle or socket or by wired or wireless means such as a docking station.

[0061] (11) The CT/MD and the network switch box may be used for communication, control, command, compute, entertainment, gaming, or other applications that may be defined in the future for both wireless and wired equipment.

5 [0062] (12) The unique feature that allows one or more antennas, one or more T/R units, one or more processors and one or more input/outputs to coexist in totality or as subsets of any combination of the above in one single CT/MD or a network switch box.

10 [0063] (13) The feature described in item 10 above and this invention allows parallel processing of the signals and data streams through the antennas, through the T/R units, through the multiple processors and through the I/O. This allows the present invention to achieve faster data rates with flexible connections for making multiple applications sequentially or simultaneously available using the same CT/MD or network switch box. As an example, video, audio and other uses can be accessed simultaneously with performance optimized for each through dedicated or multiplexed antenna paths, T/R paths, through multiple processors and I/O paths.

15 [0064] (14) The internal electronics of a CT/MD or a network switch box other than the antenna, T/R and I/O may be shared or separate. For example, the processor, memory, etc. may be common or may be separate as defined by the application, cost, and site, etc.

20 [0065] (15) The ability to have an internal IP based web server function within the CT/MD and the network switch box or an external server C connected by wired or wireless means to keep track of all the communication protocols within the unit and with the outside world and other units.

[0066] (16) The electronics that converts wireless to optical signals directly, to efficiently interface wireless and optical signals and systems without intermediate transport.

[0067] (17) The ability to process in parallel signals derived from optical signals such as at a much higher frequency.

5 [0068] (18) The attachment that makes a non-wireless device fully wireless (see figure 6).

[0069] (19) The ability to form many concentric/overlying networks and have the CT/MD exist in one or more wired or wireless networks simultaneously. Thus one single CT/MD can, at the same time, be part of one or more wired or wireless VPN (virtual private networks) or of a public network. Thus a mixed network, a mixed VPN, is dynamically made possible under the supervision of server C. In this mixed VPN one or more network boxes from different networks, different CT/MDs and base stations coexist in a new virtual network. All of these VPNs, mixed VPNs and public networks being accessible by the CT/MD through the supervision of the central server C located on a LAN, WAN, or the Internet.

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[0070] (20) The ability for a CT/MD to communicate with one or more CT/MDs and other wired or wireless devices in one or more VPNs and public networks directly allowing for paging and data transmission and communication between one or more CT/MDs. This is accomplished with all the VPNs being under the control of Server C located on a LAN, WAN or the Internet.

15

[0071] (21) The network box may also operate as a wireless base station, with the characteristics enumerated for the network box, such as multiple antennas, multiple T/R units, multiple processors and multiple I/O ports. The base station may receive inputs from one type of network and transmit to another type of network seamlessly. For example, an optical network

20

input may be transmitted as a wireless RF output over the wireless network. In reverse the wireless input to base station may be seamlessly converted into optical output for transmission over an optical network.

[0072] (22) In either the base station configuration or the network box configuration, the units have the ability to take optical data and multiplex the data for wireless transmission over one or more channels, at one or more frequencies and power levels. The base station, the network box or the CT/MD may use one or more transmission protocols as deemed optimal and appropriate by the local server C or the super server C located in a LAN, WAN or the Internet. Thus the base station unit, the network box and the CT/MD determines the required frequency spectrum, other wireless parameters such as power and signal to noise ratio to optimally transmit the data. In addition the units have the ability to multiplex between one or more transmission protocols such as CDMA, TDMA to ensure that the fast data rates of the optical network or matched closely in a wireless network to minimize the potential data transmission speed degradation of a wireless network. As an example, the data path between two optical networks may involve a wireless hop due to physical constraints. In such a case the wireless hop transmission speed is likely to be a bottleneck. The base station or the network box, configured as described in the present invention at the hardware level offers universal functionality. In addition the software capability that is resident internally to the unit, at the local server C level or network server C level, is capable of dynamically determining a number of factors for best data transfer. As an example, the unit can determine the best transmission frequencies and protocols, determine the best error correction and channel coding algorithms and multiplexes the

transmission paths and tasks. Thus it is possible that various optical and wireless protocols can co-exist in a network.

[0073] (23) The network box or network boxes may also be used to configure a predominantly optical network that has wireless capability as an adjunct or a predominantly wireless network that has optical capability as an adjunct. Other combinations are possible by extension with or without multiplexing. The optical to wireless multiplexer, can be part of a wireless ethernet or optical ethernet. Similarly other types of conversion and transmission multiplexers could be defined to be incorporated into the CT/MD, the network box or the base station to optimally and seamlessly transfer data between networks or within a network.

[0074] The foregoing descriptions of specific embodiments of the present invention have been presented for purposes of illustration and description. They are not intended to be exhaustive or to limit the invention to the precise forms disclosed, and it should be understood that many modifications and variations are possible in light of the above teaching. The embodiments were chosen and described in order to best explain the principles of the present invention and its practical application, to thereby enable others skilled in the art to best utilize the present invention and various embodiments, with various modifications, as are suited to the particular use contemplated. It is intended that the scope of the invention be defined by the Claims appended hereto and their equivalents.

WHAT IS CLAIMED IS:

1. A method for Internet Protocol (IP) based wireless data transmission between a wireless device and server comprising the steps of:
  - 5 (a) providing a plurality of ports on a wireless device,
  - (b) providing a plurality of ports on a server,
  - (c) transmitting a first data stream from the wireless device to the server on a first port and concurrently transmitting a second data stream from the wireless device to the server on a second port and
  - 10 (d) configuring the first port on the wireless device for an Ethernet connection.



ABSTRACT OF THE INVENTION

A method and apparatus in which multiple Internet Protocol (IP) based wireless data transmissions are simultaneously provided between a wireless device and a server, including providing multiple antennas, multiple T/R units, multiple processors and multiple I/O ports on the wireless device. The method includes receiving multiple IP data packets on the I/O ports at substantially the same time, and sending multiple data packets from the wireless device to the server, whereby the transmission rate between the wireless device and the server is increased.

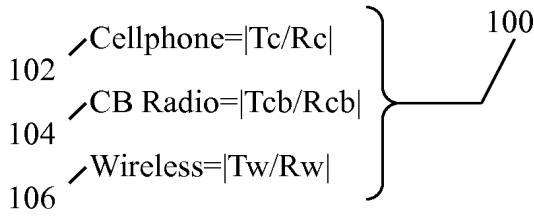


FIG. 1A

-Prior Art-

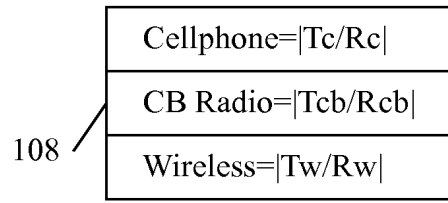


FIG. 1B

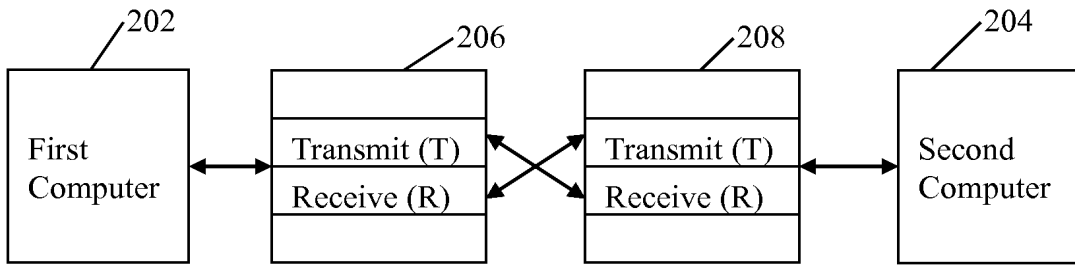


FIG. 2

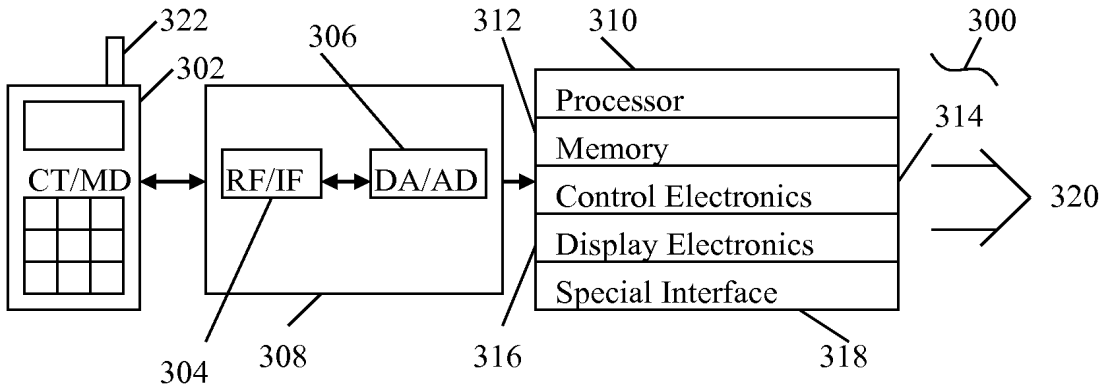


FIG. 3

-Prior Art-

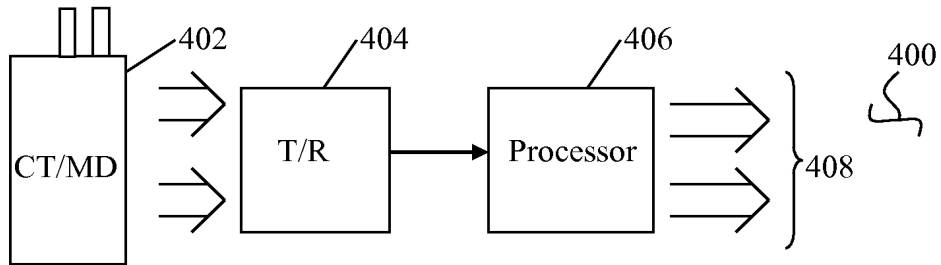


FIG. 4

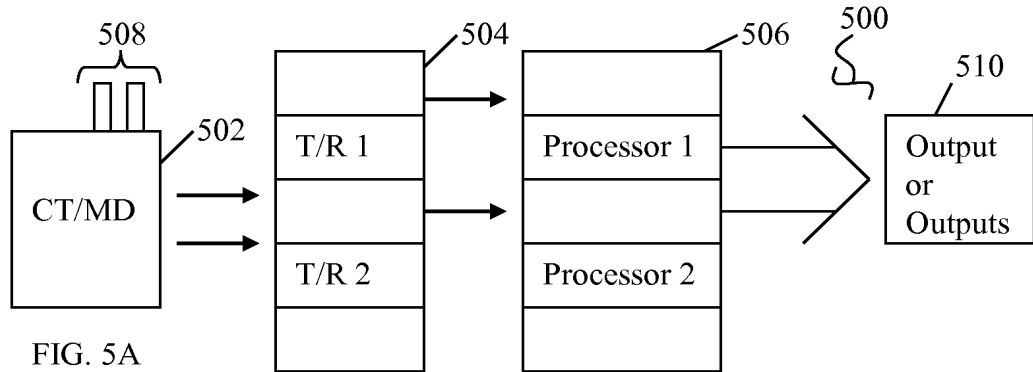


FIG. 5A

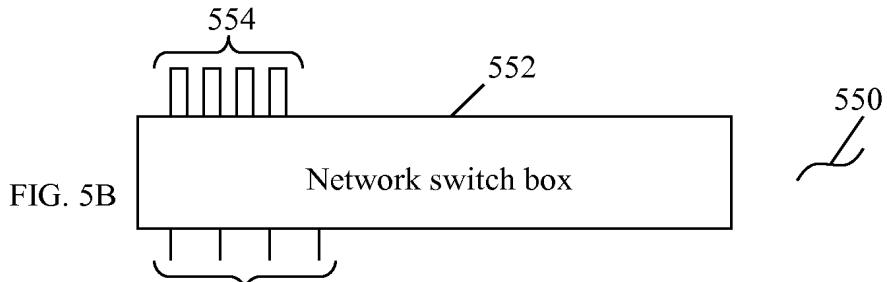


FIG. 5B

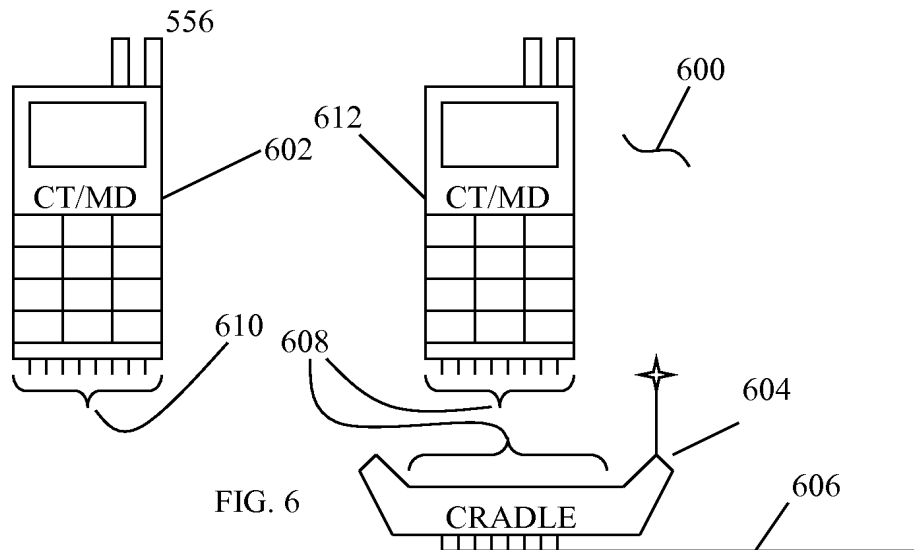


FIG. 6

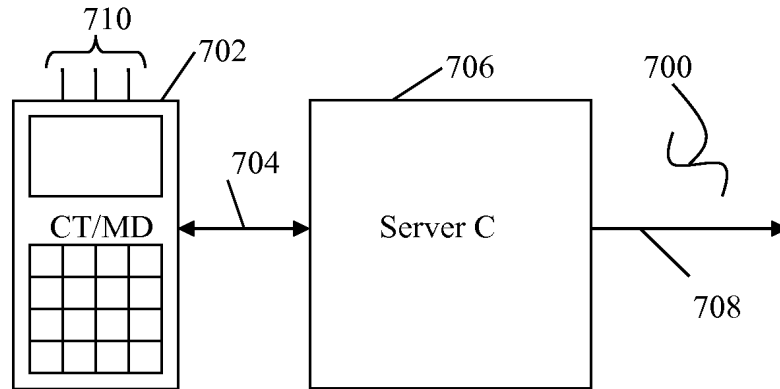


FIG. 7

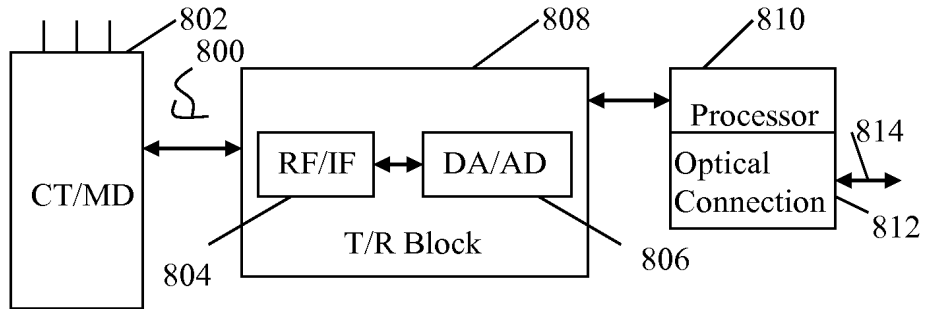


FIG 8

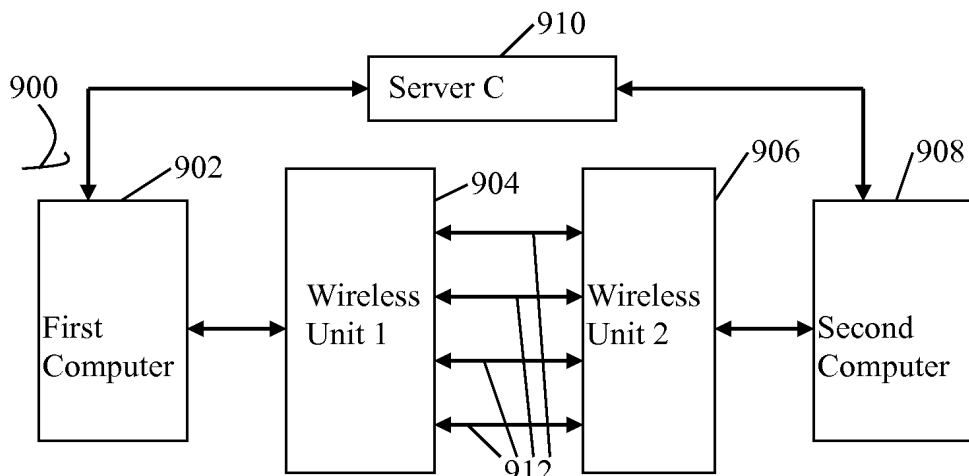


FIG. 9

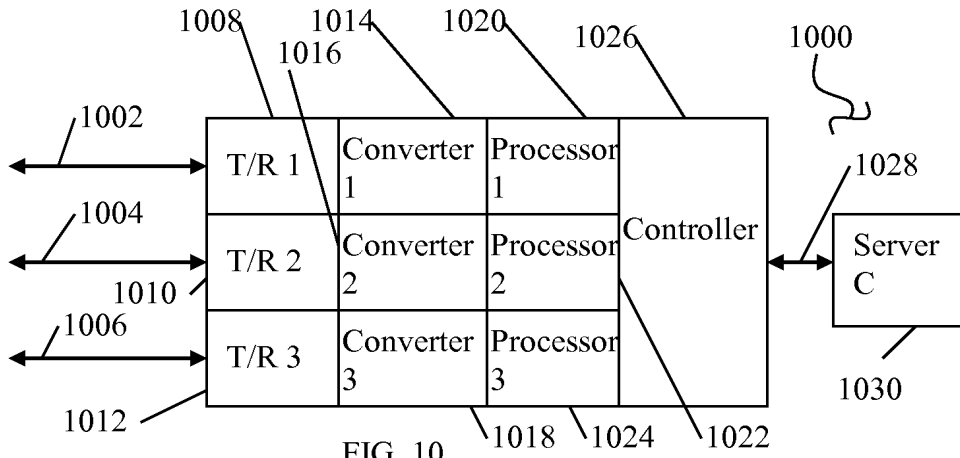


FIG. 10

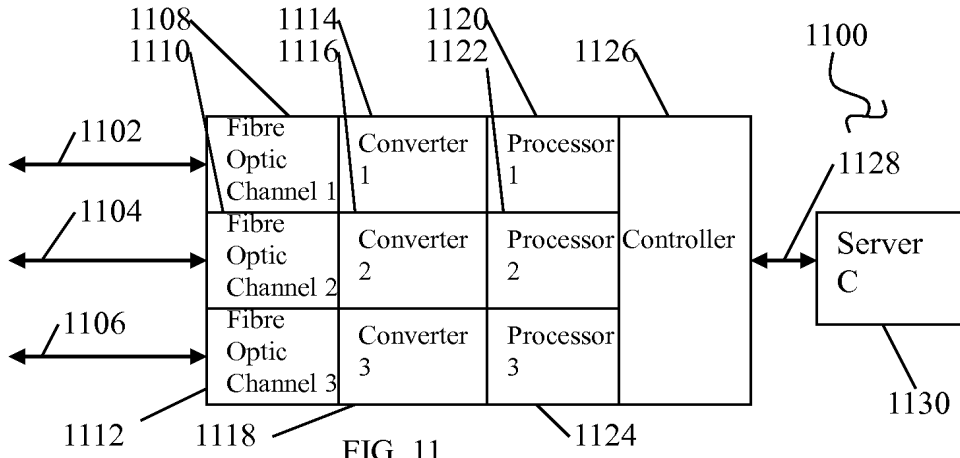


FIG. 11

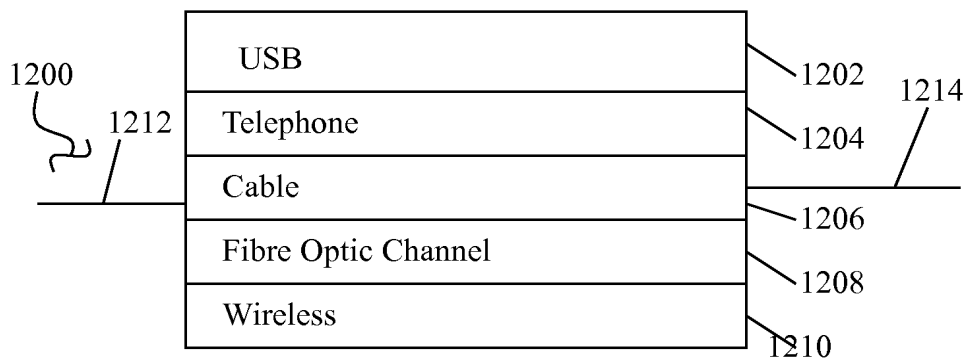


FIG. 12

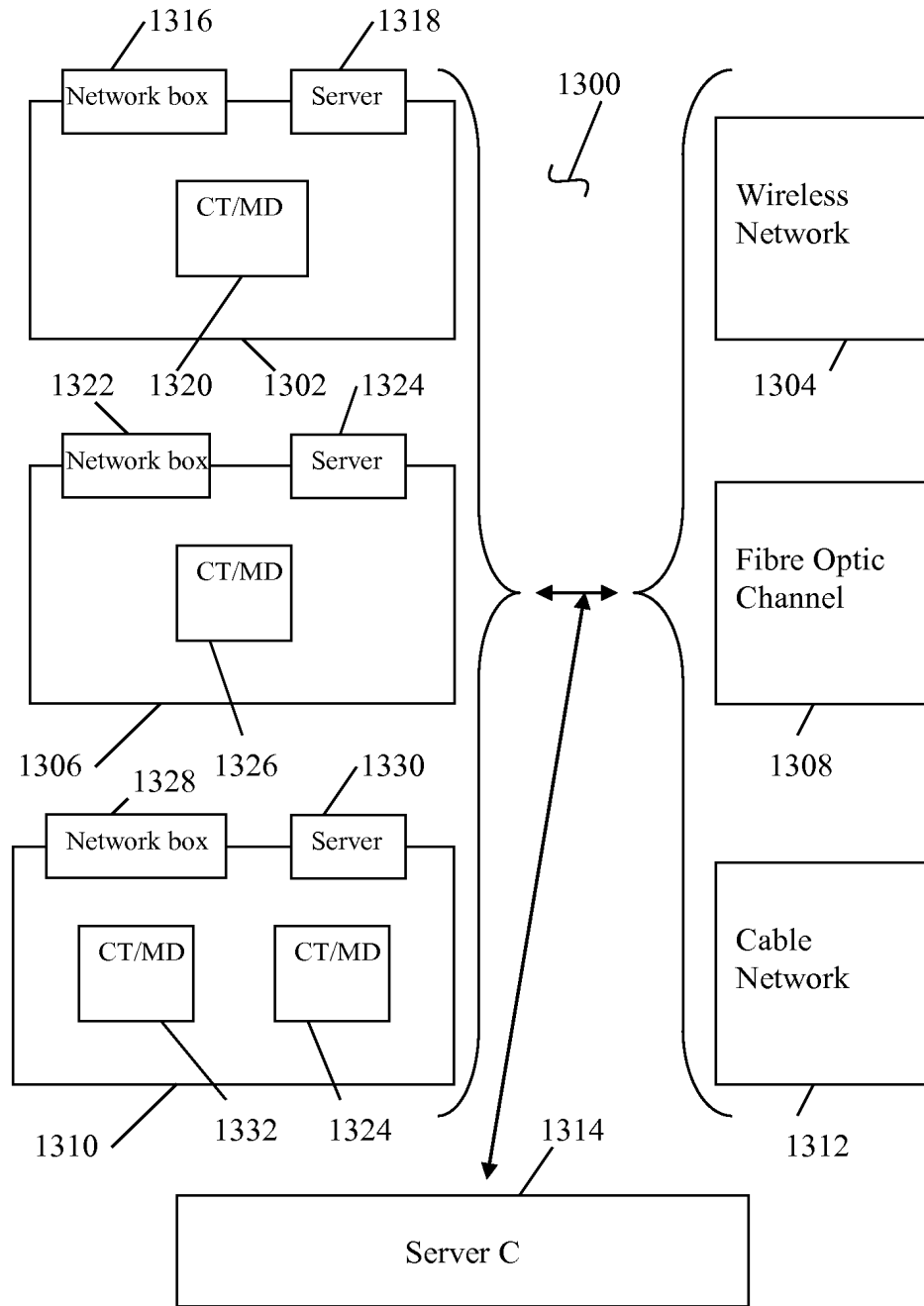


FIG. 13

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**STATEMENT UNDER 37 CFR 3.73(b)**

Applicant/Patent Owner: Raman K. Rao, et al

Application No./Patent No.: 10/940,428 Filed/Issue Date September 13, 2004

Titled: Method and System to Interface Internet Protocol (IP) Based Wireless Devices with Networks

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

states that it is

- 1.  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 021103, Frame 0006, or for which a copy therefore is attached.

OR

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

1. 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.

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3. 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(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.

Rekha K. Rao  
Signature

12/14/09  
Date

Rekha Rao  
Printed or Typed Name

Chief Executive Officer  
Title

This collection of information is required by 37 CFR 3.73(b). 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: 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.

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.

<b>NONPUBLICATION REQUEST UNDER 35 U.S.C. 122(b)(2)(B)(i)</b>	First Named Inventor		Sunil Rao
	Title	A System to Interface Internet Protocol (IP) Base	
	Attorney Docket Number		HMTR3

I hereby certify that the invention disclosed in the attached application **has not and will not be** the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

I hereby request that the attached application not be published under 35 U.S.C. 122(b).

/Rekha K. Rao/

09/17/2012

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

Rekha K. Rao

\_\_\_\_\_  
Typed or printed name

\_\_\_\_\_  
Registration Number, if applicable

\_\_\_\_\_  
Telephone Number

This request must be signed in compliance with 37 CFR 1.33(b) and submitted with the application **upon filing**.

Applicant may rescind this nonpublication request at any time. If applicant rescinds a request that an application not be published under 35 U.S.C. 122(b), the application will be scheduled for publication at eighteen months from the earliest claimed filing date for which a benefit is claimed.

If applicant subsequently files an application directed to the invention disclosed in the attached application in another country, or under a multilateral international agreement, that requires publication of applications eighteen months after filing, the applicant **must** notify the United States Patent and Trademark Office of such filing within forty-five (45) days after the date of the filing of such foreign or international application. **Failure to do so will result in abandonment of this application (35 U.S.C. 122(b)(2)(B)(iii)).**

This collection of information is required by 37 CFR 1.213(a). 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 6 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 (1-800-786-9199) and select option 2.



**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Application No: Not Yet Assigned  
Filing Date: 9/17/2012  
Inventor(s): Sunil K. Rao et al.  
Title: A System to Interface Internet Protocol (IP) Based Wireless Devices with  
Optical and Other Networks for Improved Flexibility, Performance, and Data  
Transfer  
Examiner: Phirin Sam  
Group Art Unit: 2476

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**INFORMATION DISCLOSURE STATEMENT**  
**Under 37 C.F.R. § 1.56, and 1.97-1.98**

Pursuant to the provisions of 37 C.F.R. §§ 1.56 and 1.97-98 of the Rules of Practice in Patent Cases, enclosed herewith is form PTO-SB-08, listing several references. The Examiner is requested to make these references of official record in the application.

The Applicants wish to make the Examiner aware of, and invite the Examiner to consider, as is appropriate, the following Notice of Allowance from the following U.S. patent application:

- Notice of Allowance mailed November 17, 2010 in U.S. patent application 10/940,428, now U.S. Patent 7848300, filed September 13, 2004.

No representation is made or intended as to the completeness of this list, nor is the inclusion of any reference on this list an admission that it is prior art or pertinent to this application.

The information contained in this Information Disclosure Statement under 37 C.F.R. §1.97 and §1.98 is not to be construed as a representation that: (i) a complete search has been made; (ii) additional information material to the examination of this application does not exist; (iii) the information, protocols, results and the like reported by third parties are accurate or enabling; or (iv) the above information constitutes prior art to the subject invention.

Respectfully submitted,

/Rekha K. Rao/

Rekha K. Rao  
Assignee  
Customer Number. 105481