

UTILITY PATENT APPLICATION TRANSMITTAL (ONLY FOR NEW NONPROVISIONAL APPLICATIONS UNDER 37 CFR 1.53(B))		Attorney Docket No. 091523A
		First Inventor Eric van den Berg
		Title REAL-TIME COMPARISON OF QUALITY OF INTERFACES
		Express Mail Label No.

APPLICATION ELEMENTS See MPEP chapter 600 concerning utility patent application contents. 1. ☒ Fee Transmittal Form (e.g., PTO/SB/17) 2. ☐ Applicant claims small entity status. See 37 CFR 1.27. 3. ☒ Specification [Total Pages <u>45</u>] Both the claims and abstract must start on a new page (For information on the preferred arrangement, see MPEP 608.01(a)) 4. ☒ Drawing(s) (35 U.S.C. 113) [Total Sheets <u>8</u>] 5. Oath or Declaration [Total Sheets <u>4</u>] a. ☐ Newly executed (original or copy) b. ☒ A copy from a prior application (37 CFR 1.63(d)) (for continuation/divisional with Box 18 completed) i. ☐ DELETION OF INVENTOR(S) Signed statement attached deleting inventor(s) name in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b). 6. ☒ Application Data Sheet. See 37 CFR 1.76 7. ☐ CD-ROM or CD-R in duplicate, large table or Computer Program (Appendix) ☐ Landscape Table on CD 8. Nucleotide and/or Amino Acid Sequence Submission (if applicable, items a. – c. are required) a. ☐ Computer Readable Form (CRF) b. Specification Sequence Listing on: i. ☐ CD-ROM or CD-R (2 copies); or ii. ☐ Paper c. ☐ Statements verifying identity of above copies 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.: <u>11/209,331</u> Prior application information: Examiner <u>Kerri M. Rose</u> Art Unit: <u>2474</u>	ADDRESS TO: Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450 ACCOMPANYING APPLICATION PARTS 9. ☐ Assignment Papers (cover sheet & document(s)) Name of Assignee Toshiba America Research, Inc. – Piscataway, New Jersey Telecordia Technologies, Inc. – Piscataway, New Jersey Kabushiki Kaisha Toshiba – Kawasaki-shi, Japan 10. ☐ 37 CFR 3.73(b) Statement ☐ Power of Attorney (when there is an assignee) 11. ☐ English Translation Document (if applicable) 12. ☒ Information Disclosure Statement (PTO/SB/08 or PTO-1449) ☐ Copies of citations attached 13. ☐ Preliminary Amendment 14. ☐ Return Receipt Postcard (MPEP 503) (Should be specifically itemized) 15. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed) 16. ☐ Nonpublication Request under 35 U.S.C. 122 (b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent. 17. ☒ Other: Copy of Notice of Change of Correspondence Address
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19. CORRESPONDENCE ADDRESS	
☒ The address associated with Customer Number: <u>89739</u> OR ☐ Correspondence address below	
Name	
Address	
City	State
Country	Zip Code
Telephone	Email
Signature	Date
Name (Print/Type)	Registration No. (Attorney/Agent)

/Stephen B. Parker Reg. 36631/	December 20, 2010
Stephen B. Parker	36,631

<i>Effective on 12/08/2004.</i> <i>Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).</i> FEE TRANSMITTAL For FY 2009		Complete if Known	
☐ Applicant claims small entity status. See 37 CFR 1.27		Application Number	Not Yet Assigned
		Filing Date	December 20, 2010
		First Named Inventor	Eric van den Berg
		Examiner Name	Not Yet Assigned
		Art Unit	Not Yet Assigned
TOTAL AMOUNT OF PAYMENT		(\$)	1,090.00
		Attorney Docket No.	091523A

METHOD OF PAYMENT (check all that apply)

☐ Check
 ☒ Credit Card
 ☐ Money Order
 ☐ None
 ☐ Other (please identify): _____

☐ Deposit Account
 Deposit Account Number: 50-2866
 Deposit Account Name: Westerman, Hattori, Daniels, & Adrian, LLP

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☐ Charge fee(s) indicated below
 ☐ Charge fee(s) indicated below, **except for the filing fee**

☒ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17
 ☒ Credit any overpayments

FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

Application Type	FILING FEES		SEARCH FEES		EXAMINATION FEES		Fees Paid (\$)
	Fee (\$)	<u>Small Entity</u> Fee (\$)	Fee (\$)	<u>Small Entity</u> Fee (\$)	Fee (\$)	<u>Small Entity</u> Fee (\$)	
Utility	330	165	540	270	220	110	1,090.00
Design	220	110	100	50	140	70	
Plant	220	110	330	165	170	85	
Reissue	330	165	540	270	650	325	
Provisional	220	110	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description	Fee (\$)	<u>Small Entity</u> Fee (\$)
Each claim over 20 (including Reissues)	52	26
Each independent claim over 3 (including Reissues)	220	110
Multiple dependent claims	390	195

Total Claims	Extra Claims	Fee (\$)	Fee Paid (\$)	Multiple Dependent Claims
<u>16</u> - 20 or HP	<u>0</u> x	=		Fee (\$) Fee Paid (\$)

HP = highest number of total claims paid for, if greater than 20.

Indep. Claims	Extra Claims	Fee (\$)	Fee Paid (\$)
<u>3</u> - 3 or HP =	<u> </u> x	=	

HP = highest number of independent claims paid for, if greater than 3.

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is \$270 (\$135 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee (\$)	Fee Paid (\$)
<u>41</u> - 100 =	<u>0</u> /50 =	(round up to a whole number) x		

4. OTHER FEE(S)

Non-English Specification, \$130 fee (no small entity discount)

Other (e.g., late filing surcharge): _____

SUBMITTED BY

Signature	/Stephen B. Parker Reg. 36631/	Registration No. (Attorney/Agent)	36,631	Telephone	(202) 822-1100
Name (Print/Type)	Stephen B. Parker	Date	December 20, 2010		

<i>Effective on 12/08/2004.</i> <i>Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).</i> FEE TRANSMITTAL For FY 2009		Complete if Known	
☐ Applicant claims small entity status. See 37 CFR 1.27		Application Number	
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		December 20, 2010	
		First Named Inventor	
		Eric van den Berg	
		Examiner Name	
		Not Yet Assigned	
		Art Unit	
		Not Yet Assigned	
TOTAL AMOUNT OF PAYMENT		(\$)	1,090.00
		Attorney Docket No.	091523A

METHOD OF PAYMENT (check all that apply)

☐ Check
 ☒ Credit Card
 ☐ Money Order
 ☐ None
 ☐ Other (please identify): _____

☐ Deposit Account
 Deposit Account Number: 50-2866
 Deposit Account Name: Westerman, Hattori, Daniels, & Adrian, LLP

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☐ Charge fee(s) indicated below
 ☐ Charge fee(s) indicated below, **except for the filing fee**

☒ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17
 ☒ Credit any overpayments

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Application Type	FILING FEES		SEARCH FEES		EXAMINATION FEES		Fees Paid (\$)
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<u>16</u>	- 20 or HP <u>0</u>	x <u> </u>	= <u> </u>	Fee (\$)
				Fee Paid (\$)

HP = highest number of total claims paid for, if greater than 20.

Indep. Claims	Extra Claims	Fee (\$)	Fee Paid (\$)
<u>3</u>	- 3 or HP = <u> </u>	x <u> </u>	= <u> </u>

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Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee (\$)	Fee Paid (\$)
<u>41</u>	- 100 = <u>0</u>	/50 = <u> </u> (round up to a whole number) x <u> </u>	= <u> </u>	

4. OTHER FEE(S)

Non-English Specification, \$130 fee (no small entity discount)

Other (e.g., late filing surcharge): _____

SUBMITTED BY

Signature	/Stephen B. Parker Reg. 36631/	Registration No. (Attorney/Agent)	36,631	Telephone	(202) 822-1100
Name (Print/Type)	Stephen B. Parker	Date	December 20, 2010		

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	091523A
		Application Number	
Title of Invention	REAL-TIME COMPARISON OF QUALITY OF INTERFACES		
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:

Applicant 1					Remove
Applicant Authority		☒ Inventor		☐ Legal Representative under 35 U.S.C. 117	☐ Party of Interest under 35 U.S.C. 118
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Eric		van den Berg		
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					
City	Hoboken	State/Province	NJ	Country of Residence i	US
Citizenship under 37 CFR 1.41(b) i		NL			
Mailing Address of Applicant:					
Address 1		1000 Hudson street			
Address 2					
City	Hoboken	State/Province	NJ		
Postal Code	07030	Country i	US		
Applicant 2					Remove
Applicant Authority		☒ Inventor		☐ Legal Representative under 35 U.S.C. 117	☐ Party of Interest under 35 U.S.C. 118
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Sunil		Madhani		
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					
City	Lake Hopatcong	State/Province	NJ	Country of Residence i	US
Citizenship under 37 CFR 1.41(b) i		US			
Mailing Address of Applicant:					
Address 1					
Address 2					
City		State/Province			
Postal Code		Country i			
Applicant 3					Remove
Applicant Authority		☒ Inventor		☐ Legal Representative under 35 U.S.C. 117	☐ Party of Interest under 35 U.S.C. 118
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Tao		Zhang		
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					
City	Fort Lee	State/Province	NJ	Country of Residence i	US

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	091523A	
		Application Number		
Title of Invention	REAL-TIME COMPARISON OF QUALITY OF INTERFACES			
Citizenship under 37 CFR 1.41(b) i		US		
Mailing Address of Applicant:				
Address 1	247 Harmon Ave			
Address 2				
City	Fort Lee	State/Province	NJ	
Postal Code	07024	Country	US	
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button.				Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).			
☐ An Address is being provided for the correspondence Information of this application.			
Customer Number	89739		
Email Address	patentmail@whda.com	Add Email	Remove Email

Application Information:

Title of the Invention	REAL-TIME COMPARISON OF QUALITY OF INTERFACES		
Attorney Docket Number	091523A	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		Sub Class (if any)	
Suggested Technology Center (if any)	N/A		
Total Number of Drawing Sheets (if any)	8	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). 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:	☒ Customer Number	☐ US Patent Practitioner	☐ Limited Recognition (37 CFR 11.9)

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	091523A
		Application Number	
Title of Invention	REAL-TIME COMPARISON OF QUALITY OF INTERFACES		
Customer Number	89739		

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	Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	Division of	11209331	2005-08-23
Prior Application Status	Expired	Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
11209331	non provisional of	60662749	2005-03-17
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 ⁱ	Parent 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

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.

Remove			
Assignee 1			
If the Assignee is an Organization check here. ☒			
Organization Name	TOSHIBA AMERICA RESEARCH, INC.		
Mailing Address Information:			
Address 1	1 Telcordia Drive		
Address 2	Suite 1A257		
City	Piscataway	State/Province	NJ
Country ⁱ	US	Postal Code	08854
Phone Number		Fax Number	
Email Address			
Assignee 2 Remove			

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	091523A
		Application Number	
Title of Invention	REAL-TIME COMPARISON OF QUALITY OF INTERFACES		

If the Assignee is an Organization check here. ☒			
Organization Name	Telcordia Technologies, Inc.		
Mailing Address Information:			
Address 1	1 Telcordia Drive		
Address 2	Suite 05G0116		
City	Piscataway	State/Province	NJ
Country ⁱ	US	Postal Code	08854
Phone Number		Fax Number	
Email Address			
Additional Assignee Data may be generated within this form by selecting the Add button. 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	/Stephen B. Parker, Reg. No. 36,631/		Date (YYYY-MM-DD)	2010-12-20	
First Name	Stephen B.	Last Name	Parker	Registration Number	36631

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.

REAL-TIME COMPARISON OF QUALITY OF INTERFACES

This application is a divisional of U.S. Application No. 11/209,331, filed on August 23, 2005 which claims priority under 35 U.S.C. 119 to U.S. Provisional Application Serial No. 60/662,749 filed on March 17, 2005, entitled Real-Time Comparison of Quality of Interfaces (Qol), by Van Den Berg, et al., the entire disclosure of which is incorporated herein by reference.

Field of the Invention:

The present application relates to communications over computer networks. The preferred embodiments also relate more particularly to systems and methods for comparing the qualities of interfaces and, most particularly, to real-time comparison of quality of interfaces by mobile devices over heterogeneous radio networks.

Background:

Networks and Internet Protocol

There are many types of computer networks, with the Internet having the most notoriety. The Internet is a worldwide network of computer networks. Today, the Internet is a public and self-sustaining network that is available to many millions of users. The Internet uses a set of communication protocols called TCP/IP (i.e., Transmission Control Protocol/Internet Protocol) to connect hosts. The Internet has a communications infrastructure known as the Internet backbone. Access to the Internet backbone is largely controlled by Internet Service Providers (ISPs) that resell access to corporations and individuals.

With respect to IP (Internet Protocol), this is a protocol by which data can be sent from one device (e.g., a phone, a PDA [Personal Digital Assistant], a computer, etc.) to another device on a network. There are a variety of versions of IP today, including, e.g.,

IPv4, IPv6, etc. Each host device on the network has at least one IP address that is its own unique identifier.

IP is a connectionless protocol. The connection between end points during a communication is not continuous. When a user sends or receives data or messages, the data or messages are divided into components known as packets. Every packet is treated as an independent unit of data.

In order to standardize the transmission between points over the Internet or the like networks, an OSI (Open Systems Interconnection) model was established. The OSI model separates the communications processes between two points in a network into seven stacked layers, with each layer adding its own set of functions. Each device handles a message so that there is a downward flow through each layer at a sending end point and an upward flow through the layers at a receiving end point. The programming and/or hardware that provides the seven layers of function is typically a combination of device operating systems, application software, TCP/IP and/or other transport and network protocols, and other software and hardware.

Wireless Networks

Wireless networks can incorporate a variety of types of mobile devices, such as, e.g., cellular and wireless telephones, PCs (personal computers), laptop computers, wearable computers, cordless phones, pagers, headsets, printers, PDAs, etc. For example, mobile devices may include digital systems to secure fast wireless transmissions of voice and/or data. Typical mobile devices include some or all of the following components: a transceiver (i.e., a transmitter and a receiver, including, e.g., a single chip transceiver with an integrated transmitter, receiver and, if desired, other functions); an antenna; a processor; one or more audio transducers (for example, a speaker or a microphone as in devices for audio communications); electromagnetic data storage (such as, e.g., ROM, RAM, digital data storage, etc., such as in devices where

data processing is provided); memory; flash memory; a full chip set or integrated circuit; interfaces (such as, e.g., USB, CODEC, UART, PCM, etc.); and/or the like.

Wireless LANs (WLANs) in which a mobile user can connect to a local area network (LAN) through a wireless connection may be employed for wireless communications. Wireless communications can include, e.g., communications that propagate via electromagnetic waves, such as light, infrared, radio, microwave. There are a variety of WLAN standards that currently exist, such as, e.g., Bluetooth, IEEE 802.11, and HomeRF.

By way of example, Bluetooth products may be used to provide links between mobile computers, mobile phones, portable handheld devices, personal digital assistants (PDAs), and other mobile devices and connectivity to the Internet. Bluetooth is a computing and telecommunications industry specification that details how mobile devices can easily interconnect with each other and with non-mobile devices using a short-range wireless connection. Bluetooth creates a digital wireless protocol to address end-user problems arising from the proliferation of various mobile devices that need to keep data synchronized and consistent from one device to another, thereby allowing equipment from different vendors to work seamlessly together. Bluetooth devices may be named according to a common naming concept. For example, a Bluetooth device may possess a Bluetooth Device Name (BDN) or a name associated with a unique Bluetooth Device Address (BDA). Bluetooth devices may also participate in an Internet Protocol (IP) network. If a Bluetooth device functions on an IP network, it may be provided with an IP address and an IP (network) name. Thus, a Bluetooth Device configured to participate on an IP network may contain, e.g., a BDN, a BDA, an IP address and an IP name. The term "IP name" refers to a name corresponding to an IP address of an interface.

An IEEE standard, IEEE 802.11, specifies technologies for wireless LANs and devices. Using 802.11, wireless networking may be accomplished with each single base station supporting several devices. In some examples, devices may come pre-

equipped with wireless hardware or a user may install a separate piece of hardware, such as a card, that may include an antenna. By way of example, devices used in 802.11 typically include three notable elements, whether or not the device is an access point (AP), a mobile station (STA), a bridge, a PCMCIA card or another device: a radio transceiver; an antenna; and a MAC (Media Access Control) layer that controls packet flow between points in a network.

In addition, Multiple Interface Devices (MIDs) may be utilized in some wireless networks. MIDs may contain two independent network interfaces, such as a Bluetooth interface and an 802.11 interface, thus allowing the MID to participate on two separate networks as well as to interface with Bluetooth devices. The MID may have an IP address and a common IP (network) name associated with the IP address.

Wireless network devices may include, but are not limited to Bluetooth devices, Multiple Interface Devices (MIDs), 802.11x devices (IEEE 802.11 devices including, e.g., 802.11a, 802.11b and 802.11g devices), HomeRF (Home Radio Frequency) devices, Wi-Fi (Wireless Fidelity) devices, GPRS (General Packet Radio Service) devices, 3G cellular devices, 2.5G cellular devices, GSM (Global System for Mobile Communications) devices, EDGE (Enhanced Data for GSM Evolution) devices, TDMA type (Time Division Multiple Access) devices, or CDMA type (Code Division Multiple Access) devices, including CDMA2000. Each network device may contain addresses of varying types including but not limited to an IP address, a Bluetooth Device Address, a Bluetooth Common Name, a Bluetooth IP address, a Bluetooth IP Common Name, an 802.11 IP Address, an 802.11 IP common Name, or an IEEE MAC address.

Wireless networks can also involve methods and protocols found in, e.g., Mobile IP (Internet Protocol) systems, in PCS systems, and in other mobile network systems. With respect to Mobile IP, this involves a standard communications protocol created by the Internet Engineering Task Force (IETF). With Mobile IP, mobile device users can move across networks while maintaining their IP Address assigned once. See Request for Comments (RFC) 3344. NB: RFCs are formal documents of the Internet

Engineering Task Force (IETF). Mobile IP enhances Internet Protocol (IP) and adds means to forward Internet traffic to mobile devices when connecting outside their home network. Mobile IP assigns each mobile node a home address on its home network and a care-of-address (CoA) that identifies the current location of the device within a network and its subnets. When a device is moved to a different network, it receives a new care-of address. A mobility agent on the home network can associate each home address with its care-of address. The mobile node can send the home agent a binding update each time it changes its care-of address using, e.g., Internet Control Message Protocol (ICMP).

In basic IP routing (i.e. outside mobile IP), typically, routing mechanisms rely on the assumptions that each network node always has a constant attachment point to, e.g., the Internet and that each node's IP address identifies the network link it is attached to. In this document, the terminology "node" includes a connection point, which can include, e.g., a redistribution point or an end point for data transmissions, and which can recognize, process and/or forward communications to other nodes. For example, Internet routers can look at, e.g., an IP address prefix or the like identifying a device's network. Then, at a network level, routers can look at, e.g., a set of bits identifying a particular subnet. Then, at a subnet level, routers can look at, e.g., a set of bits identifying a particular device. With typical mobile IP communications, if a user disconnects a mobile device from, e.g., the Internet and tries to reconnect it at a new subnet, then the device has to be reconfigured with a new IP address, a proper netmask and a default router. Otherwise, routing protocols would not be able to deliver the packets properly.

Quality of Interfaces

A number of approaches are available that compare the qualities of the interfaces based on a very narrow set of criteria such as radio signal strength or signal to noise

ratios. However, these approaches limit their comparison to the radio network.

Using end-to-end path quality comparisons to select optimal paths has been studied in Reference [6], incorporated herein below, in the context of MPLS (Multi-protocol Label Switching) networks, where a centralized decision is made on optimal routes to connect traffic sources and destinations. Furthermore, the end-to-end path quality comparisons are used within a single autonomous domain, where the network operator typically has access to all the required statistics. However, these statistics are hard to estimate for an individual mobile. Therefore, such methods are not suitable for an individual multi-interface (mobile) host to compare the qualities of its interfaces in real time.

In addition, techniques are currently available for estimating the available bandwidth, delay or jitter along a network path and may be used to estimate these parameters for multiple interfaces and then compare them (see Reference [10] incorporated below). However, these techniques typically require the device to send a large number of probe packets resulting in long delays and significant waste of scarce wireless network resources; hence, they are not suitable for wireless devices.

The following background references show, among other things, some background technologies related to comparing qualities of interfaces, all of which references are incorporated herein by reference in their entireties as though recited herein in full.

[1] V. J. Ribeiro et al. "pathChirp: Efficient Available Bandwidth Estimation for Network Paths", PAM Workshop, 2003.

[2] M. Jain, C. Dovrolis, "End-to-End available bandwidth: measurement methodology, dynamics, and relation with TCP throughput," Proceedings of ACM SIGCOMM, 2002.

- [3] B. Melander, M. Bjorkman, P. Gunningberg, "A new end-to-end probing and analysis method for estimating bandwidth bottlenecks," Global Internet Symposium, 2000.
- [4] K. Lai, M. Baker, "Measuring link bandwidth using a deterministic model of packet delay", ACM SIGCOMM, August 2000.
- [5] N. Hu, P. Steenkiste, "Evaluation and Characterization of Available Bandwidth Probing Techniques", IEEE Journal of Selected Areas in Comm., Vol. 21, No. 6, Aug. 2003, pp. 879-894.
- [6] T. Anjani et al., "A New Path Selection Algorithm for MPLS Networks Based on Available Bandwidth Estimation", QofIS/ICQT 2002, LNCS 2511, pp. 205-214, 2002.
- [7] T. Anjani et al., "ABEst: An Available Bandwidth Estimator within an Autonomous System.", Proceedings Globecom 2002.
- [8] B.K. Gosh, P.K. Sen, "Handbook of Sequential Analysis", Marcel Dekker, NY, 1991.
- [9] H.R. Neave, P.L. Worthington, "Distribution Free Tests", Unwin Hyman, London, 1988.
- [10] R.S. Prasad, M. Murray, C. Drovolis and K. Claffy, "Bandwidth estimation: metrics, measurement techniques, and tools", IEEE Network, 2004.
- [11] S. Saroiu, P.K. Gummadi, S.D. Gribble, "SProbe: A Fast Technique 'for Measuring Bottleneck Bandwidth in Uncooperative Environments", Proceedings IEEE Infocom, 2002.

[12] H. Kaaranen et al. "UMTS Networks: Architecture, Mobility and Services", Wiley, 2001.

[13] V. K. Garg, "IS-95 CDMA and cdma2000: Cellular/PCS Systems Implementation", Prentice-Hall, 2000.

While a variety of communication systems and methods are known, there remains a need for improved and enhanced systems and methods for communicating over the Internet and/or other networks. Among other things, while there has been work done in the area of physically tracking devices and people, existing systems do not allow, inter alia, messages to be directed to particular locations and not to other locations.

SUMMARY OF THE PREFERRED EMBODIMENTS

The preferred embodiments of the present invention can significantly improve upon existing methods and/or apparatuses.

As discussed above, a number of approaches are available that compare the qualities of the interfaces based on a very narrow set of criteria such as radio signal strength or signal to noise ratios, which approaches limit their comparison to the radio network. On the other hand, in the preferred embodiments of the present invention, approaches are designed to handle many more criteria of interface qualities, taking a full end-to-end network path into account – including, by way of example, round-trip available bandwidth, end-to-end delay and delay jitter, unidirectional available bandwidth, delay and delay jitter along an end-to-end network path through each interface.

Other methods are either 1) not suitable for dynamic, rapid comparison by distributed hosts or 2) not applicable to general comparison metrics for path.

According to the preferred embodiments, techniques are provided for a device to make rapid comparisons of the quality of the interfaces using a minimal number of injected network packets, requiring minimal information regarding path quality metrics, and making it suitable for both wireline and wireless networks.

According to the preferred embodiments, methods employed can achieve the comparison with a very small number of probe packets and can be done in a much shorter time, hence it is well suited for wireless networks and for situations where comparison needs to be done quickly (e.g., when QoI comparison is used as the basis for determine when to handoff into a new network).

In the preferred embodiments, techniques are provided for a multi-interface device to dynamically and rapidly compare the qualities of its interfaces in a domain of wireline and/or wireless paths in real-time, and with minimal injection of network traffic. These techniques preferably need minimal information about path quality metrics.

According to some embodiments, a method for substantially real-time comparison of quality of interfaces (QoIs) by mobile devices over heterogeneous wireless networks, comprising: comparing in substantially real-time the qualities of multiple interfaces using path quality metrics that are independent of how the QoI is measured, whether measured by a path through a wireless network alone or a path through both a wireless network and through a wired network, said method including comparing path quality as a quickest change detection problem for observations from a new interface or comparing path quality based on sequential two sample tests.

According to other embodiments, a method for substantially real-time comparison of quality of interfaces (QoIs) by mobile devices over heterogeneous wireless networks, comprising: comparing in substantially real-time the qualities of multiple interfaces using path quality metrics that are independent of how the QoI is measured, whether

measured by a path through a wireless network alone or a path through both a wireless network and through a wired network, said method including performing a one-sample change point detection method or performing a non-parametric and on-line two-sample method.

According to other embodiments, a method for substantially real-time comparison of quality of interfaces (Qols) by mobile devices over heterogeneous wireless networks, comprising: comparing in substantially real-time the qualities of multiple interfaces using path quality metrics that are independent of how the Qol is measured, including comparing path quality as a quickest change detection problem for observations from the new interface. In some examples, there are a set of observations from a new interface, and said comparing includes detecting whether the mean of these observations will be higher than an average available metric value. In some examples, the method includes employing a cumulative sum procedure for a path quality comparison.

According to other embodiments, a method for substantially real-time comparison of quality of interfaces (Qols) by mobile devices over heterogeneous wireless networks, comprising: comparing in substantially real-time the qualities of multiple interfaces using path quality metrics that are independent of how a Qol is measured, including comparing path qualities based on sequential two sample tests.

According to other embodiments, a method for substantially real-time comparison of quality-of-interfaces by mobile devices over heterogeneous radio networks, comprising: comparing in substantially real-time the qualities of multiple interfaces using independent Qol metrics and methods used to obtain Qol measurement, whether measured by a path through a radio network alone or a path through both a radio network and through a wired network.

In some illustrative examples a multi-interface mobile device or host may have N interfaces (e.g., where $N = 2$ or more). In some preferred embodiments, measurements are

taken on each of these interfaces that reflect the Quality of Interface (Qol). Illustrative examples of such measurements can include: end-to-end available bandwidth; round-trip delay; etc. The mobile device or host preferably includes a functional element or module with which a comparison of the Qol measurements takes place.

In the preferred embodiments, methods for quick, real-time comparison of the Qols for different measurement scenarios are provided. While illustrative examples are described in which a mobile has two interfaces, the methods can each be generalized cases when the mobile has $N > 2$ interfaces.

Case 1

In some examples, we may have many Qol measurements from the current interface, but not many from the other interfaces. In such examples, we can employ a methodology based on quickest sequential change detection.

In the preferred embodiments, the method is related to a cumulative sum (CUSUM) procedure, applied in a novel way as follows: let the null hypothesis H_0 be that the new interface does not provide significantly higher average bandwidth than the current path. We can apply the CUSUM procedure to solve the path quality comparison problem as follows:

- Step 1: From m observations $\{X_1, \dots, X_m\}$ on the current interface, compute the sample mean μ_1 and the sample standard deviation σ_1 .
- Step 2: For each new observation X_m
 - a) If the observation is from the current interface, update μ_1 and σ_1 ,
 - b) If X_m is from the new interface, calculate
$$Z_n = (Z_{n-1} + ((X_m - \mu_1) / \sigma_1 - k)^+), Z_0 = 0 \text{ where } (x)^+ = x$$
if $x > 0$, and 0 otherwise.
- Step 3: If $Z_n > h$, then recommend switching interfaces (reject H_0), otherwise don't switch interface.

Note that the above procedure treats the observations from the old the new interfaces as if they are from the same data series and then seeks to detect whether and when the mean of this combined data series will change. This type of approach for detecting changes in a mean fall into the genre of methods commonly referred to as one-sample change-point detection methods.

An example of this process is shown in Fig. 2. An interface switch is initiated/recommended after the 12th observation, indicated by the red points above the threshold line h .

Case 2

Suppose we have paired observations, (X_n, Y_n) , one observation for each interface. If necessary, we construct paired observations by discarding the "old" observations on the current interface that do not have matching observations on the new interface and then match each observation on the new interface by its closest observation in time on the current interface.

Paired observations can be used for effective path quality comparisons, for example, when the path quality metric is highly non-stationary, or X_n and Y_n are strongly correlated, or when paired observations on both interfaces are easy to obtain. Since each interface uses a different network path, X_n and Y_n are assumed to be independent. We consider the differences: $X_{t_n} = X_n - Y_n$.

If the scale of the X_{t_n} is known/estimated, e.g., σ_{t_1} , we proceed by calculating

$$Z_{t_n} = ((Z_{t_{n-1}} + (X_{t_n} / \sigma_{t_1} - kt), Z_{t_0} = 0.$$

as in Step 2b) described above, and rejecting H_0 if in Step 3, for appropriate values of h_t and kt .

In the quickest change detection methods 1) and 2) described above, accurate

estimates of the mean path quality of the current network path and/or its variance are needed. In the following alternate approaches, however, such is not needed.

Case 3

In some examples, a mobile may not have extensive knowledge of the quality of the current path but may have several measurements for both paths. In such a context, it is still possible to make a principled decision as to which interface has a higher quality.

In the preferred embodiments, a two-sample statistical test is used to compare the quality of the two paths. The input data to the test are the measured or predicted available bandwidth values for each interface. As each interface uses a different network path, we assume the data points for the two interfaces are independent samples. We test the difference in average quality by testing for a difference in location (mean/median) of the two samples. Our approach includes using a test which is non-parametric (distribution free), works for unequal sample sizes, and is online (quick to compute, essentially independent of the length of the available samples.). A test which satisfies these requirements is Rosenbaum's test.

Let $A = \{X_1 \dots, X_{n1}\}$ denote the set of observations of available bandwidth included in sample set A containing samples from the current interface. Here, $X_1 \dots X_{n1}$ are assumed to follow an arbitrary distribution with cumulative distribution function, $F(x)$. . Similarly, let $B = \{Y_1 \dots, Y_{n2}\}$ denote the values of the observations from the new interface, with common c.d.f. $G(x)$. Let $n = n1 + n2$. Without loss of generality, let the location of $G(x)$ be θ and the location of $F(x)$ be 0. The null-hypothesis of our tests is: $H_0: \theta = 0$ (i.e., the old interface does not provide significantly higher average available bandwidth), which is tested against the alternative $H_1: \theta > 0$.

Suppose the spread of a distribution increases with its location and say the location of sample set B is greater than the location of samples in A. Suppose we

combine sample sets A and B to create one large ordered sample set. Then, there is a tendency for B's data points to accumulate at the high end of the combined sample if the new interface provides higher average available bandwidth. Keeping this in mind, Rosenbaum's test statistic T_R involves the total number of B's data points, which have a value larger than the largest value in A.

If the overall maximum is not from sample set B, then the test stops immediately, and the null-hypothesis H_0 is not rejected in favor of H_1 . Otherwise, H_0 is rejected in favor of H_1 if T_R is larger than a critical value C . To calculate C , we use the distribution of T_R . For independent samples this is easy, for any sample size $n = n_1 + n_2$. Asymptotically as $n_1 \rightarrow \infty$, $n_2 \rightarrow \infty$, with $n_2/N \rightarrow p$, this converges to simply: $P(T_R \geq h) \approx p^h$.

Note that the Rosenbaum test is based on the length of the high-end "extreme run" of the samples in B, which is easy to track online.

This simple test is well-suited for cases where an increase in the mean is accompanied by an increase in the variance. Similarly, if we would have prior knowledge that typically a high location (e.g., mean or median) would be accompanied by a low spread (e.g., variance), then we could construct a similar test which only considers the "low-end" extreme run of the samples in A. This would be equally easy to apply.

On-line application of the above tests implies repetition of the test for every new observation or every new batch of observations. This means that the critical values of the tests would preferably be adjusted and/or that the tests are only applied a finite number of times.

Case 4

In some embodiments, if we have paired observations (X_n, Y_n) , which are strongly

correlated, the two sample tests described in Case 3 above are weaker or even invalid. To overcome this, we can use non-parametric approaches to test the differences. One on-line nonparametric test that we used for this purpose is the Wilcoxon sign-test. A similar non-parametric test, the Wilcoxon signed-rank test is more powerful, but has to maintain ranked samples, hence it is not an on-line algorithm.

Various Embodiments

Among other things, the preferred embodiments do not depend on application specific (e.g. decibel) thresholds. As expressed above, in the preferred embodiments, the cumulative sum tests (see 1 and 2) are used in a novel way, to compare two different samples, instead of detecting a change-of-mean in one sample or two-sample tests in (see 3 and 4) are chosen to be non-parametric (distribution free) and implementable in an on-line manner. Among other things, this is in contrast to parametric tests, which typically make the assumption that underlying distributions are Gaussian, and then use asymptotically optimal likelihood-ratio based tests, and traditional optimal nonparametric tests, which typically require availability of the entire measurement history. Moreover, the tests have good small sample behavior.

When a mobile has $N > 2$ interfaces available, the above-discussed comparison tests can still be used. In this regard, a decision of interest is the best network path among the N candidates; accordingly, a total of $N-1$ pair-wise tests (e.g., between the current path and each of the $N-1$ alternatives) can be employed in some embodiments.

According to the preferred embodiments, the solutions are not limited to radio signal strength measurements, and can take into account, inter alia, the quality of the end-to-end path from an interface to a corresponding host. In contrast, current approaches for mobile interface comparison only take into account the radio network, and in particular are largely based on signal strength alone.

The preferred embodiments described herein solve existing problems in the art based on a unique understanding of computer networks, performance measurements, statistics and more. Existing methods that involve merely measuring bandwidth are not suitable for wireless networks. In addition, other art single-handedly addresses comparing metrics but those arts require information for the comparison which may not be available to mobile hosts. Similarly, statistical change detection methods have been devised which typically only looks for changes in single measurement streams instead of multiple ones.

The above and/or other aspects, features and/or advantages of various embodiments will be further appreciated in view of the following description in conjunction with the accompanying figures. Various embodiments can include and/or exclude different aspects, features and/or advantages where applicable. In addition, various embodiments can combine one or more aspect or feature of other embodiments where applicable. The descriptions of aspects, features and/or advantages of particular embodiments should not be construed as limiting other embodiments or the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

The preferred embodiments of the present invention are shown by a way of example, and not limitation, in the accompanying figures, in which:

FIG. 1(A) is an architectural diagram depicting an illustrative environment in which a mobile device having a plurality of interfaces communicates with a plurality of networks;

FIG. 1(B) is another architectural diagram depicting an illustrative environment in which a mobile device having a plurality of interfaces communicates with a plurality of

networks, and also illustrating some components of an illustrative mobile device and an illustrative access point with which the mobile device communicates in a first network;

FIG. 2(A) is a graph depicting Ethernet and Wavelan available path bandwidths to an illustrative node at www.toast.net;

FIG. 2(B) is a set of graphs showing pair-wise correlation functions between available bandwidth series of Ethernet and Wireless links according to some illustrative examples;

FIG. 3 is a graph showing illustrative results for a CUSUM test on real measurements according to some illustrative examples;

FIG. 4 is an illustrative graph showing Ethernet, Wavelan and DCMA 2000 1xRTT available path bandwidths;

FIG. 5 is illustrative pair-wise correlation functions between the available bandwidth series of the three links;

FIG. 6 is an illustrative graph showing results for CUSUM test on real measurements; and

FIG. 7 is an illustrative graph showing results for CUSUM matched pair test on real measurements.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

While the present invention may be embodied in many different forms, a number of illustrative embodiments are described herein with the understanding that the present disclosure is to be considered as providing examples of the principles of the various

inventions described herein and that such examples are not intended to limit the invention to preferred embodiments described herein and/or illustrated herein

General:

Emerging mobile devices are equipped with multiple interfaces allowing users to take advantage of heterogeneous radio technologies (e.g., cellular networks and wireless LANs). To support mobility and quality of service (QoS) for such multi-interface mobile devices, it is important to dynamically determine which interface or interfaces a mobile should use and when to switch from one interface to another. To make such decisions, it is critical for the mobile to compare the "qualities of the interfaces (QoI)", which may be measured by a variety of metrics, in real time so that the mobile can switch from one interface to another without user perceivable interruptions to on-going applications. This application, among other things, presents and analyzes new techniques for a mobile device to make rapid comparison of the quality of the interfaces using quickest sequential change detection and sequential two-sample hypotheses tests.

The preferred embodiments contemplates that future wireless networks will use multiple radio technologies to meet different communication needs. For example, short-range radio technologies (e.g., Bluetooth) may be used to connect nearby devices (e.g., devices carried by a person or inside an office, vehicle, or home); private or public wireless LANs (e.g., IEEE 802.11) for continuous coverage throughout a building, a campus, an airport, a shopping mall, and cellular radio systems (e.g., GSM, GPRS, cdma2000, WCDMA) for wide-area coverage. Therefore, mobile devices (also referred to herein as mobiles) are being equipped with multiple radio interfaces, each supporting a different radio technology.

By way of example, FIG. 1(A) shows an illustrative future network configuration in which a mobile device 1 is shown as having interfaces for communicating with base stations 2A, 2B and access points 3A, 3B. In this illustrative example, the base stations

2A and 2B are shown as communicating with a base station controller 4 that in turn communicates with a call agent 7 which is in communication with the public switched telephone network (PSTN) 12. As also shown, the access points 3A and 3B can include, e.g., IP network access points and can be in communication with a gateway 5 that communicates, in turn to a router 6 that communicates via an IP network 10, such as, e.g., the Internet, via a trunking gateway 11 to the public switched telephone network 12.

To take full advantage of different radio technologies, a mobile device preferably is configured to select which radio interfaces (i.e., radio networks) to use and when to switch between the interfaces (hence, between radio networks), preferably in a seamless manner with little interruption to user applications. Therefore, a significant question to answer before switching to a new interface is whether a new interface will provide higher quality for a future time period than the currently used interface. The quality of an interface (QoI) can be measured in different ways depending on circumstances, such as, e.g., the needs of user applications.

With reference to FIG. 1(B), in some illustrative embodiments a mobile device 1 can include a plurality of interfaces. In the illustrated embodiment, three interfaces are shown: Interface 1; Interface 2 and Interface 3. However, in various embodiments any number of interfaces can be employed. In illustrative embodiments, a mobile device can include, e.g., portable computers, personal desktop computers, PDAs, portable voice-over-IP telephones and/or other devices. Typically, such mobile devices will include a transceiver (including an antenna for communication with the access point), a processor, memory (including, e.g., program memory and Random Access Memory). As also shown, the memory can include a program or module, such as, e.g., QoI Comparison Module for carrying out functionality as described herein-below. In various embodiments, processes to be carried out by the mobile device can be performed via software, hardware and/or firmware as may be appropriate based on circumstances.

In an illustrative embodiment shown in FIG. 1(B), a mobile device 1 is shown that is capable of communicating via a plurality of networks, such as, e.g., via Interface 1-3. For example, the mobile device can communicate via the Access Point 22 or via a Base Station 2, similar to that shown in FIG. 1(B). Additionally, FIG. 1(B) also schematically depicts an example in which the mobile device 1 can also communicate with another network, such as, e.g., another wireless network or a wired networks. With reference to FIG. 1(B), in some illustrative and non-limiting embodiments, the access point 22 can be within a wireless local area network (WLAN) connected to a wireline network 20. In some examples, the wireline network 20 can include the Internet or a corporate data processing network. In some examples, the access point 22 can be a wireless router. In some embodiments, the access point 22 can have a network interface 25 linked to the wireline network 21 and a wireless transceiver in communication with the mobile device 1 and with other mobile devices. By way of example, the wireless transceiver 26 can include an antenna 27 for radio or microwave frequency communication with the mobile devices. The access point 22 preferably also has a processor 28, a program memory 29, and a random access memory 31.

Today, mobile devices typically use only the information regarding radio networks to measure and compare QoI. This information includes radio signal strength or signal-to-noise ratio (SNR). However, a high signal strength or a high signal-to-noise ratio does not necessarily mean a high available bandwidth or a low delay through the radio network.

In general, the QoI should reflect the quality of the network path, which may involve a path through the radio network and a path through a wired backbone network (such as, by way of example, a wireline network 20 like that shown in FIG. 1(B)), between the mobile device interface and a corresponding node with which, for example, the mobile device is ultimately communication with. Depending on circumstances, the quality of a network path may be measured in a variety of ways

including unidirectional delay, round-trip delay, delay jitter, available bandwidth of the network path, or their combinations.

In some instances, the network path used to measure the Qol can be the path through the radio network only, for instance when the radio network is known to be the bottleneck in the end-to-end path. However, it is often difficult for a mobile to know whether a radio network or a wired backbone network will be the bottleneck for a particular application because it depends on a large number of factors that can dynamically change over time. These factors include, for example, the specific designs of the radio and the backbone networks, the current network loads in the radio and the backbone networks, the specific requirements of the application, and even the location of the mobile device.

Therefore, it is advantageous for a multi-interface mobile to be able to compare in real time the qualities of multiple interfaces regardless of how the Qol is measured -- e.g., whether it is measured by the path through the radio network alone or by an end-to-end path that includes both a path in the radio network and a path through a wired network.

In this disclosure, novel and advantageous solutions to this Qol comparison problem are presented in which, for example, the available bandwidth of a network path is used as the measure of Qol. Accordingly, we will now discuss in more detail the meaning of the available bandwidth of a network path. To begin with, we first discuss the capacity of a network path. As discussed in Reference [10] incorporated above, the capacity of a link along a network path can be defined as the maximum possible IP-layer transfer rate across that link. Accordingly, the capacity C of the network path can then be defined as the minimum link capacity in the path:

$$C = \min_{i=1, \dots, H} C_i,$$

where C_i is the capacity of the i -th link along the path and H is the number of links in the path. The available bandwidth of a link is the unused, "spare" capacity of the link during a certain time period. If C_i is the capacity of link i , and u is the average utilization of that link in the given time interval, then the average available bandwidth A_i of link i will be:

$$A_i = (1 - u_i) C_i$$

The available bandwidth of an H hop network path is then the minimum available bandwidth among the H links:

$$A = \min_{i=1, \dots, H} A_i.$$

Illustrative approaches for estimating available path bandwidth exist and can be broadly classified in the following categories:

- **Self-Induced Congestion Approaches.**

These approaches measure the available bandwidth or "spare" capacity along a network path. Self-induced congestion approaches are based on the following principle: If the rate of the probe packets exceeds the available bandwidth over a path, congestion will occur and the probe packets will be queued at the bottleneck router (or routers) along the path causing the inter-packet time interval to be longer at the receiver than at the sender. On the other hand, if the probing rate is below the available bandwidth over the path, no congestion will occur and the probe packets will experience no queuing delay. Therefore, the available bandwidth along a path can be estimated as the probing rate at the onset of congestion.

A few examples of self-induced congestion approaches include Pathload discussed in Reference [2] incorporated above, TOPP discussed in Reference [3] incorporated above, and PathChirp discussed in Reference [1] incorporated above.

These methods need significant cooperation between nodes at both ends of a path to estimate the available path bandwidth.

- **Packet Pair Train Dispersion Methods.**

With reference to References [4], [5] and [11], packet pair train dispersion methods estimate the Asymptotic Dispersion Rate along a path, a measure related to capacity, but influenced by the amount of cross traffic. Packet pair/train dispersion techniques typically need measurements at both ends of the network path. However, it is also possible to perform these measurements without access at the receiving node, by forcing the receiving node to send a message (such as, e.g., by forcing the receiving node to send ICMP port-unreachable or TCP RST packets) in response to each probe packet (see Reference [11] incorporated above).

- **Combined Self-Induced Congestion and Packet Pair Approaches.**

In some embodiments, it is also possible to successfully combine self-induced congestion and a packet pair technique: examples of such hybrid methods include IGI, and PTR (see Reference [5] incorporated above). Like pathChirp, these hybrid methods are relatively efficient, specifically compared to the Pathload method. PathChirp reportedly uses less 10% of the probe-volume of the Pathload method (see Reference [1] incorporated above), and IGI/PTR converges much faster than the Pathload method, in approximately 10% of the time (see Reference [5] incorporated above). The reported convergence time of IGI/PTR is on the order of 4-6 round-trip times (RTTs).

- **TCP Bulk File Transfer Rate Approaches.**

These methods measure available bandwidth by measuring the transfer time of a fixed-size file using the TCP protocol. A benefit of this technique is that it more closely reflects the available path bandwidth to be experienced by a data-

application. However, the quality of the estimation depends on the behavior of the TCP protocol which may differ depending on the type of networks. If the file is requested or pushed from a server (e.g., a Web server), the quality of the estimation can also be affected by the load on the server. Since these methods use a TCP connection between both end nodes, they implicitly require cooperation at both ends of the network path.

A straight-forward approach to comparing the average available path bandwidths of two network paths over a future time period is to first estimate the average available path bandwidths probing mobile device to, send out a large number of probe packets. For example, Pathload (see Reference [2] incorporated above) may require several megabytes of probing traffic and may take hundreds of RTTs to obtain an estimate of the available bandwidth over a path. Although the packet pair approaches can reduce the number of probe packets, a substantial number of probe packet pairs will still be needed to obtain each sample of available bandwidth in order to reduce the potential inaccuracy caused by cross traffic. Sending a large number of probe packets will waste the scarce power resources on the mobiles and the scarce radio bandwidth and may also result in excessive handoff delay.

Methods also exist that rely on the knowledge of the past and recent link utilizations to estimate available bandwidth and to then select routes or paths to connect the traffic sources and destinations (see References [6] and [7] incorporated above). They are in fact used in a context of a single autonomous domain, where the network operator typically has access to the required statistics. However, these statistics are hard to know or estimate for an individual mobile, and therefore these methods are not suitable to be used by a mobile to compare the qualities of its multiple interfaces in real time. Therefore, in the preferred embodiments, a new category of methods that can be used by a multi-interface mobile device is presented in order to compare in substantially real-time or in real-time the qualities of its interfaces regardless of what QoI metrics is used (e.g., be it by the information regarding the radio network alone or by the available bandwidth of an end-to-end path) and how the QoI measurement is

obtained.

The preferred embodiments are preferably adapted to meet the following requirements for QoI comparison needed by mobile terminals:

- Minimizing the probing traffic to be sent over the interfaces to reduce the consumption of the scarce power resources on the mobile and the scarce radio network bandwidth for transporting the probe traffic.
- Performing the comparison as quickly as possible to reduce handoff delay and potential interruptions to user applications.
- Supporting the comparison of both short-term and long-term QoI because the QoI may vary widely over time.
- Being able to handle arbitrary probability distributions of the QoI and the fact that this probability distribution may not be known to the mobile when QoI comparison needs to be performed.

The following section under Exemplary Embodiments sets forth and further describes some proposed approaches, followed by a discussion of illustrative performance results of the proposed approaches based on available path bandwidths measured over multiple real networks.

Exemplary Embodiments:

1. Basic Approach

Consider a mobile terminal with two interfaces, for example, one cellular radio interface allowing the mobile to access GSM, GPRS, cdma2000, or WCDMA and one wireless local area network (LAN) interface such as IEEE 802.11 allowing the user to access his/her enterprise networks and public wireless LAN hotspots. At any given time, we refer to the interface that the mobile has been using to support user applications as the current or old interface. We call the network path between the old interface and a reference node the old network path. The reference node could be, for example, the corresponding node or a gateway that the traffic between the mobile and the corresponding node traverses. We refer to the interface that the mobile is not currently using to transport application traffic as the new interface and we call the network path between the new interface and the reference node the new network path.

One objective of the QoI comparison problem is to determine in real time whether the new interface will have a significantly higher QoI (which, we assume as an example, is measured by the average available path bandwidth.) over a future time period. To meet the main design requirements outlined above, a central idea is to take advantage of the information a mobile can accumulate on the QoI of the old interface in a way that the mobile needs little information on the QoI of the new interface to carry out the comparison. This idea allows the proposed methods to have the following important characteristics:

- Able to compare the average available path bandwidth without having to know the average path bandwidth of a new interface first. The preferred embodiments do not require the mobile to know the average available bandwidth of the new path first in order to compare it with the average available bandwidth of the old path. The number of samples of the available bandwidth over the new path needed by the preferred embodiments can be significantly smaller than the number of samples needed to estimate the average available bandwidth of the new path. In fact, in some embodiments, a single sample could be used to obtain a rough comparison. In other

embodiments, more samples could help increase the accuracy of the comparison. As a result, the preferred embodiments can significantly reduce the number of probe packets to be sent over the new path and the time it takes to complete the bandwidth comparison.

- Independent of Qol metrics and methods used to obtain Qol measurement. The preferred embodiments involve methodologies that apply to any metrics used to measure Qol – such as, e.g., the available bandwidth of an end-to-end path or the path inside a radio network only, average delay, and average signal strength or SNR. Furthermore, the preferred embodiments involve approaches that do not depend on any particular method for obtaining samples of the Qol. For example, when the available path bandwidth is used to measure Qol, any methods described above for estimating the available path bandwidth may be used to obtain samples of the available path bandwidth.
- Able to meet preset target confidence levels. The proposed methods are capable of performing comparisons that meet given confidence levels, i.e., limits on the occurrence of "false alarms".

2. Approaches Based on Quickest Sequential Change Detection

We assume that the mobile takes samples (observations) of the available bandwidth of the path it has been using to estimate the distribution of the available bandwidth on this path. This way, the mobile can obtain a good estimate of the average available path bandwidth μ_1 of the old path and its standard deviation σ_1 . We formulate the path quality comparison problem as a quickest change detection problem for observations of the available bandwidth from the new interface.

Suppose we have observations $B = \{Y_1, Y_2, \dots\}$ from the new interface. The interface quality comparison problem is then to detect whether and when the mean of

these samples in B will be higher than μ_1 . In other words, if from the m-th sample, the sample mean starts to be larger than μ_1 , we want to detect this change in the mean as quickly as possible.

The quickest sequential detection problem is discussed in Reference [8] incorporated herein above. The detection procedures typically seek to minimize the average detection delay $T = N - m + 1$ (if $m < \infty$) (where m is the time the mean-change occurred, and N is the time at which this change is detected), subject to a bound on the average run length or false alarm probability.

Next, we describe two ways to use sequential change detection methods in order to compare the path qualities. The first approach assumes that the observations from the old the new interfaces are obtained at different times, i.e., the observations cannot be well matched in time. This, for example, will be the case when observations of the old path are taken mostly before the need for a handoff occurs and the observations from the new path are taken at and immediately after the time point the mobile initiates the path quality comparison procedure (i.e., during the handoff process). The second approach assumes that the observations from the old' and new interfaces can be matched in time. This, for example, will be the case when the mobile can obtain observations from both interfaces at approximately the same time points.

Sequential Change Detection With Unmatched Observations

An efficient detection procedure, which has been proved optimal in the case of i.i.d., normally distributed observations, and in a variety of other settings (see Reference [9] incorporated above), is Page's cumulative sum or CUSUM procedure. It defines the variables

$$\tilde{Y}_i = \frac{Y_i - \mu_1}{\hat{\sigma}_1} - k ,$$

where k is a design parameter. Furthermore, it defines the variables

$$W_n = S_n - \min_{0 \leq i \leq n} \{S_i\}, n \geq 1$$

where

$$S_i = \sum_{j=1}^i Y_j, \text{ with } W_0 = 0$$

The test now declares that a change has occurred as soon as $W_n \geq h$, $h > 0$.

A CUSUM procedure is defined by the two parameters k and h (see Reference [16] incorporated above). They are typically chosen to make the Average Run Length (ARL) of the test large if there is no change in the process mean, and small if there is a significant change in the mean. Parameter k influences the minimum (quickly) detected change, and keeps the test statistic small when there is no change in the mean. We can think of k as the overhead cost of switching interfaces. ARL values for different values of k and h have been tabulated and these tables can be used for selecting the values of parameters k and h .

Let the null hypothesis H_0 be that the new interface does not provide significantly higher average bandwidth than the current path, then we can apply the CUSUM procedure to solve the path quality comparison problem as follows:

Step 1: From m observations

$$\{X_1, \dots, X_m\}$$

on the current interface, compute the sample mean

$$\hat{\mu}_1$$

and the sample standard deviation

$$\hat{\sigma}_1$$

Step 2: For each new observation X_n :

If the observation is from the current interface, update

$$\hat{\mu}_1$$

and

$$\hat{\sigma}_1$$

If X_n is from the new interface, calculate

$$Z_n = (Z_{n-1} + \frac{X_n - \hat{\mu}_1}{\hat{\sigma}_1} - k)^+, Z_0 = 0$$

where $(x)^+ = x$ if $x > 0$, and 0 otherwise.

Step 3: If $Z_n > h$

then switch interfaces (reject H_0), otherwise don't switch interface.

Note that the above procedure treats the observations from the old the new interfaces as if they are from the same data series and then seeks to detect whether and when the mean of this combined data series will change. Such approaches for detecting changes in the mean are commonly referred to as one-sample change-point detection methods.

Matched Observations: Instantaneous Comparison

Now, suppose we have paired observations -- e.g., the observations come in pairs, (X_n, Y_n) , one for each interface. If necessary, we construct paired observations

by discarding the "old" observations on the current interface that do not have matching observations on the new interface and then match each observation Y_n on the new interface by its closest observation in time X_n on the current interface.

Paired observations can be used for effective path quality comparisons, for example, when the path quality metric is highly non-stationary, or X_n and Y_n are strongly correlated, or when paired observations on both interfaces are easy to obtain.

Since each interface uses a different network path, X_n and Y_n are assumed to be independent. We consider the differences:

$$\tilde{X}_n = X_n - Y_n$$

If the scale of the X_n is known, e.g.,

$$\tilde{\sigma}_1$$

Then, we proceed by calculating

$$\tilde{Z}_n = (\tilde{Z}_{n-1} + \frac{\tilde{X}_n}{\tilde{\sigma}_1} - \tilde{k})^+, \tilde{Z}_0 = 0$$

as in Step 2b) described above, and rejecting H_0 if

$$\tilde{Z}_n > \tilde{h}$$

in Step 3, for appropriate values of

$$\tilde{h} \quad \text{and} \quad \tilde{k}$$

As for the limitations of the quickest change detection methods described above: a requirement for application of the above methods, is that we have accurate estimates of the mean path quality of the current network path and/or its variance.

Next, an approach is presented which is based on two-sample statistical tests, for cases where we do not have extensive knowledge of the quality of the current path.

3. Approaches Based on Sequential Two-Sample Tests

Suppose now that we do not have extensive knowledge of the quality of the current path. For example, we do not have sufficiently many measurements to have a reliable estimate of the mean quality of the current path and its variance, and we do not have matched observations. In that case, we cannot apply the methods described above under Approaches Based on Quickest Sequential Change Detection. However, suppose we do have several measurements for both paths. Then, we may use a two-sample statistical test to compare the quality of the two paths. Without knowing the exact values of the mean/median, we can still do a test of which interface has the higher mean or median. The input data to the test are the measured or predicted available bandwidth values for each interface. As each interface uses a different network path, we assume the data points for the two interfaces are independent samples.

We test the difference in average quality by testing for a difference in location (mean/median) of the two samples. The test and its test statistic should ideally have the following properties:

- 1) It should be non-parametric, preferably distribution free, as a mobile usually does not know the precise statistical distribution of the quality indicator, e.g. available bandwidth.
- 2) It should work for unequal sample sizes. Note that we may have many measurements on one (the current) interface, and only a few on the other interface due to time and mobility concerns.

3) It should be online, that is: quick to compute, and essentially independent of the length of the available samples. In particular, we do not want to keep around all past data values.

One parametric test, which possesses property 2 and 3 is the two sample t-test. A non-parametric test, which has property 1 and 2 is the Mann-Whitney test (see Reference [9] incorporated above). One simple procedure, which possesses (approximately) properties 1, 2 and 3 is Rosenbaum's test (see Reference [9] incorporated above). We describe this test in more detail next.

Let $A = \{X_1, \dots, X_{n_1}\}$ denote the set of n_1 observations of available bandwidth included in sample set A containing samples from the current interface. $X_1, \dots, X_{n_1}$ are assumed to follow an arbitrary distribution with cumulative distribution function $F(x)$. Similarly, let $B = \{Y_1, \dots, Y_{n_2}\}$ denote the values of the observations from the new interface, with common c.d.f. $G(x)$. Let $n = n_1 + n_2$. Without loss of generality, let the location of $G(x)$ be Θ and the location of $F(x)$ be 0. The null-hypothesis of our tests is: $H_0: \Theta = 0$ (i.e., the old interface does not provide significantly higher average available bandwidth), which is tested against the alternative $H_1: \Theta > 0$.

Suppose the location (median/mean) of sample set B is greater than the location of samples in A. Furthermore, assume that the spread (variance, range) of a sample is greater when its location is greater. Suppose we combine sample sets A and B to create one large ordered sample set. Then, there is a tendency for B's data points to accumulate at the high end of the combined sample if the new interface provides higher average available bandwidth. Keeping this in mind, Rosenbaum's test statistic T_R involves the total number of B's data points, which have a value larger than the largest value in A.

If the overall maximum is not from sample set B, then the test stops

immediately, and the null-hypothesis H_0 is not rejected in favor of H_1 . Otherwise, H_0 is rejected in favor of H_1 if T_R is larger than a critical value $C(\alpha, n_1, n_2)$. To calculate $C(\alpha, n_1, n_2)$, we use the distribution of T_R . For independent samples this is easy, for any sample size $N = n_1 + n_2$:

$$P(T_R \geq h) = \frac{n_2}{N} x \frac{n_2 - 1}{N} x \dots x \frac{n_2 - h + 1}{N - h + 1} = \frac{n_2!(N - h)!}{N!(n_1 - h)!}$$

Now, asymptotically as $n_1 \rightarrow \infty$, $n_2 \rightarrow \infty$ with

$$\frac{n_2}{N} \rightarrow p$$

this converges to simply:

$$P(T_R \geq h) \approx p^h$$

Note that the Rosenbaum test is based on the length of the high-end 'extreme run' of the samples in B, which is easy to track online. This simple test is well suited for the case where an increase in the mean is accompanied by an increase in the variance. Similarly, if we would have prior knowledge that typically a high location (e.g., mean or median) would be accompanied by a low spread (e.g., variance), then we could construct a similar test which only considers the "low-end" extreme run of the samples in A. This would be equally easy to apply.

On-line application of the above tests implies repetition of the test for every new observation or every new batch of observations. This means that the critical values of the tests have to be adjusted (see Chapter 7 in Reference [8] incorporated above) and/or the tests are only applied a finite number of times. If we have paired observations (X_n, Y_n) , which are strongly correlated, the above two-sample tests are weaker or even invalid. To overcome this problem, we can use nonparametric approaches to test the differences

$$\tilde{X}_n = X_n - Y_n$$

One on-line nonparametric test that can be used for this purpose is the Wilcoxon sign-test (see Reference [13] incorporated above). A similar non-parametric test, the Wilcoxon signed-rank test is more powerful, but has to maintain ranked samples, hence it is not an on-line algorithm.

When a mobile has $N > 2$ interfaces available, we can still use the two-sample comparison tests described in the above sections on Approaches Based on Quickest Sequential Change Detection and Approaches Based on Sequential Two Sample Tests. Since we are only interested in the best network path among the N candidates, a total of $N-1$ pair-wise tests (e.g. between the current path and each of the $N-1$ alternatives) will suffice.

Performance Analysis:

We have analyzed the performance of our methodology using both simulated and real measurements of path bandwidths. Due to space restrictions, only the results based on real measurements are presented below.

Results on Real Available Bandwidth Measurements: Ethernet, WLAN, and 1xRTT CDMA

We have collected a series of measurements of available bandwidth from two interfaces on a mobile terminal: a 10Mbps Ethernet link and a Wavelan 802.11 11 Mbps link to a test site identified by www.toast.net. The available bandwidth was measured via the TCP bulk file transfer technique. The available bandwidths were collected every 2 minutes from 10:00 AM to 10:56 AM on a particular day on our local Ethernet and WLAN. See FIG. 2(A).

First, we present some preliminary analysis of each of the measurement series.

The Ethernet link has mean deviation 626.4 kbps. As shown in FIG. 2(B), the auto-correlation function plots show both series appear serially uncorrelated. However, the sample correlation coefficient between the two series is non-zero, 0.247, indicating that the available path bandwidths are not completely independent. Next, we tested the samples for normality. The Kolmogorov-Smirnov test applied to each measurement series did not reject the hypothesis that they were Gaussian with their given mean and standard deviation. The Shapiro-Wilk test gave the same results.

Next, we applied the proposed path quality comparison approaches based on the two CUSUM tests described in the above sections under “Proposed Approaches” to compare the average available bandwidth of the two network paths. The parameters h and k were chosen as follows: 1) $k = 0.5$ to achieve good performance for detecting shifts of about one standard deviation or more, and 2) $h = 3$, corresponding to an Average Run Length of about 117 if there is no change in the mean. The first CUSUM test was run with “prior knowledge” of

$$\hat{\mu}_1 = 1126 \text{ kbps. and } \hat{\sigma}_1 = 391 \text{ kbps.}$$

It detects the difference in mean available bandwidth at the 13th observation, as shown in FIG. 3. Notice that the detection is in fact based on observations 11-13 only. The matched-pair test, with “prior knowledge” of

$$\tilde{\sigma}_1 = 552.4 \text{ kbps.}$$

detects the difference at the 14th observation.

The two-sample tests gave the following results. Listed in Table 1 below are the p-values for the t-test, the Mann-Whitney test (labeled as MW), and the Rosenbaum test (labeled as Rb) based on 10, 15, 20, 25 and 29 (= whole sample) pairs of measurements, respectively. The p-value is the probability of observing the same or a higher test-statistic value than the one obtained, if the null-hypothesis is true, i.e., if there is no change in the means (or no change in the medians for non-parametric

tests that test for a change in the median).

**Table 1: p-values for two-sample tests for
given number of observed measurement pairs**

Test	10	15	20	25	29
t-test	0.534	0.112	0.212	0.054	0.012
MW	0.529	0.116	0.192	0.054	0.015
Rb	0.25	0.031	0.25	0.063	0.016

We see that the hypothesis of equal means is not rejected at the 0.05 level of significance by the t-test or the Mann-Whitney test, except when the whole sample is considered. The Rosenbaum test, however, already rejects at the 0.05 level of significance after 15 observations. This is encouraging, since this test does not rely on any prior knowledge, is on-line and the measurement series are weakly cross-correlated.

In light of the non-zero cross-correlation between the measurements from the two interfaces, it is interesting to see how the matched-pair tests perform. The results for the Wilcoxon signed-rank test and the sign test are shown below in Table 2.

**Table 2: p-values for matched-pair tests for given
number of observed measurement pairs**

Test	10	15	20	25	29
Wsr	0.557	0.055	0.143	0.022	0.004
sign	0.344	0.035	0.041	0.015	0.002

We see that the simple sign-test performs well and seems to be a good choice for online implementation on matched pairs of measurements.

Next, we have collected 3 new series of measurements, from three different interfaces on a mobile terminal: an 11 Mbps Wavelan 802.11 link, a 10 Mbps Ethernet link and a 1xRTT CDMA cellular link, to a test site identified by www.toast.net. The available bandwidths were collected every 2 minutes from 10AM to 5PM on a particular day on our local WLAN, Ethernet and public cellular network. See FIG. 4. Preliminary analysis of each of the measurement series show, that the WiFi link has mean available bandwidth 1797.6 ± 906.8 kbps, the Ethernet link has mean available bandwidth 1847.7 ± 860.4 kbps, and the cellular link has mean available bandwidth 116.0 ± 14.4 kbps.

FIG. 5 shows the nine pair-wise correlation functions, which indicate no significant correlation in the series. Furthermore, the cross-correlation coefficients are small as well, not exceeding 0.095.

From FIG. 4, it can be seen that the cdma2000 1xRTT cellular link provides significantly lower bandwidth than the LAN and WLAN links. Comparison of the Ethernet and Wavelan links via the CUSUM test gave the following results: suppose the current path is the Wavelan path; when the CUSUM test is run on the measurements from the Ethernet path with the following prior knowledge about the available bandwidth through the current interface: mean 1797.6 kbps and standard deviation 906.9 kbps, the higher mean bandwidth on the Ethernet path is first detected after the 11th observation, as illustrated in FIG. 6. Notice that the detection is in fact based on observations 9 through 11 only. The results are similar when we apply the CUSUM test for matched observations. See FIG. 7. Again, the higher mean bandwidth on the Ethernet link is first detected at the 11th matched observation pair.

Broad Scope of the Invention:

In the foregoing examples, the problem of interface comparison was discussed in the illustrative and non-limiting context based on available path bandwidth. Among other things, methods were presented above that use statistical

testing to quickly determine whether a new interface has significantly higher quality than the currently used one. When accurate knowledge exists of the available bandwidth on the current path, methods using CUSUM procedures for quickest detection of a difference in mean bandwidth have shown good results. In the absence of prior knowledge of path quality over the current path, a simple non-parametric test provided good results.

While illustrative embodiments of the invention have been described herein, the present invention is not limited to the various preferred embodiments described herein, but includes any and all embodiments having equivalent elements, modifications, omissions, combinations (e.g., of aspects across various embodiments), adaptations and/or alterations as would be appreciated by those in the art based on the present disclosure. The limitations in the claims are to be interpreted broadly based on the language employed in the claims and not limited to examples described in the present specification or during the prosecution of the application, which examples are to be construed as non-exclusive. For example, in the present disclosure, the term "preferably" is non-exclusive and means "preferably, but not limited to." In this disclosure and during the prosecution of this application, means-plus-function or step-plus-function limitations will only be employed where for a specific claim limitation all of the following conditions are present in that limitation: a) "means for" or "step for" is expressly recited; b) a corresponding function is expressly recited; and c) structure, material or acts that support that structure are not recited. In this disclosure and during the prosecution of this application, the terminology "present invention" or "invention" may be used as a reference to one or more aspect within the present disclosure. The language present invention or invention should not be improperly interpreted as an identification of criticality, should not be improperly interpreted as applying across all aspects or embodiments (i.e., it should be understood that the present invention has a number of aspects and embodiments), and should not be improperly interpreted as limiting the scope of the application or claims. In this disclosure and during the prosecution of this application, the terminology "embodiment" can be used to describe any aspect, feature, process or step, any combination thereof, and/or any portion

thereof, etc. In some examples, various embodiments may include overlapping features. In this disclosure, the following abbreviated terminology may be employed: "e.g." which means "for example" and "NB" which means "note well."

Claims

What is claimed:

1. A method for substantially real-time comparison of quality of interfaces (QoIs) by mobile devices having multiple heterogeneous interfaces that communicate over heterogeneous wireless networks, comprising:

comparing in substantially real-time the qualities of multiple interfaces of a mobile device that connect to heterogeneous networks using path quality metrics that are independent of how the QoI is measured, whether measured by a path through a wireless network alone or a path through both a wireless network and through a wired network,

said method including comparing path quality as a quickest change detection problem for observations from a new interface or comparing path quality based on sequential two sample tests.

2. A method for substantially real-time comparison of quality of interfaces (QoIs) by mobile devices having multiple heterogeneous interfaces that communicate over heterogeneous wireless networks, comprising:

comparing in substantially real-time the qualities of multiple interfaces of a mobile device that connect to heterogeneous networks using path quality metrics that are independent of how the QoI is measured, whether measured by a path through a wireless network alone or a path through both a wireless network and through a wired network,

said method including performing a one-sample change point detection method or performing a non-parametric and on-line two-sample method.

3. A method for substantially real-time comparison of quality of interfaces (QoIs) by mobile devices over heterogeneous wireless networks, comprising: comparing in substantially real-time the qualities of multiple interfaces using path quality metrics that are independent of how a QoI is measured, including comparing path qualities based on sequential two sample tests.
4. The method of claim 3, further including the mobile device having limited knowledge of the quality of the current path.
5. The method of claim 3, further including having insufficiently many measurements for an estimate of the mean quality of the current path and its variance and observations are not matched.
6. The method of claim 5, further including without the mobile device knowing values for mean and median, performing a test of which interface has a higher mean or median.
7. The method of claim 6, further including performing a test of the difference in average quality by testing for a difference in a location of samples.
8. The method of claim 7, wherein said method is non-parametric, works for unequal sample sizes, and is performed on-line.

9. The method of claim 7, wherein said method employs a Rosenbaum test.
10. The method of claim 9, wherein a test statistic T_R includes a total number of a second interface's data points which have a value larger than a largest value in a first interface's data points.
11. The method of claim 10, wherein if an overall maximum is not from a sample set from the second interface, then the test stops, and a null-hypothesis H_0 is not rejected in favor of H_1 , and otherwise H_0 is rejected in favor of H_1 if T_R is larger than a value $C(\alpha, n_1, n_2)$, calculated using the distribution of T_R .
12. The method of claim 7, wherein the method is based on the length of a high-end extreme run of samples for a second interface or a low-end extreme run of samples for a first interface.
13. The method of claim 12, further including repeating the test for a new observation or a new batch of observations.
14. The method of claim 3, further including using non-parametric approaches to test differences related to paired observations that are strongly correlated.
15. The method of claim 14, further including using a Wilcoxon sign test.

16. The method of claim 3, further including performing the two sample test even when the mobile has more than two interfaces.

ABSTRACT

In some embodiments, a system and method for substantially real-time comparison of quality of interfaces by mobile devices over heterogeneous networks is disclosed. The method can be performed using a dynamic and rapid comparison by distributed hosts, using a minimal number of injected network packets, using minimal path quality metrics, which path quality metrics are independent of how a Qol is measured, and in a manner suitable for both wireline and wireless networks.

FIG. 1(A)

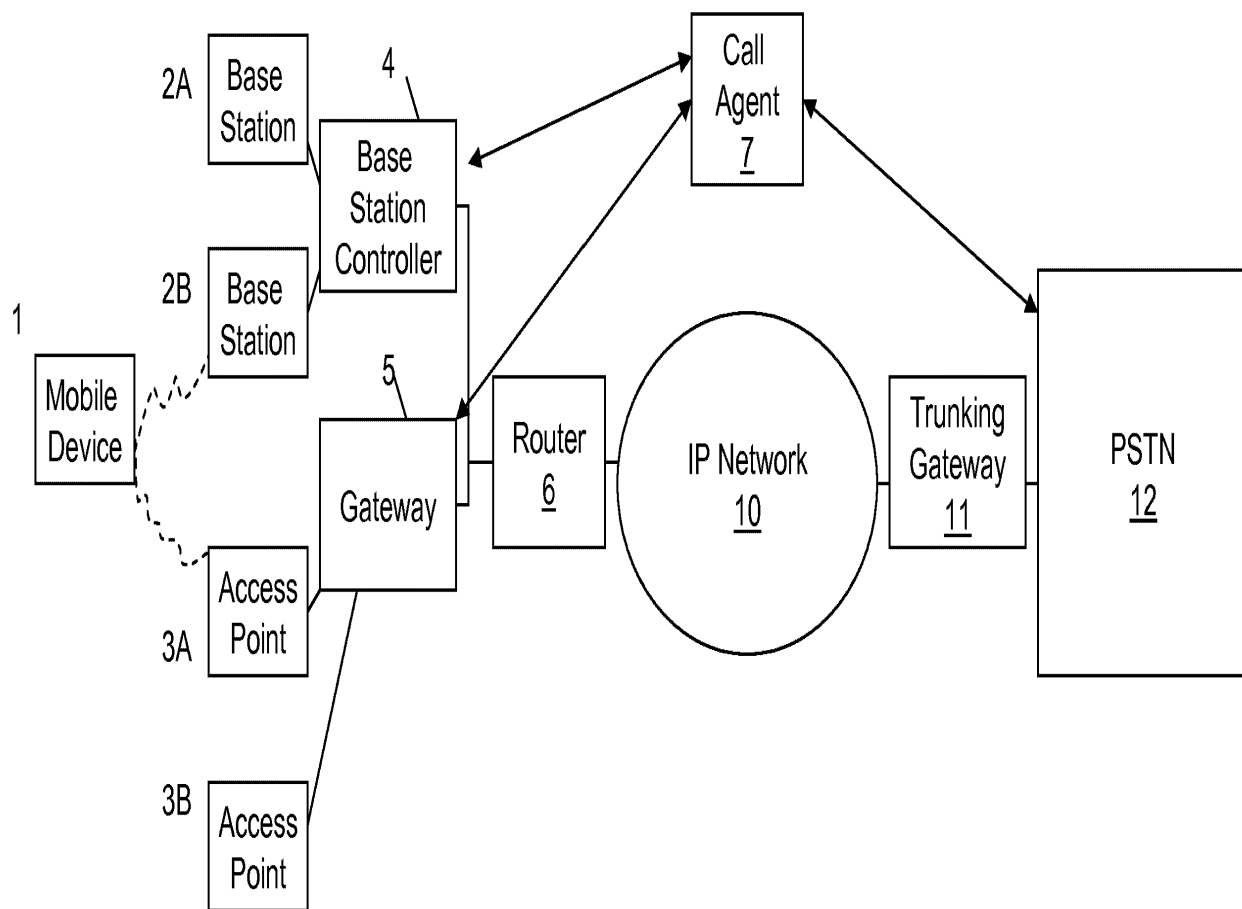
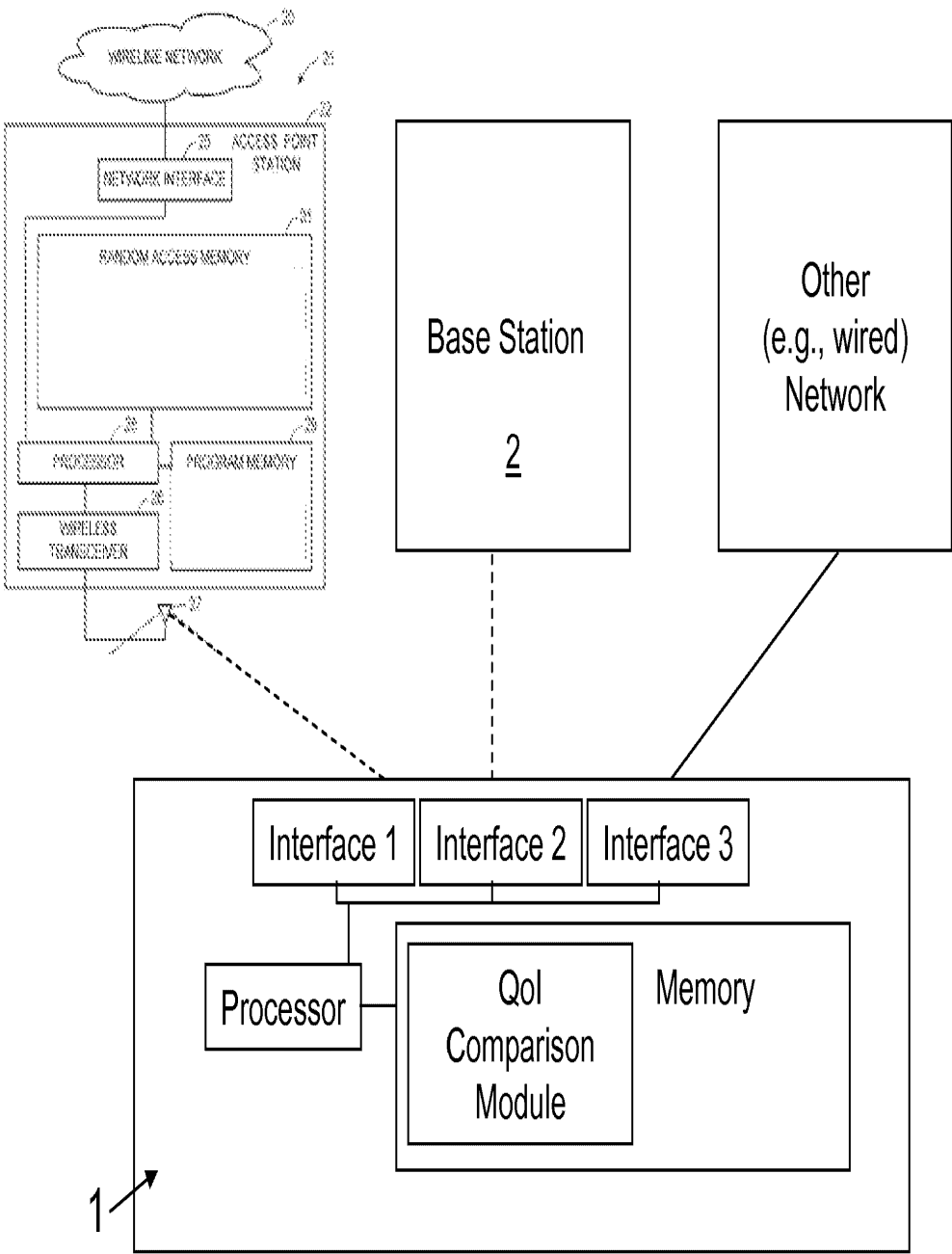


FIG. 1(B)



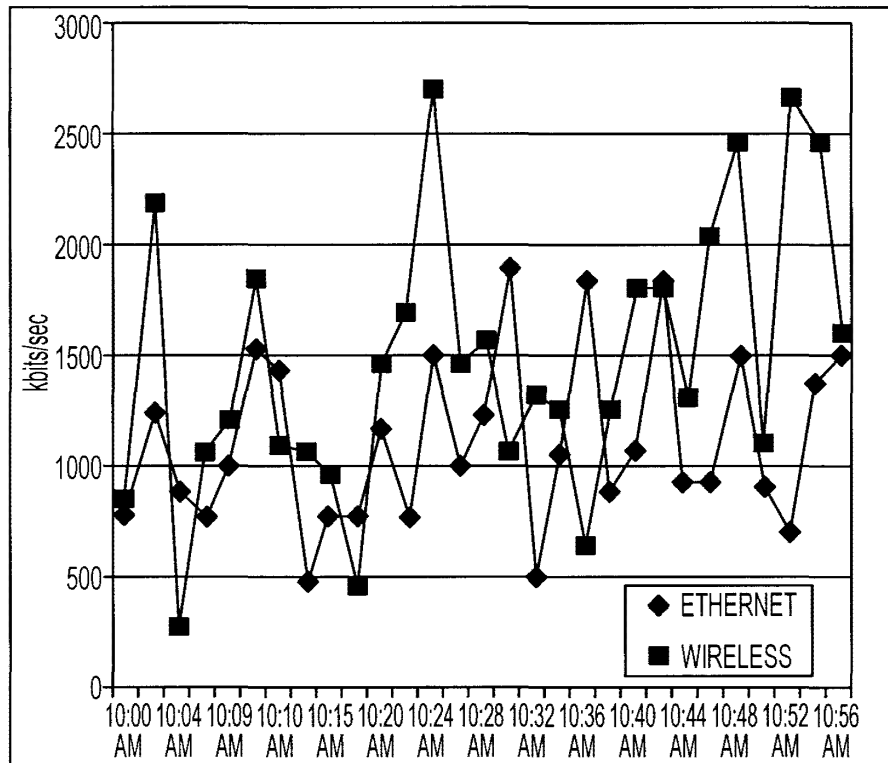


FIG. 2A

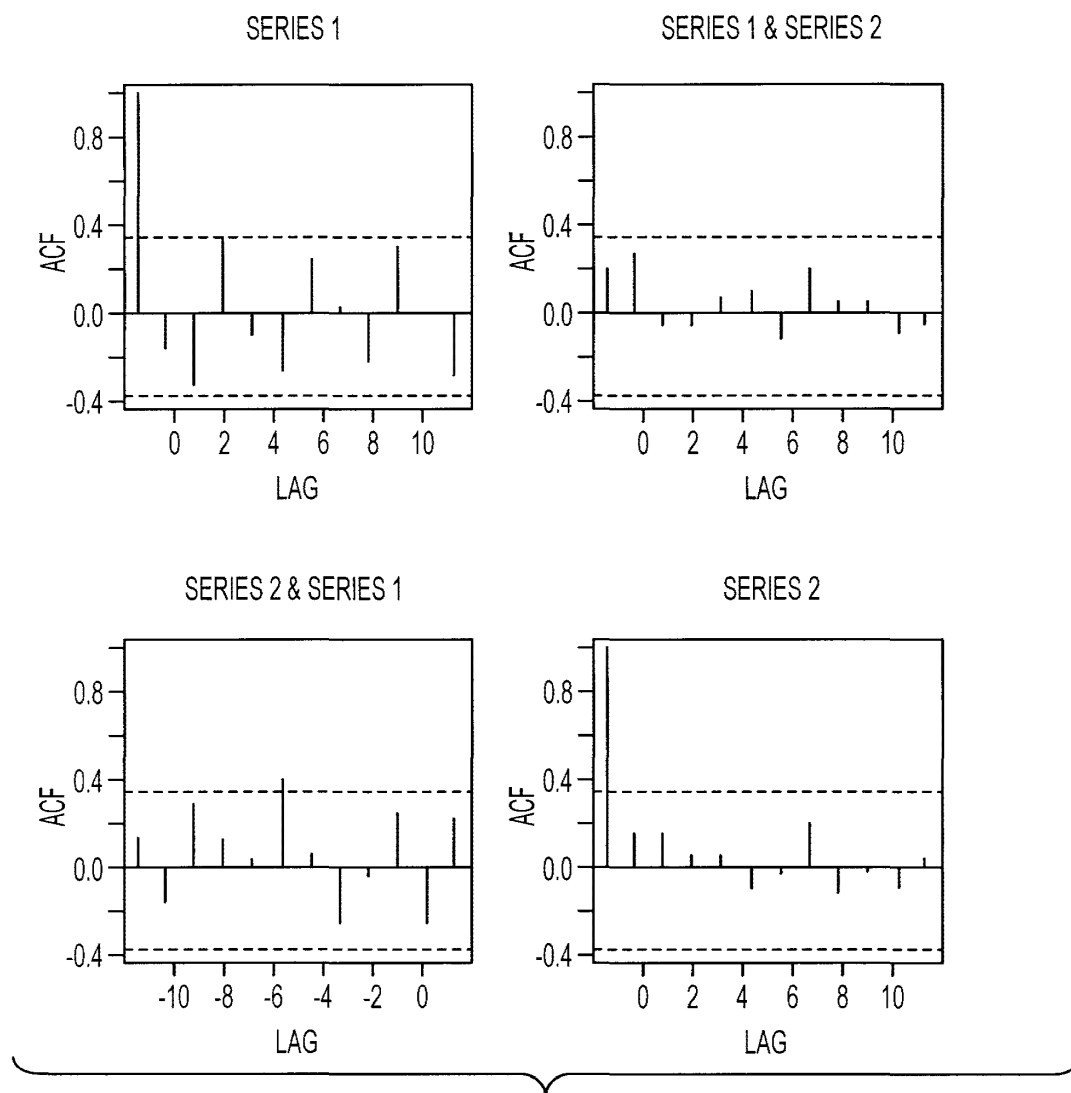


FIG. 2B

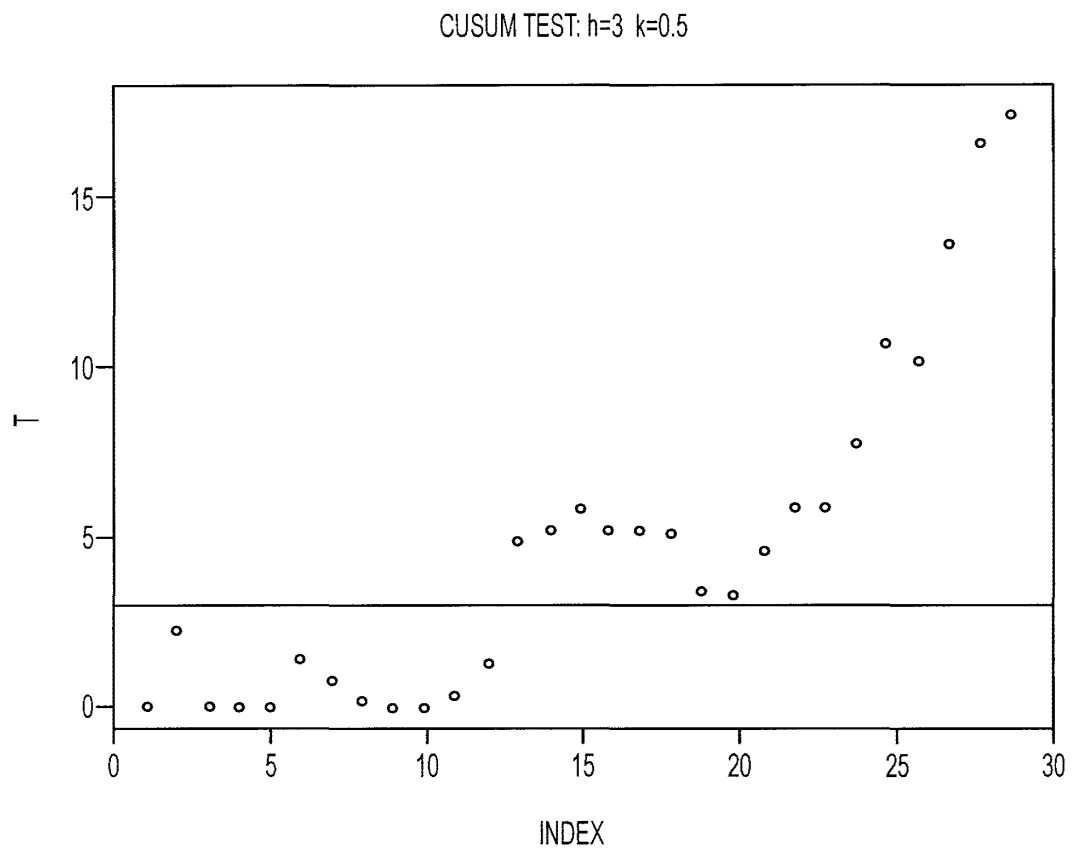


FIG. 3

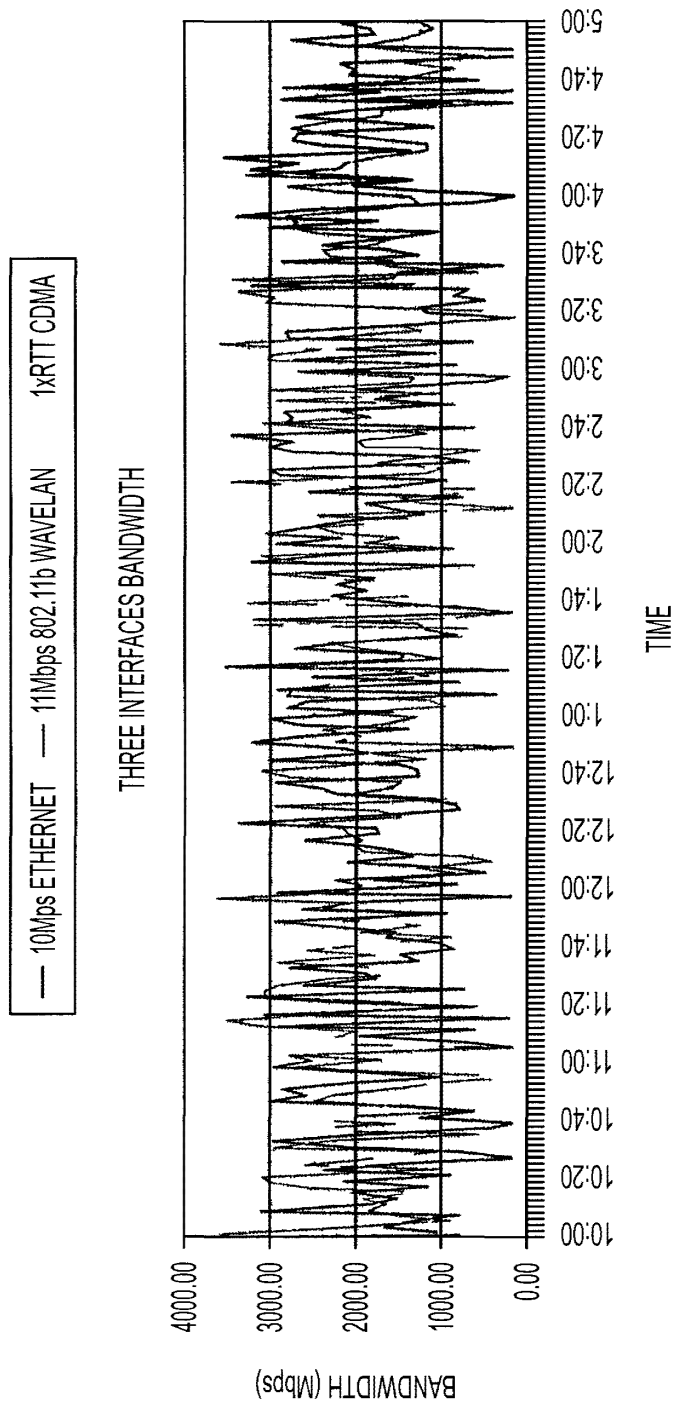


FIG. 4

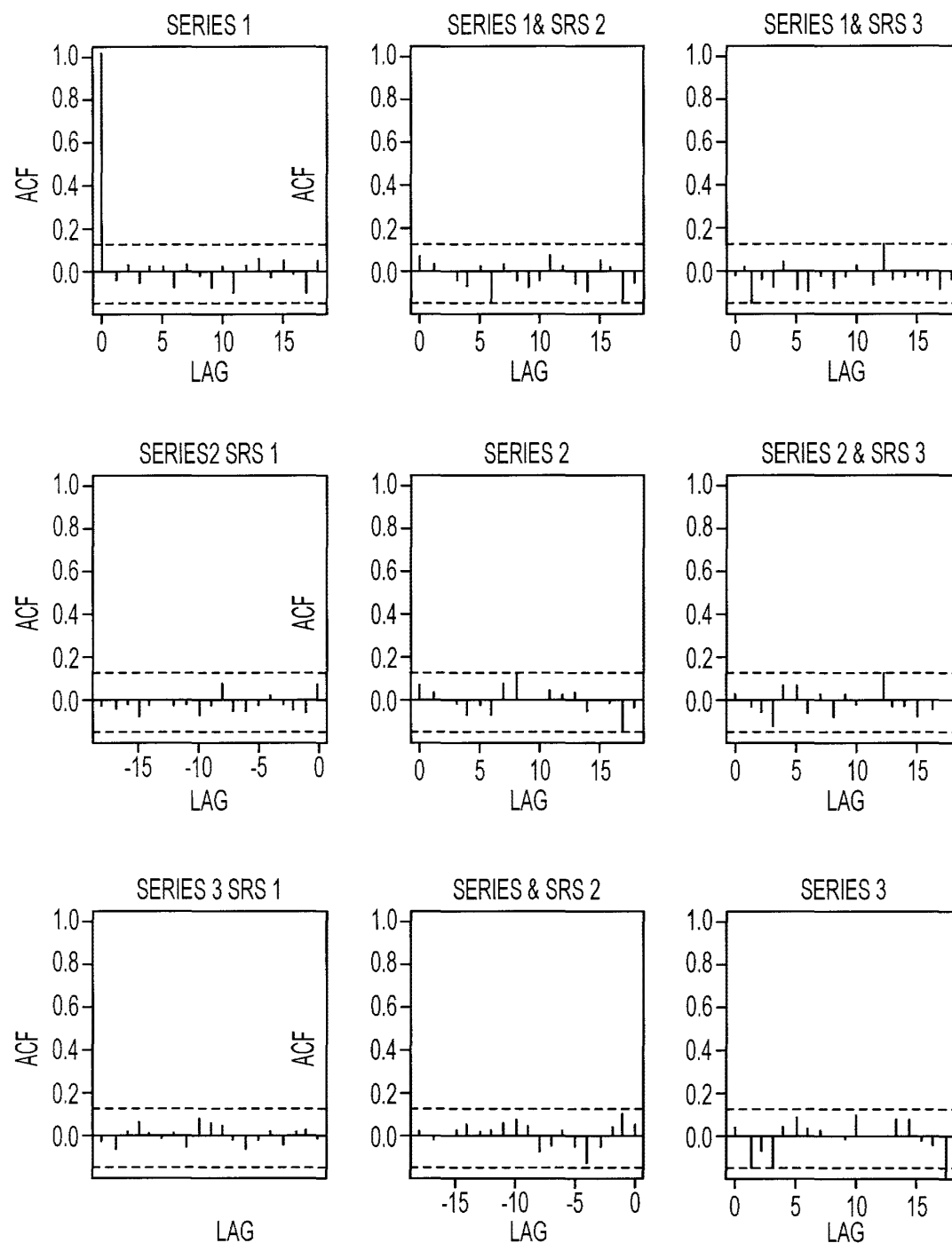


FIG. 5

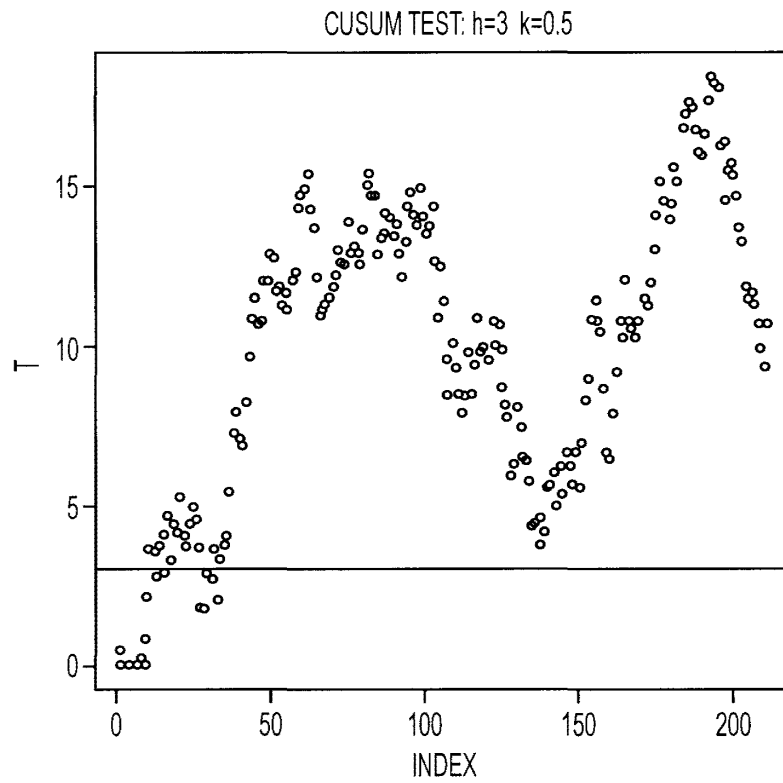


FIG. 6

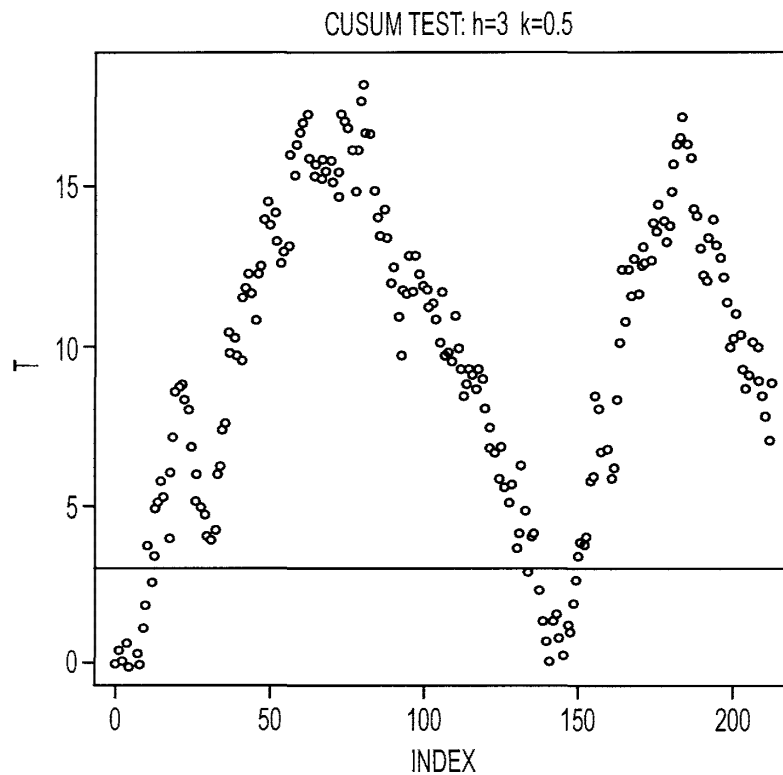


FIG. 7

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DECLARATION AND POWER OF ATTORNEY FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)		Attorney Docket No. (entered if known)	3119-127 US		
		First Named Inventor	Erick van den BERG		
		Application Number (entered if known)	11/209,331		
		Filing Date (filed herewith if no date entered)	08/23/2005		
		Group Art Unit (entered if known)	To be assigned		
Declaration	Declaration	Submitted with Initial Filing	Submitted after Initial Filing	Examiner Name (entered if known)	To be assigned
		x			

As a below named inventor, I hereby declare that:

My residence, mailing address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: **REAL-TIME COMPARISON OF QUALITY OF INTERFACES**

the specification of which is attached hereto or was filed on the above-noted filing date.

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 365(b) of any foreign application(s) for patent or inventor's certificate, 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 or inventor's certificate, or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Numbers	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Claimed	Certified Copy Attached? YES NO

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)
60/682,749	March 17, 2005

I or we hereby appoint Stephen B. Parker, Reg. No. 36,631 power of attorney and the registered practitioner(s) associated with Customer No. 52190 power of attorney, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith. Direct all correspondence to Customer Number 52190, attention Stephen B. Parker.

Declaration and Power of Attorney
Page 1

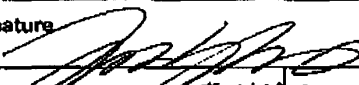
PAGE 5/10 * RCVD AT 12/9/2005 6:42:42 PM [Eastern Standard Time] * SVR:USPTO-EFXXRF-6/25 * DNIS:2738300 * CSID:2026590105 * DURATION (mm:ss):02:58

Best Available Copy

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.

NAME OF FIRST INVENTOR:			
Given Name (first and middle (if any))		Family Name or Surname	
Erick 		van den BERG	
Inventor's Signature 		Date 11/28/2005	
Residence: City:	Montville ~~Hoboken~~ 	State: NJ	Country: USA
Citizenship ~~Netherlands~~			
Mailing Address 1000 HUDSON STREET			
City	HOBOKEN	State	NJ
Zip Code	07030	Country	USA

NAME OF SECOND INVENTOR:			
Given Name (first and middle (if any))		Family Name or Surname	
Sunil		MADHANI	
Inventor's Signature		Date	
Residence: City:	Lake Hopatcong	State: NJ	Country: USA
Citizenship			
Mailing Address			
City		State	
Zip Code		Country	

NAME OF THIRD INVENTOR:			
Given Name (first and middle (if any))		Family Name or Surname	
Tao		ZHANG	
Inventor's Signature 		Date 11/28/2005	
Residence: City:	Montclair ~~Fort Lee~~	State: NJ	Country: USA
Citizenship USA			
Mailing Address 247 Harmon Ave			
City	Fort Lee	State	NJ
Zip Code	07024	Country	USA

Declaration and Power of Attorney
Page 2

PAGE 6/10 * RCVD AT 12/9/2005 6:42:42 PM [Eastern Standard Time] * SVR:USPTO-EFAXF-6/25 * DNIS:2738300 * CSID:2026590105 * DURATION (mm:ss):02:58

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DECLARATION AND POWER OF ATTORNEY FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)		Attorney Docket No. (entered if known)	3119-127 US		
		First Named Inventor	Erick van den BERG		
		Application Number (entered if known)	11/209,331		
		Filing Date (filed herewith if no date entered)	08/23/2005		
		Group Art Unit (entered if known)	To be assigned		
Declaration	Declaration	Submitted with Initial Filing	Submitted after Initial Filing	Examiner Name (entered if known)	To be assigned

As a below named inventor, I hereby declare that:

My residence, mailing address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: **REAL-TIME COMPARISON OF QUALITY OF INTERFACES** the specification of which is attached hereto or was filed on the above-noted filing date.

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 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(e) 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 or inventor's certificate, or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Numbers	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Claimed	Certified Copy Attached? YES NO

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)
60/662,749	March 17, 2005

I or we hereby appoint Stephen B. Parker, Reg. No. 36,631 power of attorney and the registered practitioner(s) associated with Customer No. 52190 power of attorney, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith. Direct all correspondence to Customer Number 52190, attention Stephen B. Parker.

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 Page 1

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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.

NAME OF FIRST INVENTOR:			
Given Name (first and middle [if any])		Family Name or Surname	
Erick		van den BERG	
Inventor's Signature		Date	
Residence: City:	Montville	State: NJ	Country: USA
Citizenship			
Mailing Address			
City	State	Zip Code	Country

NAME OF SECOND INVENTOR:			
Given Name (first and middle [if any])		Family Name or Surname	
Sunil		MADHANI	
Inventor's Signature		Date	
Austin		12/11/2005	
Residence: City:	Lake Hopatcong	State: NJ TX	Country: USA
Citizenship INDIA			
Mailing Address 7700 W. Parmer Lane, PL67/D 2220			
City Austin	State TX	Zip Code 78729	Country USA

NAME OF THIRD INVENTOR:			
Given Name (first and middle [if any])		Family Name or Surname	
Tao		ZHANG	
Inventor's Signature		Date	
Residence: City:	Morristown	State: NJ	Country: USA
Citizenship			
Mailing Address			
City	State	Zip Code	Country

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APPLICATION NUMBER	PATENT NUMBER	GROUP ART UNIT	FILE WRAPPER LOCATION
11/209,331		2416	



Correspondence Address/Fee Address Change

The following fields have been set to Customer Number 89739 on 07/27/2009

- Correspondence Address
- Power of Attorney Address

The address of record for Customer Number 89739 is:

89739
WP&D unit of Westerman Hattori Daniels & Adrian
LLP
1250 Connecticut Ave., Suite 700
Washington, DC 20036

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number			
	Filing Date			
	First Named Inventor	Eric van den Berg		
	Art Unit	N/A		
	Examiner Name	Not Yet Assigned		
	Attorney Docket Number	091523A		

U.S. PATENTS							Remove	
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear		
	1	7165102	B2	2007-01-16	Shah et al.			
If you wish to add additional U.S. Patent citation information please click the Add button.							Add	
U.S. PATENT APPLICATION PUBLICATIONS							Remove	
Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear		
	1	20050002379	A1	2005-01-06	Bye			
	2	20060085532	A1	2006-04-20	Chu et al.			
	3	20070268852	A1	2007-11-22	Stegmaier et al.			
If you wish to add additional U.S. Published Application citation information please click the Add button.							Add	
FOREIGN PATENT DOCUMENTS							Remove	
Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T ⁵
	1							☐

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		
	Filing Date		
	First Named Inventor	Eric van den Berg	
	Art Unit	N/A	
	Examiner Name	Not Yet Assigned	
	Attorney Docket Number	091523A	

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T ⁵
	1	HU, N. and STEENKISTE, P. "Evaluation and Characterization of available bandwidth probing techniques," IEEE Journal on Selected Areas in Communications, August 2003, Vol. 21 Issue 6, pp. 879-894.	☐
	2	JAIN, M. and CONSTANTINOS, DOVROLIS "End-to-End Available Bandwidth: Measurement Methodology, Dynamics, and Relation with TCP Throughput," IEEE/ACM Transactions on Networking, August 2003, Vol. 11 Issue 4, pp. 537-549.	☐
	3	MELANDER, BOB et al "A New End-to-End Probing and Analysis Method for Estimating Bandwidth Bottlenecks," Proceedings of Global Internet 2000, November 2000, Uppsala University, pp. 1-9.	☐
	4	PRASAD, R.S. et al "Bandwidth estimation: Metrics, Measurements, Techniques, and Tools," pp. 1-9.	☐
	5	SAROIU, STEFAN et al "SProbe: A Fast Technique for Measuring Bottleneck Bandwidth in Uncooperative Environments," Submitted for publication , 2002, http://sprobe.cs.washington.edu/sprobe.ps , University of Washington.	☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature		Date Considered	
--------------------	--	-----------------	--

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		
	Filing Date		
	First Named Inventor	Eric van den Berg	
	Art Unit	N/A	
	Examiner Name	Not Yet Assigned	
	Attorney Docket Number	091523A	

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Stephen B. Parker Reg. No. 36631/	Date (YYYY-MM-DD)	2010-12-20
Name/Print	Stephen B. Parker	Registration Number	36631

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 1 hour 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.**

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.

Electronic Patent Application Fee Transmittal				
Application Number:				
Filing Date:				
Title of Invention:		REAL-TIME COMPARISON OF QUALITY OF INTERFACES		
First Named Inventor/Applicant Name:		Eric van den Berg		
Filer:		Stephen B. Parker/Tarteasha Williams		
Attorney Docket Number:		091523A		
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Utility application filing	1011	1	330	330
Utility Search Fee	1111	1	540	540
Utility Examination Fee	1311	1	220	220
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1090

Electronic Acknowledgement Receipt	
EFS ID:	9076954
Application Number:	12973300
International Application Number:	
Confirmation Number:	1628
Title of Invention:	REAL-TIME COMPARISON OF QUALITY OF INTERFACES
First Named Inventor/Applicant Name:	Eric van den Berg
Customer Number:	38834
Filer:	Stephen B. Parker/Tarteasha Williams
Filer Authorized By:	Stephen B. Parker
Attorney Docket Number:	091523A
Receipt Date:	20-DEC-2010
Filing Date:	
Time Stamp:	16:40:56
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$1090
RAM confirmation Number	3921
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	Transmittal of New Application	091523A_Div_Transmittal.pdf	133262 c93a2112aa758ae312bde0b1f3fd6f923d7e e240	no	1
Warnings:					
Information:					
2	Miscellaneous Incoming Letter	091523A_Fee_Transmittal.pdf	166417 954b6813d82ecb9e8c78478bc5fb1bb5c0 d21fb	no	1
Warnings:					
Information:					
3	Application Data Sheet	091523A_ADS_12_20_2010.pdf	1426248 8072c3d17851bc3927c6b07e5f403f05af6a decc	no	5
Warnings:					
Information:					
4		091523A_Spec.pdf	1735704 8d9470b176044a19d36a41e6c0cee57229d a26df	yes	45
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	40	
	Claims		41	44	
	Abstract		45	45	
Warnings:					
Information:					
5	Drawings-only black and white line drawings	091523A_Drawings.pdf	274962 1ef0c0f1a45059960e6b58db65eedcdceea6 3ac3	no	8
Warnings:					
Information:					
6	Oath or Declaration filed	091523A_Declaration.pdf	214878 37033a077c36c1807a3eca95dff0531af5c53 ad0	no	5
Warnings:					
Information:					
7	Information Disclosure Statement (IDS) Filed (SB/08)	091523A_IDS_12_20_2010.pdf	795897 fb504804567fc79d67f68d9686ad0d16deaa 8aae	no	4
Warnings:					
Information:					

8	Fee Worksheet (PTO-875)	fee-info.pdf	32957	no	2
			9772c453b86ba19f5743eea74903be2821e8622c		
Warnings:					
Information:					
Total Files Size (in bytes):				4780325	
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. <u>New Applications Under 35 U.S.C. 111</u> 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. <u>National Stage of an International Application under 35 U.S.C. 371</u> 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. <u>New International Application Filed with the USPTO as a Receiving Office</u> 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.					

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 12/973,300				
APPLICATION AS FILED - PART I										
(Column 1)		(Column 2)		SMALL ENTITY		OTHER THAN SMALL ENTITY				
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)		RATE(\$)	FEE(\$)			
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	330			
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A	540			
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	220			
TOTAL CLAIMS (37 CFR 1.16(i))	16	minus 20 = *				x 52 =	0.00			
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3	minus 3 = *				x 220 =	0.00			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$270 (\$135 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 (37 CFR 1.16(j))							0.00			
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	1090			
APPLICATION AS AMENDED - PART II										
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OTHER THAN SMALL ENTITY		
AMENDMENT A		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	x	=		x	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=		x	=
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
					TOTAL ADD'L FEE				TOTAL ADD'L FEE	
AMENDMENT B		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	x	=		x	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=		x	=
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
					TOTAL ADD'L FEE				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.										



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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
12/973,300	12/20/2010	2469	1090	091523A	16	3

CONFIRMATION NO. 1628

89739

ATTN: Stephen B. Parker (WPD)
Westerman, Hattori, Daniels & Adrian, LLP
1250 Connecticut Ave., Suite 700
Washington, DC 20036

FILING RECEIPT



OC000000045270153

Date Mailed: 01/07/2011

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**

Applicant(s)

Eric van den Berg, Hoboken, NJ;
Sunil Madhani, Lake Hopatcong, NJ;
Tao Zhang, Fort Lee, NJ;

Assignment For Published Patent Application

TOSHIBA AMERICA RESEARCH, INC., Piscataway, NJ
TELCORDIA TECHNOLOGIES, INC., Piscataway, NJ

Power of Attorney: The patent practitioners associated with Customer Number 52190

Domestic Priority data as claimed by applicant

This application is a DIV of 11/209,331 08/23/2005
which claims benefit of 60/662,749 03/17/2005

Foreign Applications

If Required, Foreign Filing License Granted: 01/04/2011

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/973,300**

Projected Publication Date: 04/14/2011

Non-Publication Request: No

Early Publication Request: No

Title

REAL-TIME COMPARISON OF QUALITY OF INTERFACES

Preliminary Class

370

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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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).

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/973,300	12/20/2010	Eric van den Berg	091523A

CONFIRMATION NO. 1628

89739

ATTN: Stephen B. Parker (WPD)
Westerman, Hattori, Daniels & Adrian, LLP
1250 Connecticut Ave., Suite 700
Washington, DC 20036

PUBLICATION NOTICE



OC000000047145699

Title:REAL-TIME COMPARISON OF QUALITY OF INTERFACES

Publication No.US-2011-0085463-A1

Publication Date:04/14/2011

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently <http://www.uspto.gov/patft/>.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently <http://pair.uspto.gov/>. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/973,300	12/20/2010	Eric van den Berg	091523A	1628

89739 7590 12/07/2012
ATTN: Stephen B. Parker (WPD)
Westerman, Hattori, Daniels & Adrian, LLP
1250 Connecticut Ave., Suite 700
Washington, DC 20036

EXAMINER	
MILLS, DONALD L.	

ART UNIT	PAPER NUMBER
2462	

NOTIFICATION DATE	DELIVERY MODE
12/07/2012	ELECTRONIC

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.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PatentMail@WHDA.com
SParker@WHDA.com

Office Action Summary	Application No.	Applicant(s)	
	12/973,300	VAN DEN BERG ET AL.	
	Examiner	Art Unit	
	DONALD MILLS	2462	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, 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 20 December 2010.
- 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) 1-16 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) 1-16 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 or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☒ The drawing(s) filed on 20 December 2010 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).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date ____.
- 3) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 4) ☐ Other: ____.

DETAILED ACTION

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-16 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Regarding claims 1-3, for example see claim 1, lines 4-5, the claims recite *comparing in substantially real-time the qualities of multiple interfaces . . .* . The claims are directed towards a mere comparison or algorithm. The claims are wholly directed to a judicially recognized exception because the claims represent mere mathematical algorithms and formulas. The claims are not limited to a particular practical application of a judicially recognized exception. When subject matter has been reduced to a particular practical application having a real world use, the claimed practical application is evidence that the subject matter is not abstract, not purely mental and does not encompass substantially all uses of a law of nature or a natural phenomenon. The claims merely recite: "comparing in substantially real-time the qualities of multiple interfaces of a mobile device that connect to heterogeneous networks" Appropriate correction and clarification is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 2462

(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.

Claims 1-10 and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bye (US 2005/0002379) in view of admitted prior art (APA).

Regarding claims 1-3, and 16 Bye discloses a method for substantially real-time comparison of quality of interfaces (QoIs) by mobile devices (Figure 1 element 10 discloses a wireless terminal) having multiple heterogeneous interfaces (Figs. 4b-e disclose devices with multiple heterogeneous interfaces 404a-c.) over heterogeneous wireless networks, comprising: comparing in substantially real-time the qualities of multiple interfaces of a mobile device that connect to heterogeneous networks using path quality metrics that are independent of how the QoI is measured (Paragraph 18 lists some of the independent parameters used to determine QoI, such as jitter, packet loss, and transmission rate. Paragraph 14 indicates the comparison is in real-time. Paragraph 11 states that the invention allows for dynamic real-time quality management Paragraph 18 discloses that any and all portions of a network such as servicing AP, WLAN terminal, WLAN backbone network, switches, routers, nodes, and links may be monitored for quality. Paragraphs 19-21 disclose using the information gathered by the monitoring to make a selection about how to route a communication. Paragraph 21 also discloses comparing the quality from each AP and choosing a new AP if better quality is available. In order to determine if there is better quality available a comparison must be made. Paragraph 64 and fig. 6b disclose choosing between the different heterogeneous network dependent upon the measured quality.), whether measured by a path through a wireless network alone or a path through both a wireless

network and through a wired network (Fig. 1a illustrates a path through only a wireless network. Fig. 1b illustrates a path through both a wireless and wired network.).

Bye discloses comparing path quality in paragraph 49 but is silent to whether the testing methods include comparing path quality as a quickest change detection problem for observations from a new interface or comparing path quality based on sequential two sample tests.

Applicant admits one-sample change-point detection methods, which fall into the category of quickest change detection, are known in the art on page 12 of the specification.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a one-sample change-point detection method, as was known in the art, in the real-time quality of interface comparison taught by Bye because using a quick change detection technique allows for rapid selection of a new interface whenever it changes to higher quality than the existing interface.

In regards to claim 4, the primary reference further teaches *the mobile device having limited knowledge of the quality of the current path* (The mobile has little knowledge of the quality of the current path. Paragraphs 19-21 disclose using the information gathered by the monitoring to make a selection about how to route a communication. Paragraph 21 also discloses comparing the quality from each AP and choosing a new AP if better quality is available. In order to determine if there is better quality available a comparison must be made. Paragraph 64 and fig. 6b disclose choosing between the different heterogeneous network dependent upon the measured quality.)

Regarding claim 5, the primary reference further teaches *insufficiently many measurements for an estimate of the mean quality of the current path and its variance and*

observations are not matched (Note, by definition the calculation of Bye has insufficient measurements as consistent with the recited claim).

Regarding claims 6, Bye modified by APA discloses without the mobile device knowing values for mean and median, performing a test of which interface has a higher mean or median (APA on page 28 discloses Page's CUSUM procedure, which monitors the mean of observations from a new interface to determine if the new interface has a higher, i.e. better quality, metric value.).

Regarding claim 7, Bye modified by APA discloses performing a test of the difference in average quality by testing for a difference in a location of samples (APA Page 31 step 3).

In regards to claims 8, 9, 14 and 15, Bye modified by APA discloses wherein said method is non-parametric, works for unequal sample sizes, and is performed on-line/Rosenbaum test (APA page 28 discloses Page's method is applicable to unmatched observations, functionally equivalent to a Rosenbaum test.).

In regards to claim 10, Bye modified by APA discloses wherein a test statistic T_r includes a total number of a second interface's data points which have a larger value than a largest value in a first interface's data points (APA pages 28-30, it is possible to have second data points larger than a first set of data points).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DONALD MILLS whose telephone number is (571)272-3094. The examiner can normally be reached on 9:00 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yemane Mesfin can be reached on (571)272-3927. 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.

/Donald L Mills/
Primary Examiner, Art Unit 2462

Notice of References Cited	Application/Control No. 12/973,300	Applicant(s)/Patent Under Reexamination VAN DEN BERG ET AL.	
	Examiner DONALD MILLS	Art Unit 2462	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2007/0140256 A1	06-2007	Yaqub, Raziq	370/395.5
*	B	US-2008/0209026 A1	08-2008	Qi et al.	709/223
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
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FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
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	R					
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NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

<i>Search Notes</i> 	Application/Control No. 12973300	Applicant(s)/Patent Under Reexamination VAN DEN BERG ET AL.
	Examiner DONALD MILLS	Art Unit 2462

SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
370/229-232,235-238,241,252,253,331-334 (text search - see search history printout)	12/3/2012	DLM
455/436-440,450,452.1,452.2 (text search - see search history printout)	12/3/2012	DLM
EAST (US-PGPUB, USPAT, EPO, JPO, IBM, DERWENT)	12/3/2012	DLM
IEEE - ieeexplore.ieee.org - Quality of Interfaces	12/3/2012	DLM
Internet - google.com - Quality of Interfaces	12/3/2012	DLM

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

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Receipt date: 12/20/2010

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

12973300 - GAU: 2462

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

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number			
	Filing Date			
	First Named Inventor	Eric van den Berg		
	Art Unit	N/A		
	Examiner Name	Not Yet Assigned		
	Attorney Docket Number	091523A		

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	1	7165102	B2	2007-01-16	Shah et al.		

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	2	20060085532	A1	2006-04-20	Chu et al.		
	3	20070268852	A1	2007-11-22	Stegmaier et al.		

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Receipt date: 12/20/2010 INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		12973300 - GAU: 2462	
	Filing Date			
	First Named Inventor	Eric van den Berg		
	Art Unit	N/A		
	Examiner Name	Not Yet Assigned		
	Attorney Docket Number	091523A		

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	1	HU, N. and STEENKISTE, P. "Evaluation and Characterization of available bandwidth probing techniques," IEEE Journal on Selected Areas in Communications, August 2003, Vol. 21 Issue 6, pp. 879-894.	☐	
	2	JAIN, M. and CONSTANTINOS, DOVROLIS "End-to-End Available Bandwidth: Measurement Methodology, Dynamics, and Relation with TCP Throughput," IEEE/ACM Transactions on Networking, August 2003, Vol. 11 Issue 4, pp. 537-549.	☐	
	3	MELANDER, BOB et al "A New End-to-End Probing and Analysis Method for Estimating Bandwidth Bottlenecks," Proceedings of Global Internet 2000, November 2000, Uppsala University, pp. 1-9.	☐	
	4	PRASAD, R.S. et al "Bandwidth estimation: Metrics, Measurements, Techniques, and Tools," pp. 1-9.	☐	
	5	SAROIU, STEFAN et al "SProbe: A Fast Technique for Measuring Bottleneck Bandwidth in Uncooperative Environments," Submitted for publication , 2002, http://sprobe.cs.washington.edu/sprobe.ps. , University of Washington.	☐	
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¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.				

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	22	("370"/\$.ccls. or "709"/\$.ccls.) and (qualit\$3 same interface\$1 same (mobile\$1 or radio or handheld\$1 or subscriber\$1 or (base with station\$1)) same path same metric\$1)	US-PGPUB; USPAT; USOCR	OR	OFF	2012/12/03 13:17
L2	5723	("370"/\$.ccls. or "709"/\$.ccls.) and ((qualit\$3 with interface\$1) or Qol)	US-PGPUB; USPAT; USOCR	OR	OFF	2012/12/03 13:19
L3	13	("370"/\$.ccls. or "709"/\$.ccls.) and (Qol)	US-PGPUB; USPAT; USOCR	OR	OFF	2012/12/03 13:19
L4	1541	(370/229-232,235-238,241,252,253,331-334.CCLS. or 455/436-440,450,452.1,452.2.ccls) and (Qol or (quality with interfac\$3))	US-PGPUB; USPAT; USOCR	OR	OFF	2012/12/03 13:28
L5	32244	(Qol or (quality with interfac\$3))	US-PGPUB; USPAT; USOCR	OR	OFF	2012/12/03 13:28
L6	6124	("370"/\$.ccls. or "455"/\$.ccls.) and (Qol or (quality with interfac\$3))	US-PGPUB; USPAT; USOCR	OR	OFF	2012/12/03 13:29
L7	456	("370"/\$.ccls. or "455"/\$.ccls.) and ((Qol or (quality with interfac\$3)) same path)	US-PGPUB; USPAT; USOCR	OR	OFF	2012/12/03 13:29
L8	4994	(Qol or (quality with interfac\$3))	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/12/03 13:29
L10	96	((Qol or (quality with interfac\$3)) same path)	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/12/03 13:30
L11	374	(VAN-DEN-BERG-ERIC VAN-DEN-BERG-ERICK VAN-DEN-BERG-ERIC-JOZEF-DIANE MADHANI-SUNIL MADHANI-SUNIL-H MADHANI-SUNIL-HUKMI CHAND ZHANG-TAO ZHANG-TAOYI ZHANG-TAOZHU).in.	US-PGPUB; USPAT; USOCR	OR	ON	2012/12/03 13:31
L12	2	(VAN-DEN-BERG-ERIC VAN-DEN-BERG-ERICK VAN-DEN-BERG-ERIC-JOZEF-DIANE MADHANI-SUNIL MADHANI-SUNIL-H MADHANI-SUNIL-HUKMI CHAND ZHANG-TAO ZHANG-TAOYI ZHANG-TAOZHU).in. and Qol	US-PGPUB; USPAT; USOCR	OR	ON	2012/12/03 13:31
S1	70811	("370"/\$.ccls. or "709"/\$.ccls.) and ((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3))	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 14:56
S2	15449	("370"/\$.ccls. or "709"/\$.ccls.) and ((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3))	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 14:58
S3	3	("370"/\$.ccls. or "709"/\$.ccls.) and (((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3)) and (wink\$3 with test\$3))	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 14:59

S4	0	"11/290,814"	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 15:00
S5	258	(ESLAMBOLCHI -HOSSEIN MCCANUE-JOHN BAJPAY-PARI TOSH YANG-CHEN-YUI).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/09/10 15:02
S6	241	At&t.as. and (out adj2 service)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/09/10 15:03
S7	709	("370"/\$.ccls. or "709"/\$.ccls.) and (((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3)) and (automat\$3 with test\$3))	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 15:04
S8	3	("370"/\$.ccls. or "709"/\$.ccls.) and (((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3)) and (wink with test\$3))	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 15:06
S9	7	("370"/\$.ccls. or "709"/\$.ccls.) and (wink with test\$3)	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 15:06
S10	45	acterna.as.	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 15:10
S11	3852	agilent.as.	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 15:15
S12	371	agilent.as. and (network with (monitor\$3 or scan\$4 or test\$3))	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 15:15
S13	75	agilent.as. and (network with (monitor\$3 or scan\$4 or test\$3)) and ("709"/\$.ccls. or "370"/\$.ccls.)	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 15:19
S14	10	("6711134").URPN.	USPAT	OR	OFF	2008/09/10 15:21
S15	947	("370"/\$.ccls. or "709"/\$.ccls.) and (automatic\$4 near3 test\$3)	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 16:15
S16	119	("370"/\$.ccls. or "709"/\$.ccls.) and ((automatic\$4 near3 test\$3) same (error or fault))	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 16:16
S17	206	("370"/\$.ccls. or "709"/\$.ccls.) and ((automatic\$4 near3 test\$3) same (error or fault or (out ad2 serve)))	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 16:17
S18	4	("6269150").URPN.	USPAT	OR	OFF	2008/09/11 15:12
S19	9221	370/217-220,221,222,241,241.1,242-246,250,252.ccls.	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/13 17:06
S20	18905	709/223-226.ccls.	US-PGPUB; USPAT;	OR	OFF	2008/09/13 17:07

			USOCR			
S21	20390	((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3))	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/09/13 17:07
S22	1990	((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3) same scan\$4)	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/09/13 17:08
S23	179	((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3) same scan\$4 same interfac\$3)	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/09/13 17:08
S24	1	("370"/\$.ccls. or "709"/\$.ccls.) and ((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3)) and (maintenance adj2 ticket)	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/13 17:32
S25	258	(ESLAMBOLCHI -HOSSEIN MOCANUE-JOHN BAJPAY-PARITOSH YANG-CHEN-YUI XU-ZHIJIAN FENG-HSIAO-YING).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/09/13 23:12
S26	258	(ESLAMBOLCHI -HOSSEIN MOCANUE-JOHN BAJPAY-PARITOSH YANG-CHEN-YUI XU-ZHIJIAN FENG-HSIAO-YING TALMADGE-BRIAN).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/09/13 23:12
S27	258	(ESLAMBOLCHI -HOSSEIN MOCANUE-JOHN BAJPAY-PARITOSH YANG-CHEN-YUI XU-ZHIJIAN FENG-HSIAO-YING TALMADGE-BRIAN SHAH-SARYU KOLMODIN-CHRISTIAN).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/09/14 00:00
S28	55	((((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3) same scan\$4) and (power adj1 supply)))	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/10/01 02:19
S29	3415	((((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3) same scan\$4) and (power adj1 supply)))	US-PGPUB; USPAT; USOCR	OR	OFF	2008/10/01 02:19
S30	53	((((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3) same scan\$4) and (power adj1 supply adj1 line?)))	US-PGPUB; USPAT; USOCR	OR	OFF	2008/10/01 02:19
S31	254	((((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3) same scan\$4) and (power adj1 line?)))	US-PGPUB; USPAT; USOCR	OR	OFF	2008/10/01 02:24
S32	15	"370"/\$.ccls. and (((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3) same scan\$4) and (power adj1 line?)))	US-PGPUB; USPAT; USOCR	OR	OFF	2008/10/01 02:24

S33	10309	370/217-220,221,222,241,241.1,242-246,250,252.ccls.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/06/08 02:56
S34	21422	709/223-226.ccls.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/06/08 02:57
S35	21200	((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3))	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/06/08 02:57
S36	2059	((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3) same scan\$4)	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/06/08 02:57
S37	290	(ESLAMBOLCHI-HOSSEIN MOCANUE-JOHN BAJPAY-PARITOSH YANG-CHEN-YUI XU-ZHIJIAN FENG-HSI AO-YING TALMADGE-BRIAN SHAH-SARYU KOLMODIN-CHRISTIAN).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/06/08 02:57
S38	2406	370/241,242,244,245,248,250,251,431,437.ccls. and (test\$3)	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 01:23
S39	830	370/241,242,244,245,248,250,251,431,437.ccls. and ((test\$3) same (upstream\$3 or downstream\$3 or uplink\$3 or downlink\$3 or channel\$3))	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 01:23
S40	8	((("6230326") or ("20020062486") or ("20040037217") or ("20040190544") or ("6728887") or ("6704288") or ("20050047442") or ("20060100815")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 01:38
S41	8	("6728887").URPN.	USPAT	OR	OFF	2009/09/27 01:42
S42	4	("5845073" "5884157" "6061332" "6195364").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 01:43
S43	21	("5845073").URPN.	USPAT	OR	OFF	2009/09/27 01:43
S44	3742	DOCSIS	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 01:49
S45	147	DOCSIS same test\$3	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 01:49
S46	63	DOCSIS with test\$3	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 01:49
S47	1157	370/241,242,244,245,248,250-252,431,437.ccls. and (((test\$3) same (upstream\$3 or downstream\$3 or uplink\$3 or downlink\$3 or channel\$3))	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:02
S48	6	370/241,242,244,245,248,250-252,431,437.ccls. and ((test\$3) same (upstream\$3 or downstream\$3 or uplink\$3 or downlink\$3 or channel\$3) same pause)	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:04
S49	24	370/241,242,244,245,248,250-252,431,437.ccls. and ((test\$3) same pause)	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:06
S50	24	agilent.as. and ((test\$3) same pause)	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:12
S51	0	agilent.as. and ((test\$3) same pause) and DOCSIS	US-PGPUB;	OR	OFF	2009/09/27

			USPAT; USOCR			02:12
S52	0	agilent.as. and test\$3 and DOCSIS	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:12
S53	0	agilent.as. and DOCSIS	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:13
S54	1121	DOCSIS and test\$3	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:16
S55	189	DOCSIS and test\$3 and paus\$3	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:16
S56	0	DOCSIS same test\$3 same paus\$3	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:16
S57	8	DOCSIS same test\$3 and paus\$3	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:16
S58	0	("7058559").URPN.	USPAT	OR	OFF	2009/09/27 02:19
S59	6	("4607364" "5619725" "6249913" "6625255" "6662135" "6894801").PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:19
S60	0	jdsu.as. and DOCSIS	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:22
S61	0	jdsu.as. and paus\$3	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:22
S62	2	jdsu.as.	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:22
S63	1	"pathtrak"	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:25
S64	332	370/241,242,244,245,248,250-252,431,437.ccls. and ((test\$3) same (stop\$4 or paus\$3))	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:37
S65	5	370/241,242,244,245,248,250-252,431,437.ccls. and (DOCSIS and ((test\$3) same (stop\$4 or paus\$3)))	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:37
S66	29	370/241,242,244,245,248,250-252,431,437.ccls. and (DOCSIS and ((test\$3) and (stop\$4 or paus\$3)))	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:39
S77	3165	cable same channel\$3 same test\$3	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:44
S78	332	cable same channel\$3 same test\$3 same (paus\$3 or stop\$4)	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:44
S79	0	(cable same channel\$3 same test\$3 same (paus\$3 or stop\$4)) and (channel adj2 descriptor)	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:44
S80	1061	(channel adj2 descriptor)	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:44
S81	442	(channel adj2 descriptor) and cable	US- PGPUB;	OR	OFF	2009/09/27

			USPAT; USOCR			02:44
S82	178	(channel adj2 descriptor) and cable and (paus\$3 or stop\$4)	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:45
S83	97	(channel adj2 descriptor) and cable and (paus\$3 or stop\$4) and test\$3	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:45
S84	1	cm adj2 mode adj2 block	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:50
S85	1	(cm or "cable modem") adj2 mode adj2 block	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:51
S86	103	(cm or "cable modem") with mode with block\$3	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:51
S87	1	(cm or "cable modem") adj3 mode adj3 block\$3	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:51
S88	49377	(cm or "cable modem" or cmts) with test\$3	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:54
S89	10	(cm or "cable modem" or cmts) with test\$3 same (UCD or "upstream channel descriptor")	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:55
S90	2	("7246368").URPN.	USPAT	OR	OFF	2009/09/27 03:00
S91	13	(cm or "cable modem" or cmts) same test\$3 same (UCD or "upstream channel descriptor")	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 03:04
S92	144	("cable modem" or cmts) same (UCD or "upstream channel descriptor")	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 03:05
S93	88	("cable modem" or cmts) same (UCD or "upstream channel descriptor") same MAP	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 03:05
S94	39	("cable modem" or cmts) same (UCD or "upstream channel descriptor") same MAP and test\$3	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 03:05
S95	1	("7010730").PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 03:23
S96	1	("7007209").PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 03:26
S97	2	("7007209").URPN.	USPAT	OR	OFF	2009/09/27 03:26
S98	4	("5477531" "6424632" "6512747" "6643818").PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 03:27
S99	58	CMTS same channel\$3 same test\$3	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 03:50
S100	1538	379/1.01,1.03,1.04,15.01,21,27.01.ccls.	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/28 08:20
S101	1045	725/105,107.ccls.	US- PGPUB; USPAT;	OR	OFF	2009/09/28 08:20

			USOCR			
S102	206	725/107.ccls.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/28 08:20
S103	64	("5862451").URPN.	USPAT	OR	OFF	2009/09/28 08:34
S104	2	("7246368").URPN.	USPAT	OR	OFF	2009/09/28 08:48
S105	4	("5862451" "5939887" "5943604" "6772437").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/28 08:51
S106	8	("7111318").URPN.	USPAT	OR	OFF	2009/09/28 09:12
S108	12797	370/230,230.1,231,235,236,236.1,236.2,282,395.4,437,445-447,449-452,459,461,462.ccls.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/10/01 03:37
S109	1349	370/230,230.1,231,235,236,236.1,236.2,282,395.4,437,445-447,449-452,459,461,462.ccls. and (CSMA or CSMA/CD)	US-PGPUB; USPAT; USOCR	OR	OFF	2009/10/01 03:38
S110	38	370/230,230.1,231,235,236,236.1,236.2,282,395.4,437,445-447,449-452,459,461,462.ccls. and Homeplug	US-PGPUB; USPAT; USOCR	OR	OFF	2009/10/01 03:38
S111	817	370/230,230.1,231,235,236,236.1,236.2,282,395.4,437,445-447,449-452,459,461,462.ccls. and (home with network\$3)	US-PGPUB; USPAT; USOCR	OR	OFF	2009/10/01 03:50
S118	1425	370/230,230.1,231,235,236,236.1,236.2,282,395.4,437,445-447,449-452,459,461,462.ccls. and (CSMA or CSMA/CD)	US-PGPUB; USPAT; USOCR	OR	OFF	2010/03/01 10:09
S119	360	(ESLAMBOLCHI-HOSSEIN MOCANUE-JOHN BAJPAY-PARITOSH YANG-CHEN-YUI XU-ZHIJIAN FENG-HSIAO-YING TALMADGE-BRIAN SHAH-SARYU KOLMODIN-CHRISTIAN).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/03/01 10:09
S120	44	(oksman-vladimir).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/03/01 10:09
S121	3	((("20020112070") or ("20050111536") or ("20050186933")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2010/06/16 13:53
S122	2	((("6115393") or ("7321565")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2010/06/16 15:34
S123	1	("7477594").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2010/06/17 15:00
S124	1	(source adj2 rout\$3) with ((generic adj1 framing adj1 procedure) or GFP)	US-PGPUB; USPAT; USOCR	OR	OFF	2010/06/17 15:02
S125	1	(source adj2 rout\$3) same ((generic adj1 framing adj1 procedure) or GFP)	US-PGPUB; USPAT; USOCR	OR	OFF	2010/06/17 15:02
S127	13	(source adj2 rout\$3) and ((generic adj1 framing adj1 procedure) or GFP)	US-PGPUB; USPAT;	OR	OFF	2010/06/17 15:02

			USOCR			
S128	3	("2006/0002304").URPN.	USPAT	OR	OFF	2010/06/17 15:03
S129	9	("20060002304" "20060221929" "5309433" "5504746" "5563878" "5917820" "6084882" "6275492" "7334047").PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2010/06/17 15:08
S130	1	("20060002304").PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2010/06/17 15:11
S131	1	("20040139037").PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2010/06/17 15:28
S132	116	("370"/\$.ccls. or "709"/\$.ccls.) and ((hidden with node\$1) same CSMA)	US- PGPUB; USPAT; USOCR	OR	OFF	2010/06/21 11:32
S133	115	"370"/\$.ccls. and ((hidden with node\$1) same CSMA)	US- PGPUB; USPAT; USOCR	OR	OFF	2010/06/21 11:32
S134	3	("2007/0115907").URPN.	USPAT	OR	OFF	2010/06/21 11:41
S135	1	("6137784").PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2010/07/05 21:14
S136	124	("370"/\$.ccls. or "709"/\$.ccls.) and ((hidden with node\$1) same CSMA)	US- PGPUB; USPAT; USOCR	OR	OFF	2010/12/06 11:23
S137	123	"370"/\$.ccls. and ((hidden with node\$1) same CSMA)	US- PGPUB; USPAT; USOCR	OR	OFF	2010/12/06 11:23
S140	1	sub?map same bod\$3 same header\$1 same uplink\$3	US- PGPUB; USPAT; USOCR	OR	ON	2012/09/11 00:05
S142	12	sub?map same uplink\$3	US- PGPUB; USPAT; USOCR	OR	ON	2012/09/11 00:06
S143	2	sub?map same uplink\$3 same burst\$3	US- PGPUB; USPAT; USOCR	OR	ON	2012/09/11 00:28
S144	0	("2007086370").PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2012/09/11 00:28
S145	1	("20070086370").PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2012/09/11 00:28
S146	22	sub?map and (uplink\$3 same burst\$3)	US- PGPUB; USPAT; USOCR	OR	ON	2012/09/11 00:29
S147	22	sub?map and (uplink\$3 same burst\$3)	US- PGPUB; USPAT; USOCR	OR	ON	2012/09/11 00:29
S148	9	sub?map with header\$1	US- PGPUB; USPAT; USOCR	OR	ON	2012/09/11 01:27
S149	63	"370"/\$.ccls. and (SUB?MAP)	US- PGPUB; USPAT; USOCR	OR	OFF	2012/09/11 01:59
S150	63	"370"/\$.ccls. and (SUB-MAP)	US- PGPUB; USPAT; USOCR	OR	OFF	2012/09/11 02:00

S151	95	"370"/\$.ccls. and ("SUB MAP")	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/11 02:00
S152	95	"370"/\$.ccls. and ("SUB MAP" or sub?map)	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/11 02:00
S153	372	("SUB MAP" or sub?map)	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/11 02:00
S154	778	uplink\$3 same (frame\$1 or packet\$1 or cell\$1) same burst\$3 same \$4MAP	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/11 02:01
S155	2310	uplink\$3 same (frame\$1 or packet\$1 or cell\$1) same \$4MAP	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/11 02:01
S156	194	(KIM-JEONG-KI RYU-KIL-H RYU-KIL-HYEN RYU-KIL-JUNG RYU-KIO RYU-KI SEON RYU-KI -HYUN YUK-YOUNGSOO YUK-YOUNG-SOO YUK-YOUNG-SUB).in.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/11 02:02
S157	21297	"lg electronics".as.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/11 02:02
S158	9	"lg electronics".as. and "sub map"	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/11 02:03
S159	4046	dsl same subscriber\$3 with loop	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/12 18:21
S160	40	dsl same subscriber\$3 with loop same spectrum same management	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/12 18:21
S161	3	((("20030093364") or ("6498785") or ("6597705"))).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/13 09:26
S162	1	("20050286408").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/20 14:43
S163	1	"12,812,741"	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/20 14:45
S164	1	"12/812,741"	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/20 14:45
S165	1	"12/867,865"	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/20 14:51
S166	264	(superframe or super?frame) with map	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/20 15:09
S167	60	(superframe or super?frame) with map same (subframe or sub?frame)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/20 15:10
S168	183437	"370"/\$.ccls. or "455"/\$.ccls. and ((superframe or super? frame) with map same (subframe or sub?frame))	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/20 15:10
S169	54	("370"/\$.ccls. or "455"/\$.ccls.) and ((superframe or super? frame) with map same (subframe or sub?frame))	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/20 15:10
S170	1	("7990920").PN.	US-PGPUB; USPAT;	OR	OFF	2012/09/20 15:18

			USOCR			
S171	127	370/328-330,338,395.4,432,436,437,458,459,468,473.ccls. and (sub adj2 MAP)	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/22 11:35
S172	226	"370"/\$.ccls. and (sub adj2 MAP)	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/22 11:35
S173	1055	(sub adj2 MAP)	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/22 11:35
S174	162	(YUK-YOUNG-SOO KIM-JEONG KIM-JEONGCHANG KIM-JEONGDAL KIM-JEONGDEOK KIM-JEONGEUN KIM-JEONGGOO RYU-KIL-H RYU-KIL-HYEN RYU-KIL-JUNG RYU-KIO RYU-KI SEON RYU-KI-HYUN)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/22 11:36
S175	52	(YUK-YOUNG-SOO KIM-JEONG KIM-JEONGCHANG KIM-JEONGDAL KIM-JEONGDEOK KIM-JEONGEUN KIM-JEONGGOO RYU-KIL-H RYU-KIL-HYEN RYU-KIL-JUNG RYU-KIO RYU-KI SEON RYU-KI-HYUN) and (superframe or super?frame)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/22 11:36
S176	19	(YUK-YOUNG-SOO KIM-JEONG KIM-JEONGCHANG KIM-JEONGDAL KIM-JEONGDEOK KIM-JEONGEUN KIM-JEONGGOO RYU-KIL-H RYU-KIL-HYEN RYU-KIL-JUNG RYU-KIO RYU-KI SEON RYU-KI-HYUN) and ((superframe or super?frame) same MAP)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/22 11:37
S177	3	(YUK-YOUNG-SOO KIM-JEONG KIM-JEONGCHANG KIM-JEONGDAL KIM-JEONGDEOK KIM-JEONGEUN KIM-JEONGGOO RYU-KIL-H RYU-KIL-HYEN RYU-KIL-JUNG RYU-KIO RYU-KI SEON RYU-KI-HYUN) and ((superframe or super?frame) same MAP).clm.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/22 11:37
S178	5	"lg electronics".as. and ((superframe or super?frame) same MAP).clm.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/22 11:38
S179	22	(fixed or constant) and (variable or adjustable) same uplink same downlink same (superframe or super?frame)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 19:26
S180	1622	(fixed or constant) and (variable or adjustable) same uplink same downlink	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 19:27
S181	941	((fixed or constant) and (variable or adjustable)) same uplink same downlink	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 19:27
S182	3	((fixed or constant) and (variable or adjustable)) same uplink same downlink same (superframe or super?frame)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 19:27
S183	20743	"802.16"	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 19:28
S184	14869	"IEEE 802.16"	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 19:29
S185	549	"IEEE 802.16d"	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 19:30
S186	144	"IEEE 802.16d" and ((fixed or constant) and (variable or adjustable))	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 19:35
S187	44	"IEEE 802.16d" and ((fixed or constant) with (variable or adjustable))	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 19:35

S188	317	(YUK-YOUNG-SOO KIM-JEONG KIM-JEONGCHANG KIM-JEONGDAL KIM-JEONGDEOK KIM-JEONGEUN KIM-JEONGGOO RYU-KI-HYUN RYU-KIL-H RYU-KIL-HYEN RYU-KIL-JUNG RYU-KIO RYU-KI SEON KIM-YONG KIM-YONGBAE KIM-YONGBUM KIM-YONGCHUL KIM-YONGCHURL KIM-YONGDAE).in.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 20:09
S189	1	(YUK-YOUNG-SOO KIM-JEONG KIM-JEONGCHANG KIM-JEONGDAL KIM-JEONGDEOK KIM-JEONGEUN KIM-JEONGGOO RYU-KI-HYUN RYU-KIL-H RYU-KIL-HYEN RYU-KIL-JUNG RYU-KIO RYU-KI SEON KIM-YONG KIM-YONGBAE KIM-YONGBUM KIM-YONGCHUL KIM-YONGCHURL KIM-YONGDAE).in. and "IEEE 802.16d"	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 20:09
S190	51	(YUK-YOUNG-SOO KIM-JEONG KIM-JEONGCHANG KIM-JEONGDAL KIM-JEONGDEOK KIM-JEONGEUN KIM-JEONGGOO RYU-KI-HYUN RYU-KIL-H RYU-KIL-HYEN RYU-KIL-JUNG RYU-KIO RYU-KI SEON KIM-YONG KIM-YONGBAE KIM-YONGBUM KIM-YONGCHUL KIM-YONGCHURL KIM-YONGDAE).in. and superframe	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 20:10
S191	32	(YUK-YOUNG-SOO KIM-JEONG KIM-JEONGCHANG KIM-JEONGDAL KIM-JEONGDEOK KIM-JEONGEUN KIM-JEONGGOO RYU-KI-HYUN RYU-KIL-H RYU-KIL-HYEN RYU-KIL-JUNG RYU-KIO RYU-KI SEON KIM-YONG KIM-YONGBAE KIM-YONGBUM KIM-YONGCHUL KIM-YONGCHURL KIM-YONGDAE).in. and superframe and MAP	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 20:10
S192	85	lg.as. and superframe and MAP	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 20:10
S193	28	(YUK-YOUNG-SOO KIM-JEONG KIM-JEONGCHANG KIM-JEONGDAL KIM-JEONGDEOK KIM-JEONGEUN KIM-JEONGGOO RYU-KI-HYUN RYU-KIL-H RYU-KIL-HYEN RYU-KIL-JUNG RYU-KIO RYU-KI SEON KIM-YONG KIM-YONGBAE KIM-YONGBUM KIM-YONGCHUL KIM-YONGCHURL KIM-YONGDAE).in. and superframe.clm.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 20:11
S194	0	lg.as. and superframe.as.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 20:15
S195	42	lg.as. and superframe.clm.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 20:15
S196	4	((("20070242636") or ("20090170522") or ("20100220668") or ("20090129362")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/30 12:58
S197	23	("2007/0242636").URPN.	USPAT	OR	ON	2012/09/30 13:18
S198	18428	resource adj2 allocat\$3	USPAT	OR	ON	2012/09/30 13:30
S199	6629	"370"/\$.ccls. and (resource adj2 allocat\$3)	USPAT	OR	ON	2012/09/30 13:30
S200	7	"370"/\$.ccls. and (resource adj2 allocat\$3) same (bit with mask\$3)	USPAT	OR	ON	2012/09/30 13:30
S201	46882	resource adj2 allocat\$3	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 13:30
S202	50	"370"/\$.ccls. and (resource adj2 allocat\$3) same (bit with mask\$3)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 13:30
S203	4	"370"/\$.ccls. and ((resource adj2 allocat\$3) same (bit with mask\$3)).clm.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 13:30
S204	18	"370"/\$.ccls. and (resource adj2 allocat\$3) same (bit with	US-PGPUB;	OR	ON	2012/09/30

		mask\$3) and (frequency with block\$3)	USPAT; USOCR			13:43
S205	5	"370"/\$.ccls. and (resource adj2 allocat\$3) same (bit with mask\$3) and (frequency adj2 block\$3)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 13:44
S206	2019	"370"/\$.ccls. and (resource adj2 allocat\$3) and ((bit with mask\$3) same (resource adj1 block\$1) or RB)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 13:55
S207	28	"370"/\$.ccls. and (resource adj2 allocat\$3) and ((bit with mask\$3) same ((resource adj1 block\$1) or RB))	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 13:55
S208	45	"370"/\$.ccls. and (((bit with mask\$3) same ((resource adj1 block\$1) or RB)))	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:00
S209	130	"370"/\$.ccls. and pdcch and (bit with mask\$3)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:03
S210	65	"370"/\$.ccls. and (pdcch same (bit with mask\$3))	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:03
S211	74	olav.in. and nokia.as.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:13
S212	5	olav.in. and nokia.as. and esa.in.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:13
S213	45	"370"/\$.ccls. and (bit with mask\$3) same ((resource adj1 block\$1) or RB)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:15
S214	1	nokia.as. and (bit with mask\$3) same ((resource adj1 block\$1) or RB)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:16
S215	279	ntt.as. and higuchi.in.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:21
S216	176	ntt.as. and higuchi.in. and frequency and scheduling	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:21
S217	64	ntt.as. and higuchi.in. and frequency and scheduling and allocate	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:21
S218	0	ntt.as. and higuchi.in. and (frequency and scheduling and allocate).as.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:21
S219	10	ntt.as. and higuchi.in. and (frequency and scheduling and allocate).ab.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:21
S220	0	("2009/0129362").URPN.	USPAT	OR	ON	2012/09/30 14:22
S221	74	nokia.as. and olav.in.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:27
S222	1	nokia.as. and olav.in. and esa.in. and frank.in.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:27
S223	4	nokia.as. and olav.in. and (resource adj1 block\$1 same group\$1)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:32
S224	1	nokia.as. and olav.in. and (resource adj1 block\$1 same	EPO	OR	ON	2012/09/30

		group\$1)				14:33
S225	23	("2007/0242636").URPN.	USPAT	OR	ON	2012/09/30 14:49
S226	26	(AWAD-YASSIN-ADDEN AWAD-YASSIN-ADEB AWAD-YASSIN-ADEN).in.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 15:53
S227	26	(AWAD-YASSIN-ADDEN AWAD-YASSIN-ADEB AWAD-YASSIN-ADEN).in. and (frequency wiht block\$3)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 15:53
S228	30347	nec.as. and (frequency wiht block\$3)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 15:53
S229	1310	nec.as. and (frequency with block\$3)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 15:53
S230	66	nec.as. and (frequency adj1 block\$3)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 15:53
S231	2	((("20080192847") or ("7885230"))).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/30 15:56
S232	11874	"370"/\$.ccls. and (frequency with assign\$4)	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 04:55
S233	393	"370"/\$.ccls. and (frequency with assign\$4) same MAP	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 04:56
S234	217	"370"/\$.ccls. and (frequency with assign\$4) with MAP	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 04:56
S235	30	"370"/\$.ccls. and ((frequency with assign\$4) with MAP).clm.	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 04:56
S236	179	"370"/\$.ccls. and (((frequency adj1 assign\$4) or FA) same MAP)	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 05:00
S237	1	"370"/\$.ccls. and (((frequency adj1 assign\$4) or FA) same MAP same primary same secondary)	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 05:00
S238	70	"370"/\$.ccls. and (((frequency adj1 assign\$4) or FA) same primary same secondary)	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 05:01
S239	8	"370"/\$.ccls. and (((frequency adj1 assign\$4) or FA) same primary same secondary).clm.	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 05:01
S240	2	((("7068623") or ("20020128051"))).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/10/01 05:04
S241	20	("7068623").URPN.	USPAT	OR	ON	2012/10/01 05:05
S242	2	((("20050197133") or ("20050265223"))).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/10/01 05:08
S243	3	("2005/0197133").URPN.	USPAT	OR	ON	2012/10/01 05:09
S244	361	(PARK-CHUL LIM-KWANG-JAE LEE-HYUN YOON-CHUL-SIK).IN.	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 05:53

S245	11	(PARK-CHUL LIM-KWANG-JAE LEE-HYUN YOON-CHUL-SIK).IN. and FA	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 05:54
S246	677	samsung.as. and FA	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 05:54
S247	24	("370"/\$.ccls. or "455"/\$.ccls.) and LTE and (downlink with offset same acknowledge\$4)	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 06:03
S248	2	((("20080274747") or ("20070110004")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/10/01 06:08
S249	1	("20040248606").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/10/01 06:12
S250	15	("2004/0248606").URPN.	USPAT	OR	ON	2012/10/01 06:14
S251	0	("7444162").URPN.	USPAT	OR	ON	2012/10/01 06:16
S252	0	("7444162").URPN.	USPAT	OR	ON	2012/10/01 06:16
S253	1	("20050208960").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/10/01 06:28
S254	1	"12/528,817"	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 06:43
S255	1	("370"/\$.ccls. or "455"/\$.ccls.) and LTE and (downlink with offset same CQI same priority)	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 07:08
S256	7	("370"/\$.ccls. or "455"/\$.ccls.) and LTE and (downlink same offset same CQI same priority)	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 07:09
S257	173	(ISHII-HIROYUKI UMESH-ANIL) AND LTE	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 07:32
S258	93	(ISHII-HIROYUKI UMESH-ANIL) AND LTE and downlink.clm.	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 07:32
S259	6	(ISHII-HIROYUKI UMESH-ANIL) AND LTE and (downlink same priority).clm.	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 07:32
S260	7	ntt.as. AND LTE and (downlink same priority).clm.	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 07:33

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L9	508	((Qol or (quality with interfac\$3)) same path)	USPAT; UPAD	OR	OFF	2012/12/03 13:30
S67	1	(VOLPE-BRADY DUBOSE-MATT LABURADA-MARCO).in.	USPAT; UPAD	OR	OFF	2009/09/27 01:24
S68	193	sunrise.as.	USPAT; UPAD	OR	OFF	2009/09/27 01:25
S69	48	sunrise.as. and cable	USPAT; UPAD	OR	OFF	2009/09/27 01:25

S70	5	("4070648" "4347609" "4573154" "5193093" "6182264").PN.	US-PGPUB; USPAT	OR	OFF	2009/09/27 01:28
S71	1	("7010730").URPN.	USPAT	OR	OFF	2009/09/27 01:29
S72	1	("7451472").URPN.	USPAT	OR	OFF	2009/09/27 01:29
S73	0	("7584496").URPN.	USPAT	OR	OFF	2009/09/27 01:30
S74	21	("20030142622" "20040091055" "20040245995" "20060012376" "5073822" "5461318" "5617137" "5682100" "5990687" "6140822" "6151559" "6344749" "6417942" "6425132" "6570394" "6687632" "6934655" "7024680" "7069163" "7415367" "7451472").PN.	US-PGPUB; USPAT	OR	OFF	2009/09/27 01:30
S75	21	("20030142622" "20040091055" "20040245995" "20060012376" "5073822" "5461318" "5617137" "5682100" "5990687" "6140822" "6151559" "6344749" "6417942" "6425132" "6570394" "6687632" "6934655" "7024680" "7069163" "7415367" "7451472").PN.	US-PGPUB; USPAT	OR	OFF	2009/09/27 01:33
S76	23	("20020076143" "20030185176" "20040103442" "20040245995" "20050123002" "20060048200" "20060141971" "3750022" "5943604" "6049693" "6542500" "6546016" "6567132" "6567579" "6571393" "6687261" "6714534" "6785292" "6850533" "7010730" "7024680" "7162731" "7246368").PN.	US-PGPUB; USPAT	OR	OFF	2009/09/27 01:33
S112	0	oksman-vladimi.in.	USPAT; UPAD	OR	OFF	2009/10/01 03:45
S113	36	oksman.in.	USPAT; UPAD	OR	OFF	2009/10/01 03:46
S114	0	oksman-v.in.	USPAT; UPAD	OR	OFF	2009/10/01 03:46
S115	9	oksman-v\$7.in.	USPAT; UPAD	OR	OFF	2009/10/01 03:46
S116	6919	infineon.as.	USPAT; UPAD	OR	OFF	2009/10/01 03:48
S117	18	infineon.as. and (home with network\$3)	USPAT; UPAD	OR	OFF	2009/10/01 03:48
S138	0	("370"/\$.ccls. or "709"/\$.ccls.) and (((hidden with node\$1) same CSMA)).clm.	USPAT; UPAD	OR	OFF	2010/12/06 11:24
S139	34	("370"/\$.ccls. or "709"/\$.ccls.) and (hidden with node\$1).clm.	USPAT; UPAD	OR	OFF	2010/12/06 11:24

12/ 3/ 2012 1:35:32 PM

C:\Users\dmills2\Documents\EAST\Workspaces\US Case Workplaces\12-973,300 Real-Time Comparison of Qol.wsp



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BIB DATA SHEET

CONFIRMATION NO. 1628

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.		
12/973,300	12/20/2010	370	2462	091523A		
APPLICANTS Eric van den Berg, Hoboken, NJ; Sunil Madhani, Lake Hopatcong, NJ; Tao Zhang, Fort Lee, NJ; ** CONTINUING DATA ***** This application is a DIV of 11/209,331 08/23/2005 PAT 7,885,185 which claims benefit of 60/662,749 03/17/2005 ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 01/04/2011						
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☒ No Verified and /DONALD L. MILLS/ Acknowledged Examiner's Signature		☐ Met after Allowance Initials	STATE OR COUNTRY NJ	SHEETS DRAWINGS 8	TOTAL CLAIMS 16	INDEPENDENT CLAIMS 3
ADDRESS ATTN: Stephen B. Parker (WPD) Westerman, Hattori, Daniels & Adrian, LLP 1250 Connecticut Ave., Suite 700 Washington, DC 20036 UNITED STATES						
TITLE REAL-TIME COMPARISON OF QUALITY OF INTERFACES						
FILING FEE RECEIVED 1090	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:			☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit		

<i>Index of Claims</i> 	Application/Control No. 12973300	Applicant(s)/Patent Under Reexamination VAN DEN BERG ET AL.
	Examiner DONALD MILLS	Art Unit 2462

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

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47										
CLAIM		DATE								
Final	Original	12/03/2012								
	1	✓								
	2	✓								
	3	✓								
	4	✓								
	5	✓								
	6	✓								
	7	✓								
	8	✓								
	9	✓								
	10	✓								
	11	✓								
	12	✓								
	13	✓								
	14	✓								
	15	✓								
	16	✓								

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ATTN: Stephen B. Parker (WPD)
Westerman, Hattori, Daniels & Adrian, LLP
1250 Connecticut Ave., Suite 700
Washington, DC 20036



**Courtesy Reminder for
Application Serial No: 12/973,300**

Attorney Docket No: 091523A

Customer Number: 89739

Date of Electronic Notification: 12/07/2012

This is a courtesy reminder that new correspondence is available for this application. The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.:	12/973,300	Confirmation No. 1628
Applicant:	Eric VAN DEN BERG, <i>et al.</i>	
Filed:	December 20, 2010	
TC/A.U.:	2462	
Examiner:	Donald Mills	
Title:	REAL-TIME COMPARISON OF QUALITY OF INTERFACES	
Docket No.:	3119.127DIV (091523A)	

AMENDMENT

May 7, 2013

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

Dear Sir:

In response to the Office Action of December 7, 2012, the period for response being extended to May 7, 2013, please amend the application and enter the remarks as set forth herein. In this response:

1. A listing of claims, showing the present status of the claims with any additions in underlining and deletions in strike-through, begins on page 2 of this response.
2. Remarks begin on page 7 of this response.

Listing of Claims

1. (Currently Amended) A method for substantially real-time comparison of quality of interfaces (Qols) by mobile devices having multiple heterogeneous interfaces that communicate over heterogeneous wireless networks, comprising:

a mobile device comparing in substantially real-time the qualities of multiple interfaces, including at least one cellular radio interface and at least one wireless local area network interface, of said mobile device that connect to heterogeneous networks using path quality metrics that are independent of how the Qol is measured, whether measured by a path through a wireless network alone or a path through both a wireless network and through a wired network, said method including said mobile device comparing path quality as a quickest change detection problem for observations from a new interface or comparing path quality based on sequential two sample tests.

2. (Currently Amended) A method for substantially real-time comparison of quality of interfaces (Qols) by mobile devices having multiple heterogeneous interfaces that communicate over heterogeneous wireless networks, comprising:

a mobile device comparing in substantially real-time the qualities of multiple interfaces, including at least one cellular radio interface and at least one wireless local area network interface, of said mobile device that connect to

heterogeneous networks using path quality metrics that are independent of how the Qol is measured, whether measured by a path through a wireless network alone or a path through both a wireless network and through a wired network, said method including said mobile device performing a one-sample change point detection method or performing a non-parametric and on-line two-sample method.

3. (Currently Amended) (Currently Amended) A method for substantially real-time comparison of quality of interfaces (Qols) by mobile devices having multiple heterogeneous interfaces that communicate over heterogeneous wireless networks, comprising:

a mobile device comparing in substantially real-time the qualities of multiple interfaces, including at least one cellular radio interface and at least one wireless local area network interface, of said mobile device that connect to heterogeneous networks using path quality metrics that are independent of how a Qol is measured,

said method including said mobile device comparing path qualities based on sequential two sample tests.

4. (Original) The method of claim 3, further including the mobile device having limited knowledge of the quality of the current path.

5. (Original) The method of claim 3, further including having insufficiently many measurements for an estimate of the mean quality of the current path and its variance and observations are not matched.

6. (Original) The method of claim 5, further including without the mobile device knowing values for mean and median, performing a test of which interface has a higher mean or median.

7. (Original) The method of claim 6, further including performing a test of the difference in average quality by testing for a difference in a location of samples.

8. (Original) The method of claim 7, wherein said method is non-parametric, works for unequal sample sizes, and is performed on-line.

9. (Original) The method of claim 6, wherein said method employs a Rosenbaum test.

10. (Original) The method of claim 9, wherein a test statistic T_R includes a total number of a second interface's data points which have a value larger than a largest value in a first interface's data points.

11. (Original) The method of claim 10, wherein if an overall maximum is not from a sample set from the second interface, then the test stops, and a null-hypothesis H_0 is not rejected in favor of H_1 , and otherwise H_0 is rejected in favor of H_1 if T_R is larger than a value $C(\alpha, n_1, n_2)$, calculated using the distribution of T_R .

12. (Original) The method of claim 9, wherein the method is based on the length of a high-end extreme run of samples for a second interface or a low-end extreme run of samples for a first interface.

13. (Original) The method of claim 12, further including repeating the test for a new observation or a new batch of observations.

14. (Original) The method of claim 3, further including using non-parametric approaches to test differences related to paired observations that are strongly correlated.

15. (Original) The method of claim 14, further including using a Wilcoxon sign test.

16. (Original) The method of claim 3, further including performing the two sample test even when the mobile has more than two interfaces.

REMARKS

Careful reconsideration of this application in view of the above amendments and the following remarks is most respectfully requested.

Rejections under 35 U.S.C. 101:

In response to the rejections under this section, the claims have been amended. While it is submitted that the claims were proper, it is most respectfully submitted that the claims as amended are very plainly appropriate. Withdrawal of these rejections is most respectfully requested.

Rejections under 35 U.S.C. 103:

In the Office Action, claims 1-10 and 14-16 were rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Bye (U.S. Pub. 2005/0002379) in view of the allegedly admitted prior art (APA). These rejections are respectfully traversed, as follows.

Improper Assertions of Allegedly Admitted Prior Art:

It is most respectfully submitted that the Patent Office's assertions regarding admission of prior art are incorrect. Notably, the Patent office asserts that "[a]pplicant admits that one-sample change-point detection methods ... are known in the art on page 12 of the specification." However, it is most respectfully submitted that while such methods were known, such were not known by those in the art, much less as being applicable to the present context.

Moreover, it is respectfully submitted that the allegedly admitted prior art (APA) does not fulfill the deficiencies of the Bye reference. Among other thing,

applicant's disclosure merely states at page 12 that "this type of method for detecting changes in a mean fall into the genre of methods commonly referred to as one-sample change-point detection methods." It is respectfully submitted that the Patent Office has mischaracterized the statements in the present disclosure. Moreover, the present disclosure does **not** indicate or suggest that such genre of methods are commonly known to be applicable for employment ***within the art***.

Improper Combination:

It is most respectfully submitted that the Patent Office's effort to combine the Bye reference with the alleged APA is completely improper.

First, the Bye reference does **not** even teach rendering **any** form of comparison. Accordingly, there is **no** reason or basis to seek to apply some specialized form of comparative analysis to the Bye reference.

Second, the alleged APA does **not** provide **any** teaching or suggestion that such methods were applicable in the context of the present invention related to selection of network interfaces.

In addition to the fact that the alleged APA reference is improperly applied, there is absolutely **no** reason to seek to combine these references. And, even if improperly combined, they do not teach or contemplate the features of the invention as recited in the present claims. Moreover, in this regard, it is respectfully noted that the Patent Office is wholly disregarding substantial features and recitations regarding the process of comparison as detailed in various dependent claims.

Deficiencies in the Rejections:

The Patent Office indicates that Bye figures 4a-e disclose examples of wireless terminals with multiple interfaces and further that Figure 6b and paragraph 64 discloses choosing between the heterogeneous networks depending upon the measured quality in each network. However, it is respectfully submitted that the Patent Office is incorrectly overlooking some notable deficiencies in the Bye reference.

It is most respectfully submitted that the reference to Bye does **not** perform real-time comparison between multiple available interfaces. In fact, Bye does **not** disclose or suggest **any** comparison step, **much less a comparison related to communications via two interface paths**. In particular, with reference to FIG. 1(A) of Bye, it is noted that Bye depicts a **single** path through a combined wired-wireless network. Moreover, FIG. 1(B) depicts a different **single** path through a combined wired-wireless network. There is **no** teaching or suggestion of, e.g., any concurrent communication via such paths, **much less** performing a comparison of communications via such paths in real time.

In addition, paragraph 14 of Bye only considers possible rerouting via an alternative service network after determining that the real-time communications cannot be provided (at) the predetermined service level (over the current network). Notably, the quality of a current interface and the quality of a new interface are **not compared in real-time**. In Bye, the switch is only possible **after** the monitored service quality of the current network is below a pre-determined service level. See also Fig. 5C of Bye.

With respect to paragraph 64 cited by the Patent Office, it is respectfully noted that the paragraph does **not** teach that which is asserted by the Patent Office. As seen in paragraph 64, reproduced below for reference, the reference merely expresses that “modules 602 may direct that if the primary communication pathways are **unable to support** the real-time communications between wireless terminal 10 and far-end terminal 614, bypass network such as those identified above may be used in favor of WAN 606A.” Thus, Bye does not suggest comparisons to be rendered in real time **during use of a current interface**, but only involves another bypass network **after a determination that a current network cannot support communications**.

[0064] FIG. 6B includes a bypass network such as PSTN, cellular, satellite, or other like network known to those skilled in the art. In this instance, quality-monitoring modules 602 may direct that if the primary communication pathways are unable to support the real-time communications between wireless terminal 10 and far-end terminal 614, bypass network such as those identified above may be used in favor of WAN 606A. Quality monitoring modules 602, in addition to evaluating communication quality levels delivered by the network, and the coding schemes employed, may further direct that non-real-time communications receive a lower priority or be temporarily stored in a buffer, or be delayed to support real-time communications.

Moreover, the Bye reference does **not** teach or suggest that somehow quality comparisons are performed **concurrently in real time during use of a current interface**, much less even how the modules 602 are to operate. However, Bye does plainly teach away from any such real time comparison because Bye only contemplates switching once a current interface cannot support communications.

It is respectfully submitted that the references do not teach or suggest the combinations of features recited in the present claims. Among other things, as discussed above, it is respectfully submitted that the Bye reference does **not** teach employing 1) a comparison of heterogeneous interfaces in real time (e.g., concurrently during use of the current network), much less 2) using the specific methodologies as set forth in the claims.

Independent Claim 1:

With respect to claim 1, the claim recites a novel and non-obvious combination of features, including “[a] method for substantially real-time comparison of quality of interfaces (Qols) by mobile devices having multiple heterogeneous interfaces that communicate over heterogeneous wireless networks, comprising: a mobile device ***comparing in substantially real-time the qualities of multiple interfaces, including at least one cellular radio interface and at least one wireless local area network interface, of said mobile device that connect to heterogeneous networks*** using path quality metrics that are independent of how the Qol is measured, whether measured by a path through a wireless network alone or a path through both a wireless network and through a wired network, **said method including said mobile device comparing path quality as a quickest change detection problem for observations from a new interface or comparing path quality based on sequential two sample tests.**” Emphasis added. These features are, thus, plainly not taught or suggested by the cited references.

Independent Claim 2:

With respect to claim 2, the claim recites another novel and non-obvious combination of features, including “[a] method for substantially real-time comparison of quality of interfaces (Qols) by mobile devices having multiple heterogeneous interfaces that communicate over heterogeneous wireless networks, comprising: a mobile device ***comparing in substantially real-time the qualities of multiple interfaces, including at least one cellular radio interface and at least one wireless local area network interface, of said mobile device that connect to heterogeneous networks*** using path quality metrics that are independent of how the Qol is measured, whether measured by a path through a wireless network alone or a path through both a wireless network and through a wired network, **said method including said mobile device performing a one-sample change point detection method or performing a non-parametric and on-line two-sample method.**” Emphasis added. These features are, thus, plainly not taught or suggested by the cited references.

Independent Claim 3:

With respect to claim 3, the claim recites another novel and non-obvious combination of features, including “[a] method for substantially real-time comparison of quality of interfaces (Qols) by mobile devices having multiple heterogeneous interfaces that communicate over heterogeneous wireless networks, comprising: a mobile device ***comparing in substantially real-time***

the qualities of multiple interfaces, including at least one cellular radio interface and at least one wireless local area network interface, of said mobile device that connect to heterogeneous networks using path quality metrics that are independent of how a QoI is measured, **said method including said mobile device comparing path qualities based on sequential two sample tests.**” Emphasis added. These features are, thus, plainly not taught or suggested by the cited references.

Dependent Claims:

The remaining claims depend directly or indirectly from the above-discussed independent claims and, thus, are also allowable. In addition, the dependent claims also recite a variety of additional features that are not taught or suggested by the references. It is respectfully requested that the Patent Office duly consider each and every claim.

Request for Interview:

Applicants respectfully request to be granted an interview to discuss this application with the Examiner in order to expedite prosecution of this application. The Examiner is respectfully requested to contact the undersigned as soon as possible to arrange such an interview.

Concluding Remarks:

In view of the foregoing remarks, it is respectfully submitted that the present claims are in condition for allowance, which action is earnestly solicited. Early reconsideration and allowance are respectfully requested. In the event that the Examiner desires to discuss any aspect of this application, he is encouraged to contact the undersigned attorney.

In the event that any fees are now due, please charge or credit any fees due or payable to our Deposit Account No. 50-2866.

Respectfully submitted,

By ***/Stephen B. Parker Reg. No. 36631/***

Stephen B. Parker
Registration No. 36,631
Westerman, Hattori, Daniels & Adrian, LLP
1250 Connecticut Ave, N.W. (Suite 700),
Washington, D.C. 20036
(202) 822-1100

Electronic Patent Application Fee Transmittal				
Application Number:		12973300		
Filing Date:		20-Dec-2010		
Title of Invention:		REAL-TIME COMPARISON OF QUALITY OF INTERFACES		
First Named Inventor/Applicant Name:		Eric van den Berg		
Filer:		Stephen B. Parker		
Attorney Docket Number:		091523A		
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 2 months with \$0 paid	1252	1	600	600

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Total in USD (\$)				600

Electronic Acknowledgement Receipt	
EFS ID:	15716652
Application Number:	12973300
International Application Number:	
Confirmation Number:	1628
Title of Invention:	REAL-TIME COMPARISON OF QUALITY OF INTERFACES
First Named Inventor/Applicant Name:	Eric van den Berg
Customer Number:	89739
Filer:	Stephen B. Parker
Filer Authorized By:	
Attorney Docket Number:	091523A
Receipt Date:	07-MAY-2013
Filing Date:	20-DEC-2010
Time Stamp:	18:00:26
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$ 600
RAM confirmation Number	4903
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	Amendment/Req. Reconsideration-After Non-Final Reject	091523AxAmendment.pdf	183494	no	14
			d6ef5ab512fff7bfb93cd8a1bd5bbc9e47bc7d70		
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30415	no	2
			5aa2e0e6d295a6b2ed916862d275bc995660f183		
Warnings:					
Information:					
Total Files Size (in bytes):			213909		
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. <u>New Applications Under 35 U.S.C. 111</u> 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. <u>National Stage of an International Application under 35 U.S.C. 371</u> 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. <u>New International Application Filed with the USPTO as a Receiving Office</u> 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.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875				Application or Docket Number 12/973,300	Filing Date 12/20/2010	☒ To be Mailed	
ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO							
APPLICATION AS FILED – PART I							
(Column 1)		(Column 2)					
FOR	NUMBER FILED	NUMBER EXTRA			RATE (\$)	FEE (\$)	
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A			N/A		
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A			N/A		
☐ 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 \$ =		
☐ 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).						
☐ 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)			
AMENDMENT	05/07/2013	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	* 16	Minus	** 20	= 0	X \$80 =	0
	Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X \$420 =	0
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	0
(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 \$ =	
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ 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.							

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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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/973,300	12/20/2010	Eric van den Berg	091523A	1628

89739 7590 09/13/2013 ATTN: Stephen B. Parker (WPD) Westerman, Hattori, Daniels & Adrian, LLP 1250 Connecticut Ave., Suite 700 Washington, DC 20036		EXAMINER MILLS, DONALD L.
ART UNIT 2462	PAPER NUMBER	
NOTIFICATION DATE 09/13/2013	DELIVERY MODE ELECTRONIC	

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.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PatentMail@WHDA.com
SParker@WHDA.com

Office Action Summary	Application No. 12/973,300	Applicant(s) VAN DEN BERG ET AL.	
	Examiner DONALD MILLS	Art Unit 2462	AIA (First Inventor to File) Status 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 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, 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 7 May 2013.
☐ 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) 1-16 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) 1-16 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 or send an inquiry to 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) | 3) ☐ Interview Summary (PTO-413) |
| 2) ☐ Information Disclosure Statement(s) (PTO/SB/08) | Paper No(s)/Mail Date. ____. |
| Paper No(s)/Mail Date ____. | 4) ☐ Other: ____. |

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

DETAILED ACTION

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-16 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Regarding claims 1-3, for example see claim 1, lines 4-5, the claims recite *comparing in substantially real-time the qualities of multiple interfaces . . .* Although the amended claim recites a mobile device, the claims are directed towards a mere comparison or algorithm. The claims are wholly directed to a judicially recognized exception because the claims represent mere mathematical algorithms and formulas. The claims are not limited to a particular practical application of a judicially recognized exception. When subject matter has been reduced to a particular practical application having a real world use, the claimed practical application is evidence that the subject matter is not abstract, not purely mental and does not encompass substantially all uses of a law of nature or a natural phenomenon. The claims merely recite: "comparing in substantially real-time the qualities of multiple interfaces of a mobile device that connect to heterogeneous networks . . ." The claims do not include additional elements or steps, or a combination of elements and steps, which integrate the algorithm into the claimed invention such that the algorithm is practically applied and are sufficient to ensure that the claim amounts to significantly more than the natural principle itself. The claims amount to a mere mathematical operation with indication to apply it. The claims do not recite significant

limitations on the specific manner by which the law of nature is to be applied. The claims merely compare two values with no indication of the manner in which those values are used to effectuate a practical application. Appropriate correction and clarification is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-10 and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bye (US 2005/0002379) in view of admitted prior art (APA).

Regarding claims 1-3, and 16 Bye discloses a method for substantially real-time comparison of quality of interfaces (QoIs) by mobile devices (Figure 1 element 10 discloses a wireless terminal) having multiple heterogeneous interfaces (Figs. 4b-e disclose devices with multiple heterogeneous interfaces 404a-c., both a cellular and wireless LAN interface) over heterogeneous wireless networks, comprising: a mobile device comparing in substantially real-time the qualities of multiple interfaces, including at least one cellular radio interface and at least one wireless local area network interface, of said mobile device that connect to heterogeneous networks using path quality metrics that are independent of how the QoI is measured (Paragraph 18 lists some of the independent parameters used to determine QoI, such as jitter, packet loss, and transmission rate. Paragraph 14 indicates the comparison is in real-time. Paragraph 11 states that the invention allows for dynamic real-time quality management Paragraph 18 discloses that

any and all portions of a network such as servicing AP, WLAN terminal, WLAN backbone network, switches, routers, nodes, and links may be monitored for quality. Paragraphs 19-21 disclose using the information gathered by the monitoring to make a selection about how to route a communication. Paragraph 21 also discloses comparing the quality from each AP and choosing a new AP if better quality is available. In order to determine if there is better quality available a comparison must be made. Paragraph 64 and fig. 6b disclose choosing between the different heterogeneous network dependent upon the measured quality.), whether measured by a path through a wireless network alone or a path through both a wireless network and through a wired network (Fig. 1a illustrates a path through only a wireless network. Fig. 1b illustrates a path through both a wireless and wired network.).

Bye discloses comparing path quality in paragraph 49 but is silent to whether the testing methods include said mobile device comparing path quality as a quickest change detection problem for observations from a new interface or comparing path quality based on sequential two sample tests.

Applicant admits one-sample change-point detection methods, which fall into the category of quickest change detection, are known in the art on page 12 of the specification.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a one-sample change-point detection method, as was known in the art, in the real-time quality of interface comparison taught by Bye because using a quick change detection technique allows for rapid selection of a new interface whenever it changes to higher quality than the existing interface.

In regards to claim 4, the primary reference further teaches *the mobile device having limited knowledge of the quality of the current path* (The mobile has little knowledge of the quality of the current path. Paragraphs 19-21 disclose using the information gathered by the monitoring to make a selection about how to route a communication. Paragraph 21 also discloses comparing the quality from each AP and choosing a new AP if better quality is available. In order to determine if there is better quality available a comparison must be made. Paragraph 64 and fig. 6b disclose choosing between the different heterogeneous network dependent upon the measured quality.)

Regarding claim 5, the primary reference further teaches *insufficiently many measurements for an estimate of the mean quality of the current path and its variance and observations are not matched* (Note, by definition the calculation of Bye has insufficient measurements as consistent with the recited claim).

Regarding claims 6, Bye modified by APA discloses without the mobile device knowing values for mean and median, performing a test of which interface has a higher mean or median (APA on page 28 discloses Page's CUSUM procedure, which monitors the mean of observations from a new interface to determine if the new interface has a higher, i.e. better quality, metric value.).

Regarding claim 7, Bye modified by APA discloses performing a test of the difference in average quality by testing for a difference in a location of samples (APA Page 31 step 3).

In regards to claims 8, 9, 14 and 15, Bye modified by APA discloses wherein said method is non-parametric, works for unequal sample sizes, and is performed on-line/Rosenbaum

test (APA page 28 discloses Page's method is applicable to unmatched observations, functionally equivalent to a Rosenbaum test.).

In regards to claim 10, Bye modified by APA discloses wherein a test statistic T_r includes a total number of a second interface's data points which have a larger value than a largest value in a first interface's data points (APA pages 28-30, it is possible to have second data points larger than a first set of data points).

Response to Arguments

Applicant's arguments filed 07 May 2013 have been fully considered but they are not persuasive.

On page 7 of the remarks, regarding claims 1-16, the Applicant argues the claims as amended are statutory. The Examiner respectfully disagrees. The claims are wholly directed to a judicially recognized exception because the claims represent mere mathematical algorithms and formulas. The claims are not limited to a particular practical application of a judicially recognized exception. See rejection for further elaboration.

On page 7 of the remarks, regarding allegedly admitted prior art, the Applicant argues that "one-sample change-point detection methods" were known but not known within the art. The Examiner respectfully disagrees. Change-point detection is the problem of discovering time points at which properties of time-series data change and is well-known because of its use within communication systems for high-speed anomaly detection. See Mukhopadhyay, Nitis et al., "Applied Sequential Methodologies: Real-world Examples with Data Analysis," Marcel Dekker, Monticello, New York, 2004, pp. 339-340. Despite the Applicant's objections, the disclosure

and well-known use of change-point detection are commonly known to be applicable for employment within the art communication networks.

On page 9 of the remarks, regarding claims 1, 2, and 3, the Applicant argues Bye does not perform a real-time comparison between multiple available interfaces. The Examiner respectfully disagrees. The claim recites *comparing in substantially real-time the qualities of multiple interfaces*. The Examiner utilizes a broad literal reasonable interpretation. Bye determines if real-time communications cannot be provided at a predetermined service level and if the communications cannot be provided a bypass network is utilized. The Examiner interprets the claim as relating to the process by which the system compares the working path to the bypass network. In this manner, the system measures its working path against the bypass network (comparing in substantially real-time the qualities of multiple interfaces). Note, the claim does not preclude such an interpretation. The claim does not recite an ongoing and continuous measurement process of multiple working paths. Therefore, the Examiner's interpretation of a measure of the working path and bypass network sufficiently meets the claim limitation.

On page 10, the Applicant further argues Bye does not teach or disclose quality comparisons are performed concurrently in real time during use of a current interface, but such language is not recited in the claim.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DONALD MILLS whose telephone number is (571)272-3094. The examiner can normally be reached on 9:00 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yemane Mesfin can be reached on (571)272-3927. 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.

Application/Control Number: 12/973,300
Art Unit: 2462

Page 9

/Donald L Mills/
Primary Examiner, Art Unit 2462

Notice of References Cited	Application/Control No. 12/973,300		Applicant(s)/Patent Under Reexamination VAN DEN BERG ET AL.	
	Examiner DONALD MILLS		Art Unit 2462	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-7,885,185 B2	02-2011	van den Berg et al.	370/230
*	B	US-7,995,501 B2	08-2011	Jetcheva et al.	370/255
*	C	US-8,111,651 B2	02-2012	Twitchell, Jr., Robert W.	370/328
*	D	US-8,223,659 B2	07-2012	Do et al.	370/248
*	E	US-8,331,239 B2	12-2012	Yamada, Kenji	370/238
	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	Mukhopadhyay, Nitis et al., "Applied Sequential Methodologies: Real-world Examples with Data Analysis," Marcel Dekker, Monticello, New York, 2004, pp. 339-340.
	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
S1	70811	("370"/\$.ccls. or "709"/\$.ccls.) and ((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3))	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 14:56
S2	15449	("370"/\$.ccls. or "709"/\$.ccls.) and ((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3))	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 14:58
S3	3	("370"/\$.ccls. or "709"/\$.ccls.) and (((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3)) and (wink\$3 with test\$3))	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 14:59
S4	0	"11/290,814"	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 15:00
S5	258	(ESLAMBOLCHI -HOSSEIN MCCANUE-JOHN BAJPAY-PARITOSH YANG-CHEN-YUI).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/09/10 15:02
S6	241	At&t.as. and (out adj2 service)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/09/10 15:03
S7	709	("370"/\$.ccls. or "709"/\$.ccls.) and (((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3)) and (automat\$3 with test\$3))	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 15:04
S8	3	("370"/\$.ccls. or "709"/\$.ccls.) and (((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3)) and (wink with test\$3))	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 15:06
S9	7	("370"/\$.ccls. or "709"/\$.ccls.) and (wink with test\$3)	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 15:06
S10	45	acterna.as.	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 15:10
S11	3852	agilent.as.	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 15:15
S12	371	agilent.as. and (network with (monitor\$3 or scan\$4 or test\$3))	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 15:15

S13	75	agilent.as. and (network\$3 or scan\$4 or test\$3)) and ("709"/\$.ccls. or "370"/\$.ccls.)	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 15:19
S14	10	("6711134").URPN.	USPAT	OR	OFF	2008/09/10 15:21
S15	947	("370"/\$.ccls. or "709"/\$.ccls.) and (automatic\$4 near3 test\$3)	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 16:15
S16	119	("370"/\$.ccls. or "709"/\$.ccls.) and ((automatic\$4 near3 test\$3) same (error or fault))	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 16:16
S17	206	("370"/\$.ccls. or "709"/\$.ccls.) and ((automatic\$4 near3 test\$3) same (error or fault or (out ad2 serve)))	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 16:17
S18	4	("6269150").URPN.	USPAT	OR	OFF	2008/09/11 15:12
S19	9221	370/217-220,221,222,241,241.1,242-246,250,252.ccls.	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/13 17:06
S20	18905	709/223-226.ccls.	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/13 17:07
S21	20390	((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3))	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/09/13 17:07
S22	1990	((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3) same scan\$4)	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/09/13 17:08
S23	179	((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3) same scan\$4 same interfac\$3)	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/09/13 17:08
S24	1	("370"/\$.ccls. or "709"/\$.ccls.) and ((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3)) and (maintenance adj2 ticket)	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/13 17:32
S25	258	(ESLAMBOLCHI-HOSSEIN MOCANUE-JOHN BAJPAY-PARI TOSH YANG-CHEN-YUI XU-ZHIJIAN FENG-HSIAO-YING).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/09/13 23:12
S26	258	(ESLAMBOLCHI-HOSSEIN MOCANUE-JOHN BAJPAY-PARI TOSH YANG-CHEN-YUI XU-ZHIJIAN FENG-HSIAO-YING TALMADGE-BRIAN).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/09/13 23:12
S27	258	(ESLAMBOLCHI-HOSSEIN MOCANUE-JOHN BAJPAY-PARI TOSH YANG-CHEN-YUI XU-ZHIJIAN FENG-HSIAO-YING TALMADGE-BRIAN SHAH-SARYU KOLMODIN-CHRISTIAN).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/09/14 00:00
S28	55	((network\$3 or computer\$1 or node\$1 or terminal\$1 or	FPRS;	OR	OFF	2008/10/01

		(packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3) same scan\$4) and (power adj1 supply))	EPO; JPO; DERWENT; IBM_TDB			02:19
S29	3415	((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3) same scan\$4) and (power adj1 supply))	US-PGPUB; USPAT; USOCR	OR	OFF	2008/10/01 02:19
S30	53	((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3) same scan\$4) and (power adj1 supply adj1 line?))	US-PGPUB; USPAT; USOCR	OR	OFF	2008/10/01 02:19
S31	254	((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3) same scan\$4) and (power adj1 line?))	US-PGPUB; USPAT; USOCR	OR	OFF	2008/10/01 02:24
S32	15	"370"/\$.ccls. and (((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3) same scan\$4) and (power adj1 line?)))	US-PGPUB; USPAT; USOCR	OR	OFF	2008/10/01 02:24
S33	10309	370/217-220,221,222,241,241.1,242-246,250,252.ccls.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/06/08 02:56
S34	21422	709/223-226.ccls.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/06/08 02:57
S35	21200	((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3))	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/06/08 02:57
S36	2059	((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3) same scan\$4)	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/06/08 02:57
S37	290	(ESLAMBOLCHI -HOSSEIN MOCANUE-JOHN BAJPAY-PARI TOSH YANG-CHEN-YUI XU-ZHIJIAN FENG-HSI AO-YING TALMADGE-BRIAN SHAH-SARYU KOLMODIN-CHRISTIAN).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/06/08 02:57
S38	2406	370/241,242,244,245,248,250,251,431,437.ccls. and (test\$3)	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 01:23
S39	830	370/241,242,244,245,248,250,251,431,437.ccls. and ((test\$3) same (upstream\$3 or downstream\$3 or uplink\$3 or downlink\$3 or channel\$3))	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 01:23
S40	8	((("6230326") or ("20020062486") or ("20040037217") or ("20040190544") or ("6728887") or ("6704288") or ("20050047442") or ("20060100815")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 01:38
S41	8	("6728887").URPN.	USPAT	OR	OFF	2009/09/27 01:42
S42	4	("5845073" "5884157" "6061332" "6195364").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 01:43
S43	21	("5845073").URPN.	USPAT	OR	OFF	2009/09/27 01:43
S44	3742	DOCSIS	US-PGPUB; USPAT;	OR	OFF	2009/09/27 01:49

			USOCR			
S45	147	DOCSIS same test\$3	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 01:49
S46	63	DOCSIS with test\$3	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 01:49
S47	1157	370/241,242,244,245,248,250-252,431,437.ccls. and ((test\$3) same (upstream\$3 or downstream\$3 or uplink\$3 or downlink\$3 or channel\$3))	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:02
S48	6	370/241,242,244,245,248,250-252,431,437.ccls. and ((test\$3) same (upstream\$3 or downstream\$3 or uplink\$3 or downlink\$3 or channel\$3) same pause)	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:04
S49	24	370/241,242,244,245,248,250-252,431,437.ccls. and ((test\$3) same pause)	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:06
S50	24	agilent.as. and ((test\$3) same pause)	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:12
S51	0	agilent.as. and ((test\$3) same pause) and DOCSIS	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:12
S52	0	agilent.as. and test\$3 and DOCSIS	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:12
S53	0	agilent.as. and DOCSIS	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:13
S54	1121	DOCSIS and test\$3	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:16
S55	189	DOCSIS and test\$3 and paus\$3	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:16
S56	0	DOCSIS same test\$3 same paus\$3	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:16
S57	8	DOCSIS same test\$3 and paus\$3	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:16
S58	0	("7058559").URPN.	USPAT	OR	OFF	2009/09/27 02:19
S59	6	("4607364" "5619725" "6249913" "6625255" "6662135" "6894801").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:19
S60	0	jdsu.as. and DOCSIS	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:22
S61	0	jdsu.as. and paus\$3	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:22
S62	2	jdsu.as.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:22
S63	1	"pathtrak"	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:25
S64	332	370/241,242,244,245,248,250-252,431,437.ccls. and ((test\$3) same (stop\$4 or paus\$3))	US-PGPUB; USPAT;	OR	OFF	2009/09/27 02:37

			USOCR			
S65	5	370/241,242,244,245,248,250-252,431,437.ccls. and (DOCSIS and ((test\$3) same (stop\$4 or paus\$3)))	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:37
S66	29	370/241,242,244,245,248,250-252,431,437.ccls. and (DOCSIS and ((test\$3) and (stop\$4 or paus\$3)))	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:39
S77	3165	cable same channel\$3 same test\$3	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:44
S78	332	cable same channel\$3 same test\$3 same (paus\$3 or stop\$4)	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:44
S79	0	(cable same channel\$3 same test\$3 same (paus\$3 or stop\$4)) and (channel adj2 descriptor)	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:44
S80	1061	(channel adj2 descriptor)	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:44
S81	442	(channel adj2 descriptor) and cable	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:44
S82	178	(channel adj2 descriptor) and cable and (paus\$3 or stop\$4)	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:45
S83	97	(channel adj2 descriptor) and cable and (paus\$3 or stop\$4) and test\$3	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:45
S84	1	cm adj2 mode adj2 block	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:50
S85	1	(cm or "cable modem") adj2 mode adj2 block	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:51
S86	103	(cm or "cable modem") with mode with block\$3	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:51
S87	1	(cm or "cable modem") adj3 mode adj3 block\$3	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:51
S88	49377	(cm or "cable modem" or cmts) with test\$3	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:54
S89	10	(cm or "cable modem" or cmts) with test\$3 same (UCD or "upstream channel descriptor")	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:55
S90	2	("7246368").URPN.	USPAT	OR	OFF	2009/09/27 03:00
S91	13	(cm or "cable modem" or cmts) same test\$3 same (UCD or "upstream channel descriptor")	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 03:04
S92	144	("cable modem" or cmts) same (UCD or "upstream channel descriptor")	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 03:05
S93	88	("cable modem" or cmts) same (UCD or "upstream channel descriptor") same MAP	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 03:05
S94	39	("cable modem" or cmts) same (UCD or "upstream channel descriptor") same MAP and test\$3	US-PGPUB; USPAT;	OR	OFF	2009/09/27 03:05

			USOCR			
S95	1	("7010730").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 03:23
S96	1	("7007209").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 03:26
S97	2	("7007209").URPN.	USPAT	OR	OFF	2009/09/27 03:26
S98	4	("5477531" "6424632" "6512747" "6643818").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 03:27
S99	58	CMTS same channel\$3 same test\$3	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 03:50
S100	1538	379/1.01,1.03,1.04,15.01,21,27.01.ccls.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/28 08:20
S101	1045	725/105,107.ccls.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/28 08:20
S102	206	725/107.ccls.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/28 08:20
S103	64	("5862451").URPN.	USPAT	OR	OFF	2009/09/28 08:34
S104	2	("7246368").URPN.	USPAT	OR	OFF	2009/09/28 08:48
S105	4	("5862451" "5939887" "5943604" "6772437").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/28 08:51
S106	8	("7111318").URPN.	USPAT	OR	OFF	2009/09/28 09:12
S108	12797	370/230,230.1,231,235,236,236.1,236.2,282,395.4,437,445-447,449-452,459,461,462.ccls.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/10/01 03:37
S109	1349	370/230,230.1,231,235,236,236.1,236.2,282,395.4,437,445-447,449-452,459,461,462.ccls. and (CSMA or CSMA/CD)	US-PGPUB; USPAT; USOCR	OR	OFF	2009/10/01 03:38
S110	38	370/230,230.1,231,235,236,236.1,236.2,282,395.4,437,445-447,449-452,459,461,462.ccls. and Homeplug	US-PGPUB; USPAT; USOCR	OR	OFF	2009/10/01 03:38
S111	817	370/230,230.1,231,235,236,236.1,236.2,282,395.4,437,445-447,449-452,459,461,462.ccls. and (home with network\$3)	US-PGPUB; USPAT; USOCR	OR	OFF	2009/10/01 03:50
S118	1425	370/230,230.1,231,235,236,236.1,236.2,282,395.4,437,445-447,449-452,459,461,462.ccls. and (CSMA or CSMA/CD)	US-PGPUB; USPAT; USOCR	OR	OFF	2010/03/01 10:09
S119	360	(ESLAMBOLCHI-HOSSEIN MCCANUE-JOHN BAJPAY-PARITOSH YANG-CHEN-YUI XU-ZHIJIAN FENG-HSIAO-YING TALMADGE-BRIAN SHAH-SARYU KOLMODIN-CHRISTIAN).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/03/01 10:09
S120	44	(oksman-vladimir).in.	US-PGPUB; USPAT; USOCR; FPRS;	OR	OFF	2010/03/01 10:09

			EPO; JPO; DERWENT; IBM_TDB			
S121	3	((("20020112070") or ("20050111536") or ("20050186933")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2010/06/16 13:53
S122	2	((("6115393") or ("7321565")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2010/06/16 15:34
S123	1	("7477594").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2010/06/17 15:00
S124	1	(source adj2 rout\$3) with ((generic adj1 framing adj1 procedure) or GFP)	US-PGPUB; USPAT; USOCR	OR	OFF	2010/06/17 15:02
S125	1	(source adj2 rout\$3) same ((generic adj1 framing adj1 procedure) or GFP)	US-PGPUB; USPAT; USOCR	OR	OFF	2010/06/17 15:02
S127	13	(source adj2 rout\$3) and ((generic adj1 framing adj1 procedure) or GFP)	US-PGPUB; USPAT; USOCR	OR	OFF	2010/06/17 15:02
S128	3	("2006/0002304").URPN.	USPAT	OR	OFF	2010/06/17 15:03
S129	9	("20060002304" "20060221929" "5309433" "5504746" "5563878" "5917820" "6084882" "6275492" "7334047").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2010/06/17 15:08
S130	1	("20060002304").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2010/06/17 15:11
S131	1	("20040139037").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2010/06/17 15:28
S132	116	("370"/\$.ccls. or "709"/\$.ccls.) and ((hidden with node\$1) same CSMA)	US-PGPUB; USPAT; USOCR	OR	OFF	2010/06/21 11:32
S133	115	"370"/\$.ccls. and ((hidden with node\$1) same CSMA)	US-PGPUB; USPAT; USOCR	OR	OFF	2010/06/21 11:32
S134	3	("2007/0115907").URPN.	USPAT	OR	OFF	2010/06/21 11:41
S135	1	("6137784").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2010/07/05 21:14
S136	124	("370"/\$.ccls. or "709"/\$.ccls.) and ((hidden with node\$1) same CSMA)	US-PGPUB; USPAT; USOCR	OR	OFF	2010/12/06 11:23
S137	123	"370"/\$.ccls. and ((hidden with node\$1) same CSMA)	US-PGPUB; USPAT; USOCR	OR	OFF	2010/12/06 11:23
S140	1	sub?map same bod\$3 same header\$1 same uplink\$3	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/11 00:05
S142	12	sub?map same uplink\$3	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/11 00:06
S143	2	sub?map same uplink\$3 same burst\$3	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/11 00:28
S144	0	("2007086370").PN.	US-PGPUB;	OR	OFF	2012/09/11

			USPAT; USOCR			00:28
S145	1	("20070086370").PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2012/09/11 00:28
S146	22	sub?map and (uplink\$3 same burst\$3)	US- PGPUB; USPAT; USOCR	OR	ON	2012/09/11 00:29
S147	22	sub?map and (uplink\$3 same burst\$3)	US- PGPUB; USPAT; USOCR	OR	ON	2012/09/11 00:29
S148	9	sub?map with header\$1	US- PGPUB; USPAT; USOCR	OR	ON	2012/09/11 01:27
S149	63	"370"/\$.ccls. and (SUB?MAP)	US- PGPUB; USPAT; USOCR	OR	OFF	2012/09/11 01:59
S150	63	"370"/\$.ccls. and (SUB-MAP)	US- PGPUB; USPAT; USOCR	OR	OFF	2012/09/11 02:00
S151	95	"370"/\$.ccls. and ("SUB MAP")	US- PGPUB; USPAT; USOCR	OR	OFF	2012/09/11 02:00
S152	95	"370"/\$.ccls. and ("SUB MAP" or sub?map)	US- PGPUB; USPAT; USOCR	OR	OFF	2012/09/11 02:00
S153	372	("SUB MAP" or sub?map)	US- PGPUB; USPAT; USOCR	OR	OFF	2012/09/11 02:00
S154	778	uplink\$3 same (frame\$1 or packet\$1 or cell\$1) same burst\$3 same \$4MAP	US- PGPUB; USPAT; USOCR	OR	OFF	2012/09/11 02:01
S155	2310	uplink\$3 same (frame\$1 or packet\$1 or cell\$1) same \$4MAP	US- PGPUB; USPAT; USOCR	OR	OFF	2012/09/11 02:01
S156	194	(KIM-JEONG-KI RYU-KIL-H RYU-KIL-HYEN RYU-KIL-JUNG RYU-KI O RYU-KI SEON RYU-KI -HYUN YUK- YOUNGSOO YUK- YOUNG-SOO YUK- YOUNG-SUB).in.	US- PGPUB; USPAT; USOCR	OR	ON	2012/09/11 02:02
S157	21297	"lg electronics".as.	US- PGPUB; USPAT; USOCR	OR	ON	2012/09/11 02:02
S158	9	"lg electronics".as. and "sub map"	US- PGPUB; USPAT; USOCR	OR	ON	2012/09/11 02:03
S159	4046	dsl same subscriber\$3 with loop	US- PGPUB; USPAT; USOCR	OR	ON	2012/09/12 18:21
S160	40	dsl same subscriber\$3 with loop same spectrum same management	US- PGPUB; USPAT; USOCR	OR	ON	2012/09/12 18:21
S161	3	((("20030093364") or ("6498785") or ("6597705")).PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2012/09/13 09:26
S162	1	("20050286408").PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2012/09/20 14:43
S163	1	"12,812,741"	US- PGPUB; USPAT; USOCR	OR	ON	2012/09/20 14:45

S164	1	"12/812,741"	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/20 14:45
S165	1	"12/867,865"	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/20 14:51
S166	264	(superframe or super?frame) with map	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/20 15:09
S167	60	(superframe or super?frame) with map same (subframe or sub?frame)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/20 15:10
S168	183437	"370"/\$.ccls. or "455"/\$.ccls. and ((superframe or super?frame) with map same (subframe or sub?frame))	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/20 15:10
S169	54	("370"/\$.ccls. or "455"/\$.ccls.) and ((superframe or super?frame) with map same (subframe or sub?frame))	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/20 15:10
S170	1	("7990920").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/20 15:18
S171	127	370/328-330,338,395.4,432,436,437,458,459,468,473.ccls. and (sub adj2 MAP)	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/22 11:35
S172	226	"370"/\$.ccls. and (sub adj2 MAP)	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/22 11:35
S173	1055	(sub adj2 MAP)	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/22 11:35
S174	162	(YUK-YOUNG-SOO KIM-JEONG KIM-JEONGCHANG KIM-JEONGDAL KIM-JEONGDEOK KIM-JEONGEUN KIM-JEONGGOO RYU-KIL-H RYU-KIL-HYEN RYU-KIL-JUNG RYU-KIO RYU-KISEON RYU-KI-HYUN)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/22 11:36
S175	52	(YUK-YOUNG-SOO KIM-JEONG KIM-JEONGCHANG KIM-JEONGDAL KIM-JEONGDEOK KIM-JEONGEUN KIM-JEONGGOO RYU-KIL-H RYU-KIL-HYEN RYU-KIL-JUNG RYU-KIO RYU-KISEON RYU-KI-HYUN) and (superframe or super?frame)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/22 11:36
S176	19	(YUK-YOUNG-SOO KIM-JEONG KIM-JEONGCHANG KIM-JEONGDAL KIM-JEONGDEOK KIM-JEONGEUN KIM-JEONGGOO RYU-KIL-H RYU-KIL-HYEN RYU-KIL-JUNG RYU-KIO RYU-KISEON RYU-KI-HYUN) and ((superframe or super?frame) same MAP)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/22 11:37
S177	3	(YUK-YOUNG-SOO KIM-JEONG KIM-JEONGCHANG KIM-JEONGDAL KIM-JEONGDEOK KIM-JEONGEUN KIM-JEONGGOO RYU-KIL-H RYU-KIL-HYEN RYU-KIL-JUNG RYU-KIO RYU-KISEON RYU-KI-HYUN) and ((superframe or super?frame) same MAP).clm.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/22 11:37
S178	5	"lg electronics".as. and ((superframe or super?frame) same MAP).clm.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/22 11:38
S179	22	(fixed or constant) and (variable or adjustable) same uplink same downlink same (superframe or super?frame)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 19:26
S180	1622	(fixed or constant) and (variable or adjustable) same uplink same downlink	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 19:27
S181	941	((fixed or constant) and (variable or adjustable)) same uplink same downlink	US-PGPUB; USPAT;	OR	ON	2012/09/26 19:27

			USOCR			
S182	3	((fixed or constant) and (variable or adjustable)) same uplink same downlink same (superframe or super?frame)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 19:27
S183	20743	"802.16"	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 19:28
S184	14869	"IEEE 802.16"	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 19:29
S185	549	"IEEE 802.16d"	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 19:30
S186	144	"IEEE 802.16d" and ((fixed or constant) and (variable or adjustable))	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 19:35
S187	44	"IEEE 802.16d" and ((fixed or constant) with (variable or adjustable))	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 19:35
S188	317	(YUK-YOUNG-SOO KIM-JEONG KIM-JEONGCHANG KIM-JEONGDAL KIM-JEONGDEOK KIM-JEONGEUN KIM-JEONGGOO RYU-KI -HYUN RYU-KIL-H RYU-KIL-HYEN RYU-KIL-JUNG RYU-KIO RYU-KI SEON KIM-YONG KIM-YONGBAE KIM-YONGBUM KIM-YONGCHUL KIM-YONGCHURL KIM-YONGDAE).in.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 20:09
S189	1	(YUK-YOUNG-SOO KIM-JEONG KIM-JEONGCHANG KIM-JEONGDAL KIM-JEONGDEOK KIM-JEONGEUN KIM-JEONGGOO RYU-KI -HYUN RYU-KIL-H RYU-KIL-HYEN RYU-KIL-JUNG RYU-KIO RYU-KI SEON KIM-YONG KIM-YONGBAE KIM-YONGBUM KIM-YONGCHUL KIM-YONGCHURL KIM-YONGDAE).in. and "IEEE 802.16d"	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 20:09
S190	51	(YUK-YOUNG-SOO KIM-JEONG KIM-JEONGCHANG KIM-JEONGDAL KIM-JEONGDEOK KIM-JEONGEUN KIM-JEONGGOO RYU-KI -HYUN RYU-KIL-H RYU-KIL-HYEN RYU-KIL-JUNG RYU-KIO RYU-KI SEON KIM-YONG KIM-YONGBAE KIM-YONGBUM KIM-YONGCHUL KIM-YONGCHURL KIM-YONGDAE).in. and superframe	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 20:10
S191	32	(YUK-YOUNG-SOO KIM-JEONG KIM-JEONGCHANG KIM-JEONGDAL KIM-JEONGDEOK KIM-JEONGEUN KIM-JEONGGOO RYU-KI -HYUN RYU-KIL-H RYU-KIL-HYEN RYU-KIL-JUNG RYU-KIO RYU-KI SEON KIM-YONG KIM-YONGBAE KIM-YONGBUM KIM-YONGCHUL KIM-YONGCHURL KIM-YONGDAE).in. and superframe and MAP	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 20:10
S192	85	lg.as. and superframe and MAP	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 20:10
S193	28	(YUK-YOUNG-SOO KIM-JEONG KIM-JEONGCHANG KIM-JEONGDAL KIM-JEONGDEOK KIM-JEONGEUN KIM-JEONGGOO RYU-KI -HYUN RYU-KIL-H RYU-KIL-HYEN RYU-KIL-JUNG RYU-KIO RYU-KI SEON KIM-YONG KIM-YONGBAE KIM-YONGBUM KIM-YONGCHUL KIM-YONGCHURL KIM-YONGDAE).in. and superframe.clm.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 20:11
S194	0	lg.as. and superframe.as.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 20:15
S195	42	lg.as. and superframe.clm.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 20:15
S196	4	((("20070242636") or ("20090170522") or ("20100220668") or ("20090129362")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/30 12:58

S197	23	("2007/0242636").URPN.	USPAT	OR	ON	2012/09/30 13:18
S198	18428	resource adj2 allocat\$3	USPAT	OR	ON	2012/09/30 13:30
S199	6629	"370"/\$.ccls. and (resource adj2 allocat\$3)	USPAT	OR	ON	2012/09/30 13:30
S200	7	"370"/\$.ccls. and (resource adj2 allocat\$3) same (bit with mask\$3)	USPAT	OR	ON	2012/09/30 13:30
S201	46882	resource adj2 allocat\$3	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 13:30
S202	50	"370"/\$.ccls. and (resource adj2 allocat\$3) same (bit with mask\$3)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 13:30
S203	4	"370"/\$.ccls. and ((resource adj2 allocat\$3) same (bit with mask\$3)).clm.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 13:30
S204	18	"370"/\$.ccls. and (resource adj2 allocat\$3) same (bit with mask\$3) and (frequency with block\$3)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 13:43
S205	5	"370"/\$.ccls. and (resource adj2 allocat\$3) same (bit with mask\$3) and (frequency adj2 block\$3)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 13:44
S206	2019	"370"/\$.ccls. and (resource adj2 allocat\$3) and ((bit with mask\$3) same (resource adj1 block\$1) or RB)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 13:55
S207	28	"370"/\$.ccls. and (resource adj2 allocat\$3) and ((bit with mask\$3) same ((resource adj1 block\$1) or RB))	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 13:55
S208	45	"370"/\$.ccls. and (((bit with mask\$3) same ((resource adj1 block\$1) or RB)))	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:00
S209	130	"370"/\$.ccls. and pdoch and (bit with mask\$3)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:03
S210	65	"370"/\$.ccls. and (pdoch same (bit with mask\$3))	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:03
S211	74	olav.in. and nokia.as.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:13
S212	5	olav.in. and nokia.as. and esa.in.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:13
S213	45	"370"/\$.ccls. and (bit with mask\$3) same ((resource adj1 block\$1) or RB)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:15
S214	1	nokia.as. and (bit with mask\$3) same ((resource adj1 block\$1) or RB)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:16
S215	279	ntt.as. and higuchi.in.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:21
S216	176	ntt.as. and higuchi.in. and frequency and scheduling	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:21
S217	64	ntt.as. and higuchi.in. and frequency and scheduling and allocate	US-PGPUB; USPAT;	OR	ON	2012/09/30 14:21

			USOCR			
S218	0	ntt.as. and higuchi.in. and (frequency and scheduling and allocate).as.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:21
S219	10	ntt.as. and higuchi.in. and (frequency and scheduling and allocate).ab.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:21
S220	0	("2009/0129362").URPN.	USPAT	OR	ON	2012/09/30 14:22
S221	74	nokia.as. and olav.in.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:27
S222	1	nokia.as. and olav.in. and esa.in. and frank.in.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:27
S223	4	nokia.as. and olav.in. and (resource adj1 block\$1 same group\$1)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:32
S224	1	nokia.as. and olav.in. and (resource adj1 block\$1 same group\$1)	EPO	OR	ON	2012/09/30 14:33
S225	23	("2007/0242636").URPN.	USPAT	OR	ON	2012/09/30 14:49
S226	26	(AWAD-YASSIN-ADDEN AWAD-YASSIN-ADEB AWAD-YASSIN-ADEN).in.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 15:53
S227	26	(AWAD-YASSIN-ADDEN AWAD-YASSIN-ADEB AWAD-YASSIN-ADEN).in. and (frequency wiht block\$3)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 15:53
S228	30347	nec.as. and (frequency wiht block\$3)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 15:53
S229	1310	nec.as. and (frequency with block\$3)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 15:53
S230	66	nec.as. and (frequency adj1 block\$3)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 15:53
S231	2	((("20080192847") or ("7885230"))).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/30 15:56
S232	11874	"370"/\$.cls. and (frequency with assign\$4)	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 04:55
S233	393	"370"/\$.cls. and (frequency with assign\$4) same MAP	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 04:56
S234	217	"370"/\$.cls. and (frequency with assign\$4) with MAP	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 04:56
S235	30	"370"/\$.cls. and (((frequency with assign\$4) with MAP).clm.	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 04:56
S236	179	"370"/\$.cls. and (((frequency adj1 assign\$4) or FA) same MAP)	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 05:00
S237	1	"370"/\$.cls. and (((frequency adj1 assign\$4) or FA) same MAP same primary same secondary)	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 05:00

S238	70	"370"/\$.ccls. and (((frequency adj1 assign\$4) or FA) same primary same secondary)	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 05:01
S239	8	"370"/\$.ccls. and (((frequency adj1 assign\$4) or FA) same primary same secondary).clm.	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 05:01
S240	2	((("7068623") or ("20020128051"))).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/10/01 05:04
S241	20	("7068623").URPN.	USPAT	OR	ON	2012/10/01 05:05
S242	2	((("20050197133") or ("20050265223"))).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/10/01 05:08
S243	3	("2005/0197133").URPN.	USPAT	OR	ON	2012/10/01 05:09
S244	361	(PARK-CHUL LIM-KWANG-JAE LEE-HYUN YOON-CHUL-SIK).IN.	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 05:53
S245	11	(PARK-CHUL LIM-KWANG-JAE LEE-HYUN YOON-CHUL-SIK).IN. and FA	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 05:54
S246	677	samsung.as. and FA	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 05:54
S247	24	("370"/\$.ccls. or "455"/\$.ccls.) and LTE and (downlink with offset same acknowledge\$4)	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 06:03
S248	2	((("20080274747") or ("20070110004"))).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/10/01 06:08
S249	1	("20040248606").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/10/01 06:12
S250	15	("2004/0248606").URPN.	USPAT	OR	ON	2012/10/01 06:14
S251	0	("7444162").URPN.	USPAT	OR	ON	2012/10/01 06:16
S252	0	("7444162").URPN.	USPAT	OR	ON	2012/10/01 06:16
S253	1	("20050208960").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/10/01 06:28
S254	1	"12/528,817"	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 06:43
S255	1	("370"/\$.ccls. or "455"/\$.ccls.) and LTE and (downlink with offset same CQI same priority)	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 07:08
S256	7	("370"/\$.ccls. or "455"/\$.ccls.) and LTE and (downlink same offset same CQI same priority)	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 07:09
S257	173	(ISHII-HIROYUKI UMESH-ANIL) AND LTE	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 07:32
S258	93	(ISHII-HIROYUKI UMESH-ANIL) AND LTE and downlink.clm.	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 07:32

S259	6	(ISHII-HIROYUKI UMESH-ANIL) AND LTE and (downlink same priority).clm.	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 07:32
S260	7	ntt.as. AND LTE and (downlink same priority).clm.	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 07:33
S261	22	("370"/\$.ccls. or "709"/\$.ccls.) and (qualit\$3 same interface\$1 same (mobile\$1 or radio or handheld\$1 or subscriber\$1 or (base with station\$1)) same path same metric\$1)	US-PGPUB; USPAT; USOCR	OR	OFF	2012/12/03 13:17
S262	5723	("370"/\$.ccls. or "709"/\$.ccls.) and ((qualit\$3 with interface\$1) or Qol)	US-PGPUB; USPAT; USOCR	OR	OFF	2012/12/03 13:19
S263	13	("370"/\$.ccls. or "709"/\$.ccls.) and (Qol)	US-PGPUB; USPAT; USOCR	OR	OFF	2012/12/03 13:19
S264	1541	(370/229-232,235-238,241,252,253,331-334.CCLS. or 455/436-440,450,452.1,452.2.ccls) and (Qol or (quality with interfac\$3))	US-PGPUB; USPAT; USOCR	OR	OFF	2012/12/03 13:28
S265	32244	(Qol or (quality with interfac\$3))	US-PGPUB; USPAT; USOCR	OR	OFF	2012/12/03 13:28
S266	6124	("370"/\$.ccls. or "455"/\$.ccls.) and (Qol or (quality with interfac\$3))	US-PGPUB; USPAT; USOCR	OR	OFF	2012/12/03 13:29
S267	456	("370"/\$.ccls. or "455"/\$.ccls.) and ((Qol or (quality with interfac\$3)) same path)	US-PGPUB; USPAT; USOCR	OR	OFF	2012/12/03 13:29
S268	4994	(Qol or (quality with interfac\$3))	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/12/03 13:29
S269	96	((Qol or (quality with interfac\$3)) same path)	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/12/03 13:30
S270	374	(VAN-DEN-BERG-ERIC VAN-DEN-BERG-ERICK VAN-DEN-BERG-ERIC-JOZEF-DIANE MADHANI-SUNIL MADHANI-SUNIL-H MADHANI-SUNIL-HUKMI CHAND ZHANG-TAO ZHANG-TAOYI ZHANG-TAOZHU).in.	US-PGPUB; USPAT; USOCR	OR	ON	2012/12/03 13:31
S271	2	(VAN-DEN-BERG-ERIC VAN-DEN-BERG-ERICK VAN-DEN-BERG-ERIC-JOZEF-DIANE MADHANI-SUNIL MADHANI-SUNIL-H MADHANI-SUNIL-HUKMI CHAND ZHANG-TAO ZHANG-TAOYI ZHANG-TAOZHU).in. and Qol	US-PGPUB; USPAT; USOCR	OR	ON	2012/12/03 13:31
S273	3	"11/209,331"	US-PGPUB; USPAT; USOCR	OR	OFF	2013/09/07 18:48
S274	0	("7885185").URPN.	USPAT	OR	ON	2013/09/07 18:58
S275	0	("7885185").URPN.	USPAT	OR	ON	2013/09/07 18:58
S276	331669	"370"/\$.ccls. or "709"/\$.ccls. (compar\$3 same path\$3 same qualit\$3 same (mobile? or radio or handheld? or subscriber? or (base adj2 station\$1)))	US-PGPUB; USPAT; USOCR	OR	OFF	2013/09/07 19:08
S277	230	("370"/\$.ccls. or "709"/\$.ccls.) and (compar\$3 same path\$3 same qualit\$3 same (mobile? or radio or handheld? or subscriber? or (base adj2 station\$1)))	US-PGPUB; USPAT; USOCR	OR	OFF	2013/09/07 19:08
S278	26	("370"/\$.ccls. or "709"/\$.ccls.) and (compar\$3 same path\$3 same qualit\$3 same (mobile? or radio or handheld? or	US-PGPUB; USPAT;	OR	OFF	2013/09/07 19:08

		subscriber? or (base adj2 station\$1))).clm.	USOCR			
S279	3	("7170872").URPN.	USPAT	OR	ON	2013/09/07 19:10
S280	1	("8111651").URPN.	USPAT	OR	ON	2013/09/07 19:13
S281	1	("8223659").URPN.	USPAT	OR	ON	2013/09/07 19:14
S282	13	("2006/0227717").URPN.	USPAT	OR	ON	2013/09/07 19:25
S283	15	("370"/\$.ccls. or "709"/\$.ccls.) and (compar\$3 same path\$3 same qualit\$3 same (mobile? or radio or handheld? or subscriber? or (base adj2 station\$1))).ab.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/09/07 19:48
S284	13	("2006/0039280").URPN.	USPAT	OR	ON	2013/09/07 19:50
S285	6	("7636309").URPN.	USPAT	OR	ON	2013/09/07 19:51
S286	1	("7995501").URPN.	USPAT	OR	ON	2013/09/07 19:58
S287	9	("20010032272" "20040264466" "20070184864" "6993034" "7280483" "7349360" "7561526" "7570628" "7636309").PN.	US-PGPUB; USPAT; USOCR	OR	ON	2013/09/07 19:59
S288	51	("370"/\$.ccls. or "709"/\$.ccls.) and (compar\$3 same path\$3 same qualit\$3 same (mobile? or radio or handheld? or subscriber? or (base adj2 station\$1)) same packet\$1)	US-PGPUB; USPAT; USOCR	OR	OFF	2013/09/07 20:09
S289	1	("20050002379").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/09/07 20:21

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S67	1	(VOLPE-BRADY DUBOSE-MATT LABURADA-MARCO).in.	USPAT; UPAD	OR	OFF	2009/09/27 01:24
S68	193	sunrise.as.	USPAT; UPAD	OR	OFF	2009/09/27 01:25
S69	48	sunrise.as. and cable	USPAT; UPAD	OR	OFF	2009/09/27 01:25
S70	5	("4070648" "4347609" "4573154" "5193093" "6182264").PN.	US- PGPUB; USPAT	OR	OFF	2009/09/27 01:28
S71	1	("7010730").URPN.	USPAT	OR	OFF	2009/09/27 01:29
S72	1	("7451472").URPN.	USPAT	OR	OFF	2009/09/27 01:29
S73	0	("7584496").URPN.	USPAT	OR	OFF	2009/09/27 01:30
S74	21	("20030142622" "20040091055" "20040245995" "20060012376" "5073822" "5461318" "5617137" "5682100" "5990687" "6140822" "6151559" "6344749" "6417942" "6425132" "6570394" "6687632" "6934655" "7024680" "7069163" "7415367" "7451472").PN.	US- PGPUB; USPAT	OR	OFF	2009/09/27 01:30
S75	21	("20030142622" "20040091055" "20040245995" "20060012376" "5073822" "5461318" "5617137" "5682100" "5990687" "6140822" "6151559" "6344749"	US- PGPUB; USPAT	OR	OFF	2009/09/27 01:33

		"6417942" "6425132" "6570394" "6687632" "6934655" "7024680" "7069163" "7415367" "7451472").PN.				
S76	23	("20020076143" "20030185176" "20040103442" "20040245995" "20050123002" "20060048200" "20060141971" "3750022" "5943604" "6049693" "6542500" "6546016" "6567132" "6567579" "6571393" "6687261" "6714534" "6785292" "6850533" "7010730" "7024680" "7162731" "7246368").PN.	US- PGPUB; USPAT	OR	OFF	2009/09/27 01:33
S112	0	oksman-vladimi.in.	USPAT; UPAD	OR	OFF	2009/10/01 03:45
S113	36	oksman.in.	USPAT; UPAD	OR	OFF	2009/10/01 03:46
S114	0	oksman-v.in.	USPAT; UPAD	OR	OFF	2009/10/01 03:46
S115	9	oksman-v\$7.in.	USPAT; UPAD	OR	OFF	2009/10/01 03:46
S116	6919	infineon.as.	USPAT; UPAD	OR	OFF	2009/10/01 03:48
S117	18	infineon.as. and (home with network\$3)	USPAT; UPAD	OR	OFF	2009/10/01 03:48
S138	0	("370"/\$.ccls. or "709"/\$.ccls.) and (((hidden with node\$1) same CSMA)).clm.	USPAT; UPAD	OR	OFF	2010/12/06 11:24
S139	34	("370"/\$.ccls. or "709"/\$.ccls.) and (hidden with node\$1).clm.	USPAT; UPAD	OR	OFF	2010/12/06 11:24
S272	508	((Qol or (quality with interfac\$3)) same path)	USPAT; UPAD	OR	OFF	2012/12/03 13:30

9/7/2013 9:22:42 PM

C:\Users\dmills2\Documents\EAST\Workspaces\US Case Workplaces\12-973,300 Real-Time
Comparison of Qol.wsp



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BIB DATA SHEET

CONFIRMATION NO. 1628

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.		
12/973,300	12/20/2010	370	2462	091523A		
APPLICANTS Eric van den Berg, Hoboken, NJ; Sunil Madhani, Lake Hopatcong, NJ; Tao Zhang, Fort Lee, NJ; ** CONTINUING DATA ***** This application is a DIV of 11/209,331 08/23/2005 PAT 7885185 which claims benefit of 60/662,749 03/17/2005 ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 01/04/2011						
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☒ No Verified and /DONALD L. MILLS/ Acknowledged Examiner's Signature		☐ Met after Allowance Initials	STATE OR COUNTRY NJ	SHEETS DRAWINGS 8	TOTAL CLAIMS 16	INDEPENDENT CLAIMS 3
ADDRESS ATTN: Stephen B. Parker (WPD) Westerman, Hattori, Daniels & Adrian, LLP 1250 Connecticut Ave., Suite 700 Washington, DC 20036 UNITED STATES						
TITLE REAL-TIME COMPARISON OF QUALITY OF INTERFACES						
FILING FEE RECEIVED 1090	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:			☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit		

Search Notes 	Application/Control No. 12973300	Applicant(s)/Patent Under Reexamination VAN DEN BERG ET AL.
	Examiner DONALD MILLS	Art Unit 2462

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
370/229-232,235-238,241,252,253,331-334 (text search - see search history printout)	12/3/2012	DLM
455/436-440,450,452.1,452.2 (text search - see search history printout)	12/3/2012	DLM
EAST (US-PGPUB, USPAT, EPO, JPO, IBM, DERWENT)	12/3/2012	DLM
IEEE - ieeexplore.ieee.org - Quality of Interfaces	12/3/2012	DLM
Internet - google.com - Quality of Interfaces	12/3/2012	DLM
Above Updated	9/7/2013	DLM

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

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<i>Index of Claims</i> 	Application/Control No. 12973300	Applicant(s)/Patent Under Reexamination VAN DEN BERG ET AL.
	Examiner DONALD MILLS	Art Unit 2462

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

☐ Claims renumbered in the same order as presented by applicant				☐ CPA				☐ T.D.				☐ R.1.47			
CLAIM		DATE													
Final	Original	12/03/2012	09/07/2013												
	1	✓	✓												
	2	✓	✓												
	3	✓	✓												
	4	✓	✓												
	5	✓	✓												
	6	✓	✓												
	7	✓	✓												
	8	✓	✓												
	9	✓	✓												
	10	✓	✓												
	11	✓	✓												
	12	✓	✓												
	13	✓	✓												
	14	✓	✓												
	15	✓	✓												
	16	✓	✓												

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	12973300	Filing Date	2010-12-20	Docket Number (if applicable)	091523A	Art Unit	2462
First Named Inventor	Eric Van Den Berg			Examiner Name	D. L. Mills		

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 50-2866

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

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Signature of Registered U.S. Patent Practitioner			
Signature	/Stephen B. Parker Reg. 36631/	Date (YYYY-MM-DD)	2014-03-13
Name	Stephen B. Parker	Registration Number	36631

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:

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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.
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.: 12/973,300 Confirmation No. 1628
Applicant: Eric VAN DEN BERG, *et al.*
Filed: December 20, 2010
TC/A.U.: 2462
Examiner: Donald Mills
Title: REAL-TIME COMPARISON OF QUALITY OF
INTERFACES
Docket No.: 3119.127DIV (091523A)

AMENDMENT ACCOMPANYING REQUEST
FOR CONTINUED EXAMINATION

March 13, 2014

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

Dear Sir:

Applicants most respectfully submit the following amendments and remarks. In this response:

1. A listing of claims, showing the present status of the claims with any additions in underlining and deletions in strike-through, begins on page 2 of this response.
2. Remarks begin on page 8 of this response.

Listing of Claims

1. (Currently Amended) A method for substantially real-time comparison of quality of interfaces (QoIs) by mobile devices having multiple heterogeneous interfaces that communicate over heterogeneous wireless networks, comprising:

a mobile device comparing in substantially real-time the qualities of multiple interfaces, including at least one cellular radio interface and at least one wireless local area network interface, of said mobile device that connect to heterogeneous networks using path quality metrics that are independent of how the QoI is measured, whether measured by a path through a wireless network alone or a path through both a wireless network and through a wired network,

said method including said mobile device comparing path quality as a quickest change detection problem for observations from a new interface or comparing path quality based on sequential two sample tests,

said mobile device performing said comparing of said multiple interfaces concurrently in real time during use of a current interface, and

said mobile device selecting one of said interfaces based on said comparing.

2. (Currently Amended) A method for substantially real-time comparison of quality of interfaces (QoIs) by mobile devices having multiple heterogeneous interfaces that communicate over heterogeneous wireless networks, comprising:

a mobile device comparing in substantially real-time the qualities of multiple interfaces, including at least one cellular radio interface and at least one wireless local area network interface, of said mobile device that connect to heterogeneous networks using path quality metrics that are independent of how the QoI is measured, whether measured by a path through a wireless network alone or a path through both a wireless network and through a wired network,

said method including said mobile device performing a one-sample change point detection method or performing a non-parametric and on-line two-sample method,

said mobile device performing said comparing of said multiple interfaces concurrently in real time during use of a current interface, and

said mobile device selecting one of said interfaces based on said comparing.

3. (Currently Amended) A method for substantially real-time comparison of quality of interfaces (QoIs) by mobile devices having multiple heterogeneous interfaces that communicate over heterogeneous

wireless networks, comprising:

a mobile device comparing in substantially real-time the qualities of multiple interfaces, including at least one cellular radio interface and at least one wireless local area network interface, of said mobile device that connect to heterogeneous networks using path quality metrics that are independent of how a QoI is measured,

said method including said mobile device comparing path qualities based on sequential two sample tests,

said mobile device performing said comparing of said multiple interfaces concurrently in real time during use of a current interface, and

said mobile device selecting one of said interfaces based on said comparing.

4. (Original) The method of claim 3, further including the mobile device having limited knowledge of the quality of the current path.

5. (Original) The method of claim 3, further including having insufficiently many measurements for an estimate of the mean quality of the current path and its variance and observations are not matched.

6. (Original) The method of claim 5, further including without the mobile device knowing values for mean and median, performing a test of which interface has a higher mean or median.
7. (Original) The method of claim 6, further including performing a test of the difference in average quality by testing for a difference in a location of samples.
8. (Original) The method of claim 7, wherein said method is non-parametric, works for unequal sample sizes, and is performed on-line.
9. (Original) The method of claim 7, wherein said method employs a Rosenbaum test.
10. (Original) The method of claim 9, wherein a test statistic T_R includes a total number of a second interface's data points which have a value larger than a largest value in a first interface's data points.

11. (Original) The method of claim 10, wherein if an overall maximum is not from a sample set from the second interface, then the test stops, and a null-hypothesis H_0 is not rejected in favor of H_1 , and otherwise H_0 is rejected in favor of H_1 if T_R is larger than a value $C(\alpha, n_1, n_2)$, calculated using the distribution of T_R .

12. (Original) The method of claim 7, wherein the method is based on the length of a high-end extreme run of samples for a second interface or a low-end extreme run of samples for a first interface.

13. (Original) The method of claim 12, further including repeating the test for a new observation or a new batch of observations.

14. (Original) The method of claim 3, further including using non-parametric approaches to test differences related to paired observations that are strongly correlated.

15. (Original) The method of claim 14, further including using a Wilcoxon sign test.
16. (Original) The method of claim 3, further including performing the two sample test even when the mobile has more than two interfaces.

REMARKS

Careful reconsideration of this application in view of the above amendments and the following remarks is most respectfully requested.

Rejections under 35 U.S.C. 101:

In response to the rejections under this section, the claims have been amended so as to further recite “***said mobile device selecting one of said interfaces based on said comparing.***” While it is again most respectfully submitted that the claims were proper, it is most respectfully submitted that the claims as amended are plainly appropriate. Withdrawal of these rejections is most respectfully requested.

Rejections under 35 U.S.C. 103:

In the Office Action, claims 1-10 and 14-16 were finally rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Bye (U.S. Pub. 2005/0002379) in view of the allegedly admitted prior art (APA). These rejections are respectfully traversed, as follows.

Amendments to Claims:

Although Applicants most respectfully submit that the claims were previously allowable over the cited references, in the present response, each of the independent claims 1, 2 and 3 are further amended to recite that “***said mobile device performing said comparing of said multiple interfaces concurrently in real time during use of a current interface.***” It is most respectfully submitted that the cited art

does **not** teach or suggest such features, and the Patent Office is respectfully requested to duly consider such features. See, e.g., page 7 of the last Office Action, stating “On page 10, the Applicant further argues Bye does not teach or disclose quality comparisons are performed concurrently in real time during use of a current interface, but such language is not recited in the claim. In view of the present amendments and the prior arguments, it is most respectfully requested that the Examiner withdraw the rejections and allow the present application to proceed to allowance.

Improper Assertions of Allegedly Admitted Prior Art:

As previously expressed, it is again most respectfully submitted that the Patent Office’s assertions regarding admission of prior art are incorrect. Notably, the Patent office asserts that “[a]pplicant admits that one-sample change-point detection methods ... are known in the art on page 12 of the specification.” However, it is most respectfully submitted that while such methods were known, such were not known by those in the art, much less as being applicable to the present context.

Moreover, it is respectfully submitted that the allegedly admitted prior art (APA) does not fulfill the deficiencies of the Bye reference. Among other thing, applicant’s disclosure merely states at page 12 that “this type of method for detecting changes in a mean fall into the genre of methods commonly referred to as one-sample change-point detection

methods.” It is respectfully submitted that the Patent Office has mischaracterized the statements in the present disclosure. Moreover, the present disclosure does **not** indicate or suggest that such genre of methods are commonly known to be applicable for employment ***within the art.***

Improper Combination:

As previously expressed, it is also most respectfully submitted that the Patent Office’s effort to combine the Bye reference with the alleged APA is completely improper.

First, the Bye reference does **not** even teach rendering **any** form of comparison. Accordingly, there is **no** reason or basis to seek to apply some specialized form of comparative analysis to the Bye reference.

Second, the alleged APA does **not** provide **any** teaching or suggestion that such methods were applicable in the context of the present invention related to selection of network interfaces.

In addition to the fact that the alleged APA reference is improperly applied, there is absolutely **no** reason to seek to combine these references. And, even if improperly combined, they do not teach or contemplate the features of the invention as recited in the present claims. Moreover, in this regard, it is respectfully noted that the Patent Office is wholly disregarding substantial features and recitations regarding the process of comparison as detailed in various dependent

claims.

Deficiencies in the Rejections:

As also previously expressed, the Patent Office indicates that Bye figures 4a-e disclose examples of wireless terminals with multiple interfaces and further that Figure 6b and paragraph 64 discloses choosing between the heterogeneous networks depending upon the measured quality in each network. However, it is respectfully submitted that the Patent Office is incorrectly overlooking some notable deficiencies in the Bye reference.

It is most respectfully submitted that the reference to Bye does **not** perform real-time comparison between multiple available interfaces. In fact, Bye does **not** disclose or suggest **any** comparison step, **much less a comparison related to communications via two interface paths**. In particular, with reference to FIG. 1(A) of Bye, it is noted that Bye depicts a **single** path through a combined wired-wireless network. Moreover, FIG. 1(B) depicts a different **single** path through a combined wired-wireless network. There is **no** teaching or suggestion of, e.g., any concurrent communication via such paths, **much less** performing a comparison of communications via such paths in real time.

In addition, paragraph 14 of Bye only considers possible rerouting via an alternative service network after determining that the real-time communications cannot be provided (at) the predetermined service level

(over the current network). Notably, the quality of a current interface and the quality of a new interface are **not compared in real-time**. In Bye, the switch is only possible **after** the monitored service quality of the current network is below a pre-determined service level. See also Fig. 5C of Bye.

With respect to paragraph 64 cited by the Patent Office, it is respectfully noted that the paragraph does **not** teach that which is asserted by the Patent Office. As seen in paragraph 64, reproduced below for reference, the reference merely expresses that “modules 602 may direct that if the primary communication pathways are **unable to support** the real-time communications between wireless terminal 10 and far-end terminal 614, bypass network such as those identified above may be used in favor of WAN 606A.” Thus, Bye does not suggest comparisons to be rendered in real time **during use of a current interface**, but only involves another bypass network **after a determination that a current network cannot support communications**.

[0064] FIG. 6B includes a bypass network such as PSTN, cellular, satellite, or other like network known to those skilled in the art. In this instance, quality-monitoring modules 602 may direct that if the primary communication pathways are unable to support the real-time communications between wireless terminal 10 and far-end terminal 614, bypass network such as those identified above may be used in favor of WAN 606A. Quality monitoring modules 602, in addition to evaluating communication quality levels delivered by the network, and the coding schemes employed, may further direct that non-real-time communications receive a lower priority or be temporarily stored in a buffer, or be delayed to support real-time communications.

Moreover, the Bye reference does **not** teach or suggest that somehow quality comparisons are performed ***concurrently in real time during use of a current interface***, much less even how the modules 602 are to operate. However, Bye does plainly teach away from any such real time comparison because Bye only contemplates switching once a current interface cannot support communications.

It is respectfully submitted that the references do not teach or suggest the combinations of features recited in the present claims. Among other things, as discussed above, it is respectfully submitted that the Bye reference does **not** teach employing 1) a comparison of heterogeneous interfaces in real time (e.g., concurrently during use of the current network), much less 2) using the specific methodologies as set forth in the claims.

Independent Claim 1:

With respect to claim 1, the claim recites a novel and non-obvious combination of features, including “[a] method for substantially real-time comparison of quality of interfaces (QoIs) by mobile devices having multiple heterogeneous interfaces that communicate over heterogeneous wireless networks, comprising: a mobile device ***comparing in substantially real-time the qualities of multiple interfaces, including at least one cellular radio interface and at least one wireless local area network interface, of said mobile device that***

connect to heterogeneous networks using path quality metrics that are independent of how the QoI is measured, whether measured by a path through a wireless network alone or a path through both a wireless network and through a wired network, **said method including said mobile device comparing path quality as a quickest change detection problem for observations from a new interface or comparing path quality based on sequential two sample tests, said mobile device performing said comparing of said multiple interfaces concurrently in real time during use of a current interface, and said mobile device selecting one of said interfaces based on said comparing.**” Emphasis added. These features are, thus, plainly not taught or suggested by the cited references.

Independent Claim 2:

With respect to claim 2, the claim recites another novel and non-obvious combination of features, including “[a] method for substantially real-time comparison of quality of interfaces (QoIs) by mobile devices having multiple heterogeneous interfaces that communicate over heterogeneous wireless networks, comprising: a mobile device ***comparing in substantially real-time the qualities of multiple interfaces, including at least one cellular radio interface and at least one wireless local area network interface, of said mobile device that connect to heterogeneous networks*** using path quality

metrics that are independent of how the QoI is measured, whether measured by a path through a wireless network alone or a path through both a wireless network and through a wired network, ***said method including said mobile device performing a one-sample change point detection method or performing a non-parametric and on-line two-sample method, said mobile device performing said comparing of said multiple interfaces concurrently in real time during use of a current interface, and said mobile device selecting one of said interfaces based on said comparing.*** Emphasis added. These features are, thus, plainly not taught or suggested by the cited references.

Independent Claim 3:

With respect to claim 3, the claim recites another novel and non-obvious combination of features, including “[a] method for substantially real-time comparison of quality of interfaces (QoIs) by mobile devices having multiple heterogeneous interfaces that communicate over heterogeneous wireless networks, comprising: a mobile device ***comparing in substantially real-time the qualities of multiple interfaces, including at least one cellular radio interface and at least one wireless local area network interface, of said mobile device that connect to heterogeneous networks*** using path quality metrics that are independent of how a QoI is measured, ***said method***

including said mobile device comparing path qualities based on sequential two sample tests, said mobile device performing said comparing of said multiple interfaces concurrently in real time during use of a current interface, and said mobile device selecting one of said interfaces based on said comparing.” Emphasis added.

These features are, thus, plainly not taught or suggested by the cited references.

Dependent Claims:

The remaining claims depend directly or indirectly from the above-discussed independent claims and, thus, are also allowable. In addition, the dependent claims also recite a variety of additional features that are not taught or suggested by the references. It is respectfully requested that the Patent Office duly consider each and every claim.

Request for Interview:

Applicants respectfully request to be granted an interview to discuss this application with the Examiner in order to expedite prosecution of this application. The Examiner is respectfully requested to contact the undersigned as soon as possible to arrange such an interview.

Concluding Remarks:

In view of the foregoing remarks, it is respectfully submitted that the present claims are in condition for allowance, which action is earnestly solicited. Early reconsideration and allowance are respectfully requested. In the event that the Examiner desires to discuss any aspect of this application, he is encouraged to contact the undersigned attorney.

In the event that any fees are now due, please charge or credit any fees due or payable to our Deposit Account No. 50-2866.

Respectfully submitted,

By ***/Stephen B. Parker Reg. No. 36631/***

Stephen B. Parker
Registration No. 36,631
Westerman, Hattori, Daniels & Adrian,
LLP
1250 Connecticut Ave, N.W. (Suite 700),
Washington, D.C. 20036
(202) 822-1100

Electronic Patent Application Fee Transmittal				
Application Number:		12973300		
Filing Date:		20-Dec-2010		
Title of Invention:		REAL-TIME COMPARISON OF QUALITY OF INTERFACES		
First Named Inventor/Applicant Name:		Eric van den Berg		
Filer:		Stephen B. Parker/renee flood		
Attorney Docket Number:		091523A		
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 3 months with \$0 paid	1253	1	1400	1400

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Request for Continued Examination	1801	1	1200	1200
Total in USD (\$)				2600

Electronic Acknowledgement Receipt	
EFS ID:	18459439
Application Number:	12973300
International Application Number:	
Confirmation Number:	1628
Title of Invention:	REAL-TIME COMPARISON OF QUALITY OF INTERFACES
First Named Inventor/Applicant Name:	Eric van den Berg
Customer Number:	89739
Filer:	Stephen B. Parker/renee flood
Filer Authorized By:	Stephen B. Parker
Attorney Docket Number:	091523A
Receipt Date:	13-MAR-2014
Filing Date:	20-DEC-2010
Time Stamp:	15:26:06
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$2600
RAM confirmation Number	2208
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	Request for Continued Examination (RCE)	091523A_RCE_Transmittal.pdf	325715 8e7611c683cf178ae5ad78b86a553493507dc003	no	3
Warnings:					
This is not a USPTO supplied RCE SB30 form.					
Information:					
2	Amendment Submitted/Entered with Filing of CPA/RCE	091523A_RCE_Amendment.pdf	182991 d6df5a2adf85ec5b274f6d06089a6d4161d9781a	no	17
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	32429 8ee1551a07d4777e896dc8dba3a86d5490f6c082	no	2
Warnings:					
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Total Files Size (in bytes):			541135		
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. <u>New Applications Under 35 U.S.C. 111</u> 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. <u>National Stage of an International Application under 35 U.S.C. 371</u> 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. <u>New International Application Filed with the USPTO as a Receiving Office</u> 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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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875				Application or Docket Number 12/973,300		Filing Date 12/20/2010		☐ To be Mailed	
ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO									
APPLICATION AS FILED – PART I									
(Column 1)		(Column 2)							
FOR	NUMBER FILED	NUMBER EXTRA		RATE (\$)		FEE (\$)			
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A					
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A					
☐ 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 \$ =					
☐ 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).							
☐ 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)					
AMENDMENT	03/13/2014	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)		ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 16	Minus	** 20	= 0	X \$80 =		0	
	Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X \$420 =		0	
	☐ Application Size Fee (37 CFR 1.16(s))								
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								
						TOTAL ADD'L FEE		0	
(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 \$ =			
	☐ Application Size Fee (37 CFR 1.16(s))								
	☐ 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
/JAMES MASON/

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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NOTICE OF ALLOWANCE AND FEE(S) DUE

89739 7590 04/02/2014
ATTN: Stephen B. Parker (WPD)
Westerman, Hattori, Daniels & Adrian, LLP
1250 Connecticut Ave., Suite 700
Washington, DC 20036

EXAMINER

MILLS, DONALD L

ART UNIT

PAPER NUMBER

2462

DATE MAILED: 04/02/2014

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/973,300	12/20/2010	Eric van den Berg	091523A	1628

TITLE OF INVENTION: REAL-TIME COMPARISON OF QUALITY OF INTERFACES

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$960	\$0	\$0	\$960	07/02/2014

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)

89739 7590 04/02/2014
ATTN: Stephen B. Parker (WPD)
Westerman, Hattori, Daniels & Adrian, LLP
1250 Connecticut Ave., Suite 700
Washington, DC 20036

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.
12/973,300	12/20/2010	Eric van den Berg	091523A	1628

TITLE OF INVENTION: REAL-TIME COMPARISON OF QUALITY OF INTERFACES

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$960	\$0	\$0	\$960	07/02/2014

EXAMINER	ART UNIT	CLASS-SUBCLASS
MILLS, DONALD L	2462	370-332000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) The names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
- (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 _____
- 3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (**Please first reapply any previously paid issue fee shown above**)

- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ 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).

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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www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/973,300	12/20/2010	Eric van den Berg	091523A	1628
89739 7590 04/02/2014 ATTN: Stephen B. Parker (WPD) Westerman, Hattori, Daniels & Adrian, LLP 1250 Connecticut Ave., Suite 700 Washington, DC 20036			EXAMINER MILLS, DONALD L.	
			ART UNIT 2462	PAPER NUMBER

DATE MAILED: 04/02/2014

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

The Patent Term Adjustment to date is 146 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 146 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 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.

Notice of Allowability	Application No. 12/973,300	Applicant(s) VAN DEN BERG ET AL.	
	Examiner DONALD MILLS	Art Unit 2462	AIA (First Inventor to File) Status 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 response filed 13 March 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 1-16. 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 or send an inquiry to 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. ☐ Notice of References Cited (PTO-892)	5. ☐ Examiner's Amendment/Comment
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____	6. ☐ Examiner's Statement of Reasons for Allowance
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material	7. ☐ Other _____
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____	

/DONALD MILLS/ Primary Examiner, Art Unit 2462	
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<i>Index of Claims</i> 	Application/Control No. 12973300	Applicant(s)/Patent Under Reexamination VAN DEN BERG ET AL.
	Examiner DONALD MILLS	Art Unit 2462

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

☒ Claims renumbered in the same order as presented by applicant					☐ CPA		☐ T.D.		☐ R.1.47	
CLAIM		DATE								
Final	Original	12/03/2012	09/07/2013	03/24/2014						
	1	✓	✓	=						
	2	✓	✓	=						
	3	✓	✓	=						
	4	✓	✓	=						
	5	✓	✓	=						
	6	✓	✓	=						
	7	✓	✓	=						
	8	✓	✓	=						
	9	✓	✓	=						
	10	✓	✓	=						
	11	✓	✓	=						
	12	✓	✓	=						
	13	✓	✓	=						
	14	✓	✓	=						
	15	✓	✓	=						
	16	✓	✓	=						

Search Notes 	Application/Control No. 12973300	Applicant(s)/Patent Under Reexamination VAN DEN BERG ET AL.
	Examiner DONALD MILLS	Art Unit 2462

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
370/229-232,235-238,241,252,253,331-334 (text search - see search history printout)	12/3/2012	DLM
455/436-440,450,452.1,452.2 (text search - see search history printout)	12/3/2012	DLM
EAST (US-PGPUB, USPAT, EPO, JPO, IBM, DERWENT)	12/3/2012	DLM
IEEE - ieeexplore.ieee.org - Quality of Interfaces	12/3/2012	DLM
Internet - google.com - Quality of Interfaces	12/3/2012	DLM
Above Updated	9/7/2013	DLM
Above Updated	3/24/2014	DLM

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
See Interference Search History Printout		3/24/2014	DLM

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	354452	"370"/\$.ccls. or "709"/\$.ccls. (compar\$3 same path\$3 same qualit\$3 same (mobile? or radio or handheld? or subscriber? or (base adj2 station\$1)))	US-PGPUB; USPAT; USOCR	OR	OFF	2014/03/24 11:53
L2	245	("370"/\$.ccls. or "709"/\$.ccls.) and (compar\$3 same path\$3 same qualit\$3 same (mobile? or radio or handheld? or subscriber? or (base adj2 station\$1)))	US-PGPUB; USPAT; USOCR	OR	OFF	2014/03/24 11:54
L3	2866	("370"/\$.ccls. or "709"/\$.ccls.) and ((measur\$3 or compar\$3 or judg\$3 or determin\$3) same (rout\$3 or path\$3 or interface\$1) same qualit\$3 same (mobile? or radio or handheld? or subscriber? or (base adj2 station\$1)))	US-PGPUB; USPAT; USOCR	OR	OFF	2014/03/24 11:54
S1	70811	("370"/\$.ccls. or "709"/\$.ccls.) and ((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3))	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 14:56
S2	15449	("370"/\$.ccls. or "709"/\$.ccls.) and ((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3))	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 14:58
S3	3	("370"/\$.ccls. or "709"/\$.ccls.) and ((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3)) and (wink\$3 with test\$3))	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 14:59
S4	0	"11/290,814"	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 15:00
S5	258	(ESLAMBOLCHI -HOSSEIN MCCANUE-JOHN BAJPAY-PARITOSH YANG-CHEN-YUI).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/09/10 15:02
S6	241	At&t.as. and (out adj2 service)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/09/10 15:03
S7	709	("370"/\$.ccls. or "709"/\$.ccls.) and (((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3)) and (automat\$3 with test\$3))	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 15:04
S8	3	("370"/\$.ccls. or "709"/\$.ccls.) and (((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3)) and (wink with test\$3))	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 15:06
S9	7	("370"/\$.ccls. or "709"/\$.ccls.) and (wink with test\$3)	US-PGPUB;	OR	OFF	2008/09/10

			USPAT; USOCR			15:06
S10	45	acterna.as.	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 15:10
S11	3852	agilent.as.	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 15:15
S12	371	agilent.as. and (network with (monitor\$3 or scan\$4 or test\$3))	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 15:15
S13	75	agilent.as. and (network with (monitor\$3 or scan\$4 or test\$3)) and ("709"/\$.ccls. or "370"/\$.ccls.)	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 15:19
S14	10	("6711134").URPN.	USPAT	OR	OFF	2008/09/10 15:21
S15	947	("370"/\$.ccls. or "709"/\$.ccls.) and (automatic\$4 near3 test\$3)	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 16:15
S16	119	("370"/\$.ccls. or "709"/\$.ccls.) and ((automatic\$4 near3 test\$3) same (error or fault))	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 16:16
S17	206	("370"/\$.ccls. or "709"/\$.ccls.) and ((automatic\$4 near3 test\$3) same (error or fault or (out adj2 serve)))	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/10 16:17
S18	4	("6269150").URPN.	USPAT	OR	OFF	2008/09/11 15:12
S19	9221	370/217-220,221,222,241,241.1,242-246,250,252.ccls.	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/13 17:06
S20	18905	709/223-226.ccls.	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/13 17:07
S21	20390	((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3))	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/09/13 17:07
S22	1990	((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3) same scan\$4)	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/09/13 17:08
S23	179	((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3) same scan\$4 same interfac\$3)	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/09/13 17:08
S24	1	("370"/\$.ccls. or "709"/\$.ccls.) and ((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3)) and (maintenance adj2 ticket)	US-PGPUB; USPAT; USOCR	OR	OFF	2008/09/13 17:32
S25	258	(ESLAMBOLCHI -HOSSEIN MOCANUE-JOHN BAJPAY-PARITOSH YANG-CHEN-YUI XU-ZHIJIAN FENG-HSIAO-YING).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/09/13 23:12
S26	258	(ESLAMBOLCHI -HOSSEIN MOCANUE-JOHN BAJPAY-PARITOSH YANG-CHEN-YUI XU-ZHIJIAN FENG-HSIAO-YING TALMADGE-BRIAN).in.	US-PGPUB; USPAT; USOCR;	OR	OFF	2008/09/13 23:12

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S27	258	(ESLAMBOLCHI -HOSSEIN MOCANUE-JOHN BAJPAY-PARI TOSH YANG-CHEN-YUI XU-ZHIJIAN FENG-HSIAO-YING TALMADGE-BRIAN SHAH-SARYU KOLMODIN-CHRISTIAN).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/09/14 00:00
S28	55	((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3) same scan\$4) and (power adj1 supply))	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/10/01 02:19
S29	3415	((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3) same scan\$4) and (power adj1 supply))	US-PGPUB; USPAT; USOCR	OR	OFF	2008/10/01 02:19
S30	53	((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3) same scan\$4) and (power adj1 supply adj1 line?))	US-PGPUB; USPAT; USOCR	OR	OFF	2008/10/01 02:19
S31	254	((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3) same scan\$4) and (power adj1 line?))	US-PGPUB; USPAT; USOCR	OR	OFF	2008/10/01 02:24
S32	15	"370"/\$.ccls. and (((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3) same scan\$4) and (power adj1 line?)))	US-PGPUB; USPAT; USOCR	OR	OFF	2008/10/01 02:24
S33	10309	370/217-220,221,222,241,241.1,242-246,250,252.ccls.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/06/08 02:56
S34	21422	709/223-226.ccls.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/06/08 02:57
S35	21200	((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3))	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/06/08 02:57
S36	2059	((network\$3 or computer\$1 or node\$1 or terminal\$1 or (packet or circuit with switch\$3)) same (monitor\$3 or scan\$4 or test\$3) same (error\$3 or (out adj2 service) or fail\$3 or fault\$3) same scan\$4)	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/06/08 02:57
S37	290	(ESLAMBOLCHI -HOSSEIN MOCANUE-JOHN BAJPAY-PARI TOSH YANG-CHEN-YUI XU-ZHIJIAN FENG-HSIAO-YING TALMADGE-BRIAN SHAH-SARYU KOLMODIN-CHRISTIAN).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/06/08 02:57
S38	2406	370/241,242,244,245,248,250,251,431,437.ccls. and (test\$3)	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 01:23
S39	830	370/241,242,244,245,248,250,251,431,437.ccls. and ((test\$3) same (upstream\$3 or downstream\$3 or uplink\$3 or downlink\$3 or channel\$3))	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 01:23
S40	8	("6230326") or ("20020062486") or ("20040037217") or	US-PGPUB;	OR	OFF	2009/09/27

		("20040190544") or ("6728887") or ("6704288") or ("20050047442") or ("20060100815")).PN.	USPAT; USOCR			01:38
S41	8	("6728887").URPN.	USPAT	OR	OFF	2009/09/27 01:42
S42	4	("5845073" "5884157" "6061332" "6195364").PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 01:43
S43	21	("5845073").URPN.	USPAT	OR	OFF	2009/09/27 01:43
S44	3742	DOCSIS	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 01:49
S45	147	DOCSIS same test\$3	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 01:49
S46	63	DOCSIS with test\$3	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 01:49
S47	1157	370/241,242,244,245,248,250-252,431,437.ccls. and ((test\$3) same (upstream\$3 or downstream\$3 or uplink\$3 or downlink\$3 or channel\$3))	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:02
S48	6	370/241,242,244,245,248,250-252,431,437.ccls. and ((test\$3) same (upstream\$3 or downstream\$3 or uplink\$3 or downlink\$3 or channel\$3) same pause)	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:04
S49	24	370/241,242,244,245,248,250-252,431,437.ccls. and ((test\$3) same pause)	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:06
S50	24	agilent.as. and ((test\$3) same pause)	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:12
S51	0	agilent.as. and ((test\$3) same pause) and DOCSIS	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:12
S52	0	agilent.as. and test\$3 and DOCSIS	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:12
S53	0	agilent.as. and DOCSIS	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:13
S54	1121	DOCSIS and test\$3	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:16
S55	189	DOCSIS and test\$3 and paus\$3	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:16
S56	0	DOCSIS same test\$3 same paus\$3	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:16
S57	8	DOCSIS same test\$3 and paus\$3	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:16
S58	0	("7058559").URPN.	USPAT	OR	OFF	2009/09/27 02:19
S59	6	("4607364" "5619725" "6249913" "6625255" "6662135" "6894801").PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:19
S60	0	jdsu.as. and DOCSIS	US- PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:22

S61	0	jdsu.as. and paus\$3	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:22
S62	2	jdsu.as.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:22
S63	1	"pathtrak"	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:25
S64	332	370/241,242,244,245,248,250-252,431,437.ccls. and ((test\$3) same (stop\$4 or paus\$3))	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:37
S65	5	370/241,242,244,245,248,250-252,431,437.ccls. and (DOCSI S and ((test\$3) same (stop\$4 or paus\$3)))	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:37
S66	29	370/241,242,244,245,248,250-252,431,437.ccls. and (DOCSI S and ((test\$3) and (stop\$4 or paus\$3)))	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:39
S77	3165	cable same channel\$3 same test\$3	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:44
S78	332	cable same channel\$3 same test\$3 same (paus\$3 or stop\$4)	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:44
S79	0	(cable same channel\$3 same test\$3 same (paus\$3 or stop\$4)) and (channel adj2 descriptor)	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:44
S80	1061	(channel adj2 descriptor)	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:44
S81	442	(channel adj2 descriptor) and cable	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:44
S82	178	(channel adj2 descriptor) and cable and (paus\$3 or stop\$4)	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:45
S83	97	(channel adj2 descriptor) and cable and (paus\$3 or stop\$4) and test\$3	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:45
S84	1	cm adj2 mode adj2 block	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:50
S85	1	(cm or "cable modem") adj2 mode adj2 block	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:51
S86	103	(cm or "cable modem") with mode with block\$3	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:51
S87	1	(cm or "cable modem") adj3 mode adj3 block\$3	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:51
S88	49377	(cm or "cable modem" or cmts) with test\$3	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:54
S89	10	(cm or "cable modem" or cmts) with test\$3 same (UCD or "upstream channel descriptor")	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 02:55
S90	2	("7246368").URPN.	USPAT	OR	OFF	2009/09/27 03:00

S91	13	(cm or "cable modem" or cmts) same test\$3 same (UCD or "upstream channel descriptor")	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 03:04
S92	144	("cable modem" or cmts) same (UCD or "upstream channel descriptor")	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 03:05
S93	88	("cable modem" or cmts) same (UCD or "upstream channel descriptor") same MAP	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 03:05
S94	39	("cable modem" or cmts) same (UCD or "upstream channel descriptor") same MAP and test\$3	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 03:05
S95	1	("7010730").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 03:23
S96	1	("7007209").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 03:26
S97	2	("7007209").URPN.	USPAT	OR	OFF	2009/09/27 03:26
S98	4	("5477531" "6424632" "6512747" "6643818").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 03:27
S99	58	CMTS same channel\$3 same test\$3	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/27 03:50
S100	1538	379/1.01,1.03,1.04,15.01,21,27.01.ccls.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/28 08:20
S101	1045	725/105,107.ccls.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/28 08:20
S102	206	725/107.ccls.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/28 08:20
S103	64	("5862451").URPN.	USPAT	OR	OFF	2009/09/28 08:34
S104	2	("7246368").URPN.	USPAT	OR	OFF	2009/09/28 08:48
S105	4	("5862451" "5939887" "5943604" "6772437").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/28 08:51
S106	8	("7111318").URPN.	USPAT	OR	OFF	2009/09/28 09:12
S108	12797	370/230,230.1,231,235,236,236.1,236.2,282,395.4,437,445-447,449-452,459,461,462.ccls.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/10/01 03:37
S109	1349	370/230,230.1,231,235,236,236.1,236.2,282,395.4,437,445-447,449-452,459,461,462.ccls. and (CSMA or CSMA/CD)	US-PGPUB; USPAT; USOCR	OR	OFF	2009/10/01 03:38
S110	38	370/230,230.1,231,235,236,236.1,236.2,282,395.4,437,445-447,449-452,459,461,462.ccls. and Homeplug	US-PGPUB; USPAT; USOCR	OR	OFF	2009/10/01 03:38
S111	817	370/230,230.1,231,235,236,236.1,236.2,282,395.4,437,445-447,449-452,459,461,462.ccls. and (home with network\$3)	US-PGPUB; USPAT; USOCR	OR	OFF	2009/10/01 03:50
S118	1425	370/230,230.1,231,235,236,236.1,236.2,282,395.4,437,445-447,449-452,459,461,462.ccls. and (CSMA or CSMA/CD)	US-PGPUB; USPAT;	OR	OFF	2010/03/01 10:09

			USOCR			
S119	360	(ESLAMBOLCHI -HOSSEIN MOCANUE-JOHN BAJPAY-PARI TOSH YANG-CHEN-YUI XU-ZHIJIAN FENG-HSIAO-YING TALMADGE-BRIAN SHAH-SARYU KOLMODIN-CHRISTIAN).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/03/01 10:09
S120	44	(oksman-vladimir).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/03/01 10:09
S121	3	((("20020112070") or ("20050111536") or ("20050186933")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2010/06/16 13:53
S122	2	((("6115393") or ("7321565")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2010/06/16 15:34
S123	1	("7477594").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2010/06/17 15:00
S124	1	(source adj2 rout\$3) with ((generic adj1 framing adj1 procedure) or GFP)	US-PGPUB; USPAT; USOCR	OR	OFF	2010/06/17 15:02
S125	1	(source adj2 rout\$3) same ((generic adj1 framing adj1 procedure) or GFP)	US-PGPUB; USPAT; USOCR	OR	OFF	2010/06/17 15:02
S127	13	(source adj2 rout\$3) and ((generic adj1 framing adj1 procedure) or GFP)	US-PGPUB; USPAT; USOCR	OR	OFF	2010/06/17 15:02
S128	3	("2006/0002304").URPN.	USPAT	OR	OFF	2010/06/17 15:03
S129	9	("20060002304" "20060221929" "5309433" "5504746" "5563878" "5917820" "6084882" "6275492" "7334047").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2010/06/17 15:08
S130	1	("20060002304").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2010/06/17 15:11
S131	1	("20040139037").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2010/06/17 15:28
S132	116	("370"/\$.ccls. or "709"/\$.ccls.) and ((hidden with node\$1) same CSMA)	US-PGPUB; USPAT; USOCR	OR	OFF	2010/06/21 11:32
S133	115	"370"/\$.ccls. and ((hidden with node\$1) same CSMA)	US-PGPUB; USPAT; USOCR	OR	OFF	2010/06/21 11:32
S134	3	("2007/0115907").URPN.	USPAT	OR	OFF	2010/06/21 11:41
S135	1	("6137784").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2010/07/05 21:14
S136	124	("370"/\$.ccls. or "709"/\$.ccls.) and ((hidden with node\$1) same CSMA)	US-PGPUB; USPAT; USOCR	OR	OFF	2010/12/06 11:23
S137	123	"370"/\$.ccls. and ((hidden with node\$1) same CSMA)	US-PGPUB;	OR	OFF	2010/12/06

			USPAT; USOCR			11:23
S140	1	sub?map same bod\$3 same header\$1 same uplink\$3	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/11 00:05
S142	12	sub?map same uplink\$3	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/11 00:06
S143	2	sub?map same uplink\$3 same burst\$3	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/11 00:28
S144	0	("2007086370").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/11 00:28
S145	1	("20070086370").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/11 00:28
S146	22	sub?map and (uplink\$3 same burst\$3)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/11 00:29
S147	22	sub?map and (uplink\$3 same burst\$3)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/11 00:29
S148	9	sub?map with header\$1	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/11 01:27
S149	63	"370"/\$.ccls. and (SUB?MAP)	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/11 01:59
S150	63	"370"/\$.ccls. and (SUB-MAP)	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/11 02:00
S151	95	"370"/\$.ccls. and ("SUB MAP")	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/11 02:00
S152	95	"370"/\$.ccls. and ("SUB MAP" or sub?map)	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/11 02:00
S153	372	("SUB MAP" or sub?map)	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/11 02:00
S154	778	uplink\$3 same (frame\$1 or packet\$1 or cell\$1) same burst\$3 same \$4MAP	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/11 02:01
S155	2310	uplink\$3 same (frame\$1 or packet\$1 or cell\$1) same \$4MAP	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/11 02:01
S156	194	(KIM-JEONG-KI RYU-KIL-H RYU-KIL-HYEN RYU-KIL-JUNG RYU-KI O RYU-KI SEON RYU-KI -HYUN YUK-YOUNGSOO YUK-YOUNG-SOO YUK-YOUNG-SUB).in.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/11 02:02
S157	21297	"lg electronics".as.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/11 02:02
S158	9	"lg electronics".as. and "sub map"	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/11 02:03
S159	4046	dsl same subscriber\$3 with loop	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/12 18:21

S160	40	dsl same subscriber\$3 with loop same spectrum same management	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/12 18:21
S161	3	((("20030093364") or ("6498785") or ("6597705"))).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/13 09:26
S162	1	("20050286408").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/20 14:43
S163	1	"12,812,741"	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/20 14:45
S164	1	"12/812,741"	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/20 14:45
S165	1	"12/867,865"	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/20 14:51
S166	264	(superframe or super?frame) with map	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/20 15:09
S167	60	(superframe or super?frame) with map same (subframe or sub?frame)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/20 15:10
S168	183437	"370"/\$.ccls. or "455"/\$.ccls. and ((superframe or super?frame) with map same (subframe or sub?frame))	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/20 15:10
S169	54	("370"/\$.ccls. or "455"/\$.ccls.) and ((superframe or super?frame) with map same (subframe or sub?frame))	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/20 15:10
S170	1	("7990920").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/20 15:18
S171	127	370/328-330,338,395.4,432,436,437,458,459,468,473.ccls. and (sub adj2 MAP)	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/22 11:35
S172	226	"370"/\$.ccls. and (sub adj2 MAP)	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/22 11:35
S173	1055	(sub adj2 MAP)	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/22 11:35
S174	162	(YUK-YOUNG-SOO KIM-JEONG KIM-JEONGCHANG KIM-JEONGDAL KIM-JEONGDEOK KIM-JEONGEUN KIM-JEONGGOO RYU-KIL-H RYU-KIL-HYEN RYU-KIL-JUNG RYU-KIO RYU-KISEON RYU-KI-HYUN)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/22 11:36
S175	52	(YUK-YOUNG-SOO KIM-JEONG KIM-JEONGCHANG KIM-JEONGDAL KIM-JEONGDEOK KIM-JEONGEUN KIM-JEONGGOO RYU-KIL-H RYU-KIL-HYEN RYU-KIL-JUNG RYU-KIO RYU-KISEON RYU-KI-HYUN) and (superframe or super?frame)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/22 11:36
S176	19	(YUK-YOUNG-SOO KIM-JEONG KIM-JEONGCHANG KIM-JEONGDAL KIM-JEONGDEOK KIM-JEONGEUN KIM-JEONGGOO RYU-KIL-H RYU-KIL-HYEN RYU-KIL-JUNG RYU-KIO RYU-KISEON RYU-KI-HYUN) and ((superframe or super?frame) same MAP)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/22 11:37
S177	3	(YUK-YOUNG-SOO KIM-JEONG KIM-JEONGCHANG KIM-JEONGDAL KIM-JEONGDEOK KIM-JEONGEUN KIM-JEONGGOO RYU-KIL-H RYU-KIL-HYEN RYU-KIL-JUNG RYU-KIO RYU-KISEON RYU-KI-HYUN) and ((superframe or	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/22 11:37

		super?frame) same MAP).clm.				
S178	5	"lg electronics".as. and ((superframe or super?frame) same MAP).clm.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/22 11:38
S179	22	(fixed or constant) and (variable or adjustable) same uplink same downlink same (superframe or super?frame)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 19:26
S180	1622	(fixed or constant) and (variable or adjustable) same uplink same downlink	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 19:27
S181	941	((fixed or constant) and (variable or adjustable)) same uplink same downlink	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 19:27
S182	3	((fixed or constant) and (variable or adjustable)) same uplink same downlink same (superframe or super?frame)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 19:27
S183	20743	"802.16"	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 19:28
S184	14869	"IEEE 802.16"	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 19:29
S185	549	"IEEE 802.16d"	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 19:30
S186	144	"IEEE 802.16d" and ((fixed or constant) and (variable or adjustable))	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 19:35
S187	44	"IEEE 802.16d" and ((fixed or constant) with (variable or adjustable))	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 19:35
S188	317	(YUK-YOUNG-SOO KIM-JEONG KIM-JEONGCHANG KIM-JEONGDAL KIM-JEONGDEOK KIM-JEONGEUN KIM-JEONGGOO RYU-KI-HYUN RYU-KIL-H RYU-KIL-HYEN RYU-KIL-JUNG RYU-KIO RYU-KISEON KIM-YONG KIM-YONGBAE KIM-YONGBUM KIM-YONGCHUL KIM-YONGCHURL KIM-YONGDAE).in.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 20:09
S189	1	(YUK-YOUNG-SOO KIM-JEONG KIM-JEONGCHANG KIM-JEONGDAL KIM-JEONGDEOK KIM-JEONGEUN KIM-JEONGGOO RYU-KI-HYUN RYU-KIL-H RYU-KIL-HYEN RYU-KIL-JUNG RYU-KIO RYU-KISEON KIM-YONG KIM-YONGBAE KIM-YONGBUM KIM-YONGCHUL KIM-YONGCHURL KIM-YONGDAE).in. and "IEEE 802.16d"	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 20:09
S190	51	(YUK-YOUNG-SOO KIM-JEONG KIM-JEONGCHANG KIM-JEONGDAL KIM-JEONGDEOK KIM-JEONGEUN KIM-JEONGGOO RYU-KI-HYUN RYU-KIL-H RYU-KIL-HYEN RYU-KIL-JUNG RYU-KIO RYU-KISEON KIM-YONG KIM-YONGBAE KIM-YONGBUM KIM-YONGCHUL KIM-YONGCHURL KIM-YONGDAE).in. and superframe	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 20:10
S191	32	(YUK-YOUNG-SOO KIM-JEONG KIM-JEONGCHANG KIM-JEONGDAL KIM-JEONGDEOK KIM-JEONGEUN KIM-JEONGGOO RYU-KI-HYUN RYU-KIL-H RYU-KIL-HYEN RYU-KIL-JUNG RYU-KIO RYU-KISEON KIM-YONG KIM-YONGBAE KIM-YONGBUM KIM-YONGCHUL KIM-YONGCHURL KIM-YONGDAE).in. and superframe and MAP	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 20:10
S192	85	lg.as. and superframe and MAP	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 20:10
S193	28	(YUK-YOUNG-SOO KIM-JEONG KIM-JEONGCHANG KIM-JEONGDAL KIM-JEONGDEOK KIM-JEONGEUN KIM-	US-PGPUB; USPAT;	OR	ON	2012/09/26 20:11

		JEONGGOO RYU-KI-HYUN RYU-KIL-H RYU-KIL-HYEN RYU-KIL-JUNG RYU-KIO RYU-KISEON KIM-YONG KIM-YONGBAE KIM-YONGBUM KIM-YONGCHUL KIM-YONGCHURL KIM-YONGDAE).in. and superframe.clm.	USOCR			
S194	0	lg.as. and superframe.as.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 20:15
S195	42	lg.as. and superframe.clm.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/26 20:15
S196	4	((("20070242636") or ("20090170522") or ("20100220668") or ("20090129362"))).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/30 12:58
S197	23	("2007/0242636").URPN.	USPAT	OR	ON	2012/09/30 13:18
S198	18428	resource adj2 allocat\$3	USPAT	OR	ON	2012/09/30 13:30
S199	6629	"370"/\$.ccls. and (resource adj2 allocat\$3)	USPAT	OR	ON	2012/09/30 13:30
S200	7	"370"/\$.ccls. and (resource adj2 allocat\$3) same (bit with mask\$3)	USPAT	OR	ON	2012/09/30 13:30
S201	46882	resource adj2 allocat\$3	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 13:30
S202	50	"370"/\$.ccls. and (resource adj2 allocat\$3) same (bit with mask\$3)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 13:30
S203	4	"370"/\$.ccls. and ((resource adj2 allocat\$3) same (bit with mask\$3)).clm.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 13:30
S204	18	"370"/\$.ccls. and (resource adj2 allocat\$3) same (bit with mask\$3) and (frequency with block\$3)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 13:43
S205	5	"370"/\$.ccls. and (resource adj2 allocat\$3) same (bit with mask\$3) and (frequency adj2 block\$3)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 13:44
S206	2019	"370"/\$.ccls. and (resource adj2 allocat\$3) and ((bit with mask\$3) same (resource adj1 block\$1) or RB)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 13:55
S207	28	"370"/\$.ccls. and (resource adj2 allocat\$3) and ((bit with mask\$3) same ((resource adj1 block\$1) or RB))	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 13:55
S208	45	"370"/\$.ccls. and (((bit with mask\$3) same ((resource adj1 block\$1) or RB)))	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:00
S209	130	"370"/\$.ccls. and pdcch and (bit with mask\$3)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:03
S210	65	"370"/\$.ccls. and (pdccch same (bit with mask\$3))	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:03
S211	74	olav.in. and nokia.as.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:13
S212	5	olav.in. and nokia.as. and esa.in.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:13
S213	45	"370"/\$.ccls. and (bit with mask\$3) same ((resource adj1 block\$1) or RB)	US-PGPUB; USPAT;	OR	ON	2012/09/30 14:15

			USOCR			
S214	1	nokia.as. and (bit with mask\$3) same ((resource adj1 block\$1) or RB)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:16
S215	279	ntt.as. and higuchi.in.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:21
S216	176	ntt.as. and higuchi.in. and frequency and scheduling	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:21
S217	64	ntt.as. and higuchi.in. and frequency and scheduling and allocate	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:21
S218	0	ntt.as. and higuchi.in. and (frequency and scheduling and allocate).as.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:21
S219	10	ntt.as. and higuchi.in. and (frequency and scheduling and allocate).ab.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:21
S220	0	("2009/0129362").URPN.	USPAT	OR	ON	2012/09/30 14:22
S221	74	nokia.as. and olav.in.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:27
S222	1	nokia.as. and olav.in. and esa.in. and frank.in.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:27
S223	4	nokia.as. and olav.in. and (resource adj1 block\$1 same group\$1)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 14:32
S224	1	nokia.as. and olav.in. and (resource adj1 block\$1 same group\$1)	EPO	OR	ON	2012/09/30 14:33
S225	23	("2007/0242636").URPN.	USPAT	OR	ON	2012/09/30 14:49
S226	26	(AWAD-YASSIN-ADDEN AWAD-YASSIN-ADEB AWAD-YASSIN-ADEN).in.	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 15:53
S227	26	(AWAD-YASSIN-ADDEN AWAD-YASSIN-ADEB AWAD-YASSIN-ADEN).in. and (frequency wiht block\$3)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 15:53
S228	30347	nec.as. and (frequency wiht block\$3)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 15:53
S229	1310	nec.as. and (frequency with block\$3)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 15:53
S230	66	nec.as. and (frequency adj1 block\$3)	US-PGPUB; USPAT; USOCR	OR	ON	2012/09/30 15:53
S231	2	((("20080192847") or ("7885230")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/30 15:56
S232	11874	"370"/\$.cls. and (frequency with assign\$4)	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 04:55
S233	393	"370"/\$.cls. and (frequency with assign\$4) same MAP	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 04:56

S234	217	"370"/\$.ccls. and (frequency with assign\$4) with MAP	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 04:56
S235	30	"370"/\$.ccls. and ((frequency with assign\$4) with MAP).clm.	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 04:56
S236	179	"370"/\$.ccls. and (((frequency adj1 assign\$4) or FA) same MAP)	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 05:00
S237	1	"370"/\$.ccls. and (((frequency adj1 assign\$4) or FA) same MAP same primary same secondary)	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 05:00
S238	70	"370"/\$.ccls. and (((frequency adj1 assign\$4) or FA) same primary same secondary)	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 05:01
S239	8	"370"/\$.ccls. and (((frequency adj1 assign\$4) or FA) same primary same secondary).clm.	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 05:01
S240	2	((("7068623") or ("20020128051")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/10/01 05:04
S241	20	("7068623").URPN.	USPAT	OR	ON	2012/10/01 05:05
S242	2	((("20050197133") or ("20050265223")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/10/01 05:08
S243	3	("2005/0197133").URPN.	USPAT	OR	ON	2012/10/01 05:09
S244	361	(PARK-CHUL LIM-KWANG-JAE LEE-HYUN YOON-CHUL-SIK).IN.	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 05:53
S245	11	(PARK-CHUL LIM-KWANG-JAE LEE-HYUN YOON-CHUL-SIK).IN. and FA	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 05:54
S246	677	samsung.as. and FA	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 05:54
S247	24	("370"/\$.ccls. or "455"/\$.ccls.) and LTE and (downlink with offset same acknowledge\$4)	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 06:03
S248	2	((("20080274747") or ("20070110004")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/10/01 06:08
S249	1	("20040248606").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/10/01 06:12
S250	15	("2004/0248606").URPN.	USPAT	OR	ON	2012/10/01 06:14
S251	0	("7444162").URPN.	USPAT	OR	ON	2012/10/01 06:16
S252	0	("7444162").URPN.	USPAT	OR	ON	2012/10/01 06:16
S253	1	("20050208960").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/10/01 06:28
S254	1	"12/528,817"	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 06:43

S255	1	("370"/\$.ccls. or "455"/\$.ccls.) and LTE and (downlink with offset same CQI same priority)	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 07:08
S256	7	("370"/\$.ccls. or "455"/\$.ccls.) and LTE and (downlink same offset same CQI same priority)	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 07:09
S257	173	(ISHII-HIROYUKI UMESH-ANIL) AND LTE	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 07:32
S258	93	(ISHII-HIROYUKI UMESH-ANIL) AND LTE and downlink.clm.	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 07:32
S259	6	(ISHII-HIROYUKI UMESH-ANIL) AND LTE and (downlink same priority).clm.	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 07:32
S260	7	ntt.as. AND LTE and (downlink same priority).clm.	US-PGPUB; USPAT; USOCR	OR	ON	2012/10/01 07:33
S261	22	("370"/\$.ccls. or "709"/\$.ccls.) and (qualit\$3 same interface\$1 same (mobile\$1 or radio or handheld\$1 or subscriber\$1 or (base with station\$1)) same path same metric\$1)	US-PGPUB; USPAT; USOCR	OR	OFF	2012/12/03 13:17
S262	5723	("370"/\$.ccls. or "709"/\$.ccls.) and ((qualit\$3 with interface\$1) or QoI)	US-PGPUB; USPAT; USOCR	OR	OFF	2012/12/03 13:19
S263	13	("370"/\$.ccls. or "709"/\$.ccls.) and (QoI)	US-PGPUB; USPAT; USOCR	OR	OFF	2012/12/03 13:19
S264	1541	(370/229-232,235-238,241,252,253,331-334.CCLS. or 455/436-440,450,452.1,452.2.ccls) and (QoI or (quality with interfac\$3))	US-PGPUB; USPAT; USOCR	OR	OFF	2012/12/03 13:28
S265	32244	(QoI or (quality with interfac\$3))	US-PGPUB; USPAT; USOCR	OR	OFF	2012/12/03 13:28
S266	6124	("370"/\$.ccls. or "455"/\$.ccls.) and (QoI or (quality with interfac\$3))	US-PGPUB; USPAT; USOCR	OR	OFF	2012/12/03 13:29
S267	456	("370"/\$.ccls. or "455"/\$.ccls.) and ((QoI or (quality with interfac\$3)) same path)	US-PGPUB; USPAT; USOCR	OR	OFF	2012/12/03 13:29
S268	4994	(QoI or (quality with interfac\$3))	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/12/03 13:29
S269	96	((QoI or (quality with interfac\$3)) same path)	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/12/03 13:30
S270	374	(VAN-DEN-BERG-ERIC VAN-DEN-BERG-ERICK VAN-DEN-BERG-ERIC-JOZEF-DIANE MADHANI-SUNIL MADHANI-SUNIL-H MADHANI-SUNIL-HUKMI CHAND ZHANG-TAO ZHANG-TAOYI ZHANG-TAOZHU).in.	US-PGPUB; USPAT; USOCR	OR	ON	2012/12/03 13:31
S271	2	(VAN-DEN-BERG-ERIC VAN-DEN-BERG-ERICK VAN-DEN-BERG-ERIC-JOZEF-DIANE MADHANI-SUNIL MADHANI-SUNIL-H MADHANI-SUNIL-HUKMI CHAND ZHANG-TAO ZHANG-TAOYI ZHANG-TAOZHU).in. and QoI	US-PGPUB; USPAT; USOCR	OR	ON	2012/12/03 13:31
S273	3	"11/209,331"	US-PGPUB; USPAT; USOCR	OR	OFF	2013/09/07 18:48

S274	0	("7885185").URPN.	USPAT	OR	ON	2013/09/07 18:58
S275	0	("7885185").URPN.	USPAT	OR	ON	2013/09/07 18:58
S276	331669	"370"/\$.ccls. or "709"/\$.ccls. (compar\$3 same path\$3 same qualit\$3 same (mobile? or radio or handheld? or subscriber? or (base adj2 station\$1)))	US-PGPUB; USPAT; USOCR	OR	OFF	2013/09/07 19:08
S277	230	("370"/\$.ccls. or "709"/\$.ccls.) and (compar\$3 same path\$3 same qualit\$3 same (mobile? or radio or handheld? or subscriber? or (base adj2 station\$1)))	US-PGPUB; USPAT; USOCR	OR	OFF	2013/09/07 19:08
S278	26	("370"/\$.ccls. or "709"/\$.ccls.) and (compar\$3 same path\$3 same qualit\$3 same (mobile? or radio or handheld? or subscriber? or (base adj2 station\$1))).clm.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/09/07 19:08
S279	3	("7170872").URPN.	USPAT	OR	ON	2013/09/07 19:10
S280	1	("8111651").URPN.	USPAT	OR	ON	2013/09/07 19:13
S281	1	("8223659").URPN.	USPAT	OR	ON	2013/09/07 19:14
S282	13	("2006/0227717").URPN.	USPAT	OR	ON	2013/09/07 19:25
S283	15	("370"/\$.ccls. or "709"/\$.ccls.) and (compar\$3 same path\$3 same qualit\$3 same (mobile? or radio or handheld? or subscriber? or (base adj2 station\$1))).ab.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/09/07 19:48
S284	13	("2006/0039280").URPN.	USPAT	OR	ON	2013/09/07 19:50
S285	6	("7636309").URPN.	USPAT	OR	ON	2013/09/07 19:51
S286	1	("7995501").URPN.	USPAT	OR	ON	2013/09/07 19:58
S287	9	("20010032272" "20040264466" "20070184864" "6993034" "7280483" "7349360" "7561526" "7570628" "7636309").PN.	US-PGPUB; USPAT; USOCR	OR	ON	2013/09/07 19:59
S288	51	("370"/\$.ccls. or "709"/\$.ccls.) and (compar\$3 same path\$3 same qualit\$3 same (mobile? or radio or handheld? or subscriber? or (base adj2 station\$1)) same packet\$1)	US-PGPUB; USPAT; USOCR	OR	OFF	2013/09/07 20:09
S289	1	("20050002379").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/09/07 20:21

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L4	234	("370"/\$.ccls. or "709"/\$.ccls.) and ((measur\$3 or compar\$3 or judg\$3 or determin\$3) same (rout\$3 or path\$3 or interface\$1) same qualit\$3 same (mobile? or radio or handheld? or subscriber? or (base adj2 station\$1))).clm.	USPAT; UPAD	OR	OFF	2014/03/24 11:55
L5	106	("370"/\$.ccls. or "709"/\$.ccls.) and ((measur\$3 or compar\$3 or judg\$3 or determin\$3) same interface\$1 same qualit\$3 same (mobile? or radio or handheld? or subscriber? or (base adj2 station\$1))).clm.	USPAT; UPAD	OR	OFF	2014/03/24 11:56
L6	115	("370"/\$.ccls. or "709"/\$.ccls.) and ((measur\$3 or compar\$3 or judg\$3 or determin\$3) same (port\$1 or interface\$1) same qualit\$3 same (mobile? or radio or handheld? or subscriber? or (base adj2 station\$1))).clm.	USPAT; UPAD	OR	OFF	2014/03/24 11:56

L7	4	("370"/\$.ccls. or "709"/\$.ccls.) and ((measur\$3 or compar\$3 or judg\$3 or determin\$3) same (port\$1 or interface\$1) same qualit\$3 same (mobile? or radio or handheld? or subscriber? or (base adj2 station\$1)) same real?time).clm.	USPAT; UPAD	OR	OFF	2014/03/24 11:56
S67	1	(VOLPE-BRADY DUBOSE-MATT LABURADA-MARCO).in.	USPAT; UPAD	OR	OFF	2009/09/27 01:24
S68	193	sunrise.as.	USPAT; UPAD	OR	OFF	2009/09/27 01:25
S69	48	sunrise.as. and cable	USPAT; UPAD	OR	OFF	2009/09/27 01:25
S70	5	("4070648" "4347609" "4573154" "5193093" "6182264").PN.	US- PGPUB; USPAT	OR	OFF	2009/09/27 01:28
S71	1	("7010730").URPN.	USPAT	OR	OFF	2009/09/27 01:29
S72	1	("7451472").URPN.	USPAT	OR	OFF	2009/09/27 01:29
S73	0	("7584496").URPN.	USPAT	OR	OFF	2009/09/27 01:30
S74	21	("20030142622" "20040091055" "20040245995" "20060012376" "5073822" "5461318" "5617137" "5682100" "5990687" "6140822" "6151559" "6344749" "6417942" "6425132" "6570394" "6687632" "6934655" "7024680" "7069163" "7415367" "7451472").PN.	US- PGPUB; USPAT	OR	OFF	2009/09/27 01:30
S75	21	("20030142622" "20040091055" "20040245995" "20060012376" "5073822" "5461318" "5617137" "5682100" "5990687" "6140822" "6151559" "6344749" "6417942" "6425132" "6570394" "6687632" "6934655" "7024680" "7069163" "7415367" "7451472").PN.	US- PGPUB; USPAT	OR	OFF	2009/09/27 01:33
S76	23	("20020076143" "20030185176" "20040103442" "20040245995" "20050123002" "20060048200" "20060141971" "3750022" "5943604" "6049693" "6542500" "6546016" "6567132" "6567579" "6571393" "6687261" "6714534" "6785292" "6850533" "7010730" "7024680" "7162731" "7246368").PN.	US- PGPUB; USPAT	OR	OFF	2009/09/27 01:33
S112	0	oksman-vladimi.in.	USPAT; UPAD	OR	OFF	2009/10/01 03:45
S113	36	oksman.in.	USPAT; UPAD	OR	OFF	2009/10/01 03:46
S114	0	oksman-v.in.	USPAT; UPAD	OR	OFF	2009/10/01 03:46
S115	9	oksman-v\$7.in.	USPAT; UPAD	OR	OFF	2009/10/01 03:46
S116	6919	infineon.as.	USPAT; UPAD	OR	OFF	2009/10/01 03:48
S117	18	infineon.as. and (home with network\$3)	USPAT; UPAD	OR	OFF	2009/10/01 03:48
S138	0	("370"/\$.ccls. or "709"/\$.ccls.) and (((hidden with node\$1) same CSMA)).clm.	USPAT; UPAD	OR	OFF	2010/12/06 11:24
S139	34	("370"/\$.ccls. or "709"/\$.ccls.) and (hidden with node\$1).clm.	USPAT; UPAD	OR	OFF	2010/12/06 11:24
S272	508	((Qol or (quality with interfac\$3)) same path)	USPAT;	OR	OFF	2012/12/03

					UPAD			13:30
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3/ 24/ 2014 11:59:33 AM

**C:\ Users\ dmills2\ Documents\ EAST\ Workspaces\ US Case Workplaces\ 12-973,300 Real-Time
Comparison of Qol .wsp**

Issue Classification 	Application/Control No. 12973300	Applicant(s)/Patent Under Reexamination VAN DEN BERG ET AL.
	Examiner DONALD MILLS	Art Unit 2462

CPC			Type	Version
Symbol				

CPC Combination Sets				
Symbol	Type	Set	Ranking	Version

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	16	
/DONALD MILLS/ Primary Examiner.Art Unit 2462	03/24/2014	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1(B)

Issue Classification 	Application/Control No. 12973300	Applicant(s)/Patent Under Reexamination VAN DEN BERG ET AL.
	Examiner DONALD MILLS	Art Unit 2462

US ORIGINAL CLASSIFICATION						INTERNATIONAL CLASSIFICATION														
CLASS			SUBCLASS			CLAIMED					NON-CLAIMED									
370			332			H	0	4	L	12 / 26 (2006.0)										
CROSS REFERENCE(S)																				
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)																			
370	230	252	331																	
455	436																			
709	224																			

NONE		Total Claims Allowed:	
		16	
(Assistant Examiner)	(Date)		
/DONALD MILLS/ Primary Examiner.Art Unit 2462	03/24/2014	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1(B)

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)

38834
 WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP
 1250 Connecticut Avenue, NW, Suite 700
 Washington, DC 20036

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.
12/973,300	12/20/2010	Eric van den Berg	091523A	1628

TITLE OF INVENTION: REAL-TIME COMPARISON OF QUALITY OF INTERFACES

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$960.00	\$0	\$0	\$960.00	07/02/2014
EXAMINER		ART UNIT	CLASS-SUBCLASS			
D. L. Mills		2462	370-332000			

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363). ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached. ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.	2. For printing on the patent front page, list (1) The names of up to 3 registered patent attorneys or agents OR, alternatively, (2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.	Westerman, Hattori, Daniels & Adrian, LLP 1 2 3
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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

TOSHIBA AMERICA RESEARCH, INC.
 TELCORDIA TECHNOLOGIES, INC.

(B) RESIDENCE: (CITY AND STATE OR COUNTRY)

WASHINGTON, D.C.
 PISCATAWAY, NJ

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☒ Issue Fee
☐ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
☒ Payment by credit card.
☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number 50-2866 (enclose an extra copy of this form).

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 /Stephen B. Parker Reg. 36631/ Date June 26, 2014
 Typed or printed name Stephen B. Parker Registration No. 36,631

Electronic Patent Application Fee Transmittal				
Application Number:		12973300		
Filing Date:		20-Dec-2010		
Title of Invention:		REAL-TIME COMPARISON OF QUALITY OF INTERFACES		
First Named Inventor/Applicant Name:		Eric van den Berg		
Filer:		Stephen B. Parker/Soo Jin Hur		
Attorney Docket Number:		091523A		
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl Issue Fee	1501	1	960	960
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Total in USD (\$)				960

Electronic Acknowledgement Receipt	
EFS ID:	19418673
Application Number:	12973300
International Application Number:	
Confirmation Number:	1628
Title of Invention:	REAL-TIME COMPARISON OF QUALITY OF INTERFACES
First Named Inventor/Applicant Name:	Eric van den Berg
Customer Number:	89739
Filer:	Stephen B. Parker/Soo Jin Hur
Filer Authorized By:	Stephen B. Parker
Attorney Docket Number:	091523A
Receipt Date:	26-JUN-2014
Filing Date:	20-DEC-2010
Time Stamp:	13:08:13
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$ 960
RAM confirmation Number	14705
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	Issue Fee Payment (PTO-85B)	091523A_IssueFeeTransmittal_06_26_2014.pdf	112325 a540892a1884ae2305fe06f9ad351054d0a0daab	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30321 ac20b634d157e799d748f6ced7eeae092af7ee6	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			142646		
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. <u>New Applications Under 35 U.S.C. 111</u> 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. <u>National Stage of an International Application under 35 U.S.C. 371</u> 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. <u>New International Application Filed with the USPTO as a Receiving Office</u> 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.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/973,300	08/05/2014	8798006	091523A	1628

89739 7590 07/16/2014
ATTN: Stephen B. Parker (WPD)
Westerman, Hattori, Daniels & Adrian, LLP
1250 Connecticut Ave., Suite 700
Washington, DC 20036

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 228 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):

Eric van den Berg, Hoboken, NJ;
Sunil Madhani, Lake Hopatcong, NJ;
Tao Zhang, Fort Lee, NJ;

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.

UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

Page 1 of 5

PATENT NO. : 8,798,006 B2

APPLICATION NO. : 12/973,300

ISSUE DATE : August 5, 2014

INVENTOR(S) : van den Berg, et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

On the Face Page, in Field (56), under "OTHER PUBLICATIONS", in Column 2, Line 5, delete "bandwifth" and insert - - bandwidth - -, therefor.

On the Face Page, in Field (57), under "ABSTRACT", in Column 2, Line 7, delete "Qol" and insert - - QoI - -, therefor.

In Column 1, Line 8, delete "(Qol)," and insert - - (QoI), - -, therefor.

In Column 3, Line 61, delete "Labal" and insert - - Label - -, therefor.

In Column 4, Line 33, delete "T. Anjani et al.," and insert - - T. Anjali et al., - -, therefor.

In Column 4, Line 36, delete "T. Anjani et al.," and insert - - T. Anjali et al., - -, therefor.

In Column 5, Line 36, delete "(Qols)" and insert - - (QoIs) - -, therefor.

MAILING ADDRESS OF SENDER (Please do not use customer number below):

6300 Legacy, MS EVR 1-C-11
Plano, TX 75024
972-583-8656

This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. 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 1.0 hour 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: Attention Certificate of Corrections Branch, 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 CERTIFICATE OF CORRECTION

Page 2 of 6

PATENT NO. : 8,798,006 B2

APPLICATION NO. : 12/973,300

ISSUE DATE : August 5, 2014

INVENTOR(S) : van den Berg, et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In Column 5, Line 40, delete “Qol” and insert - - QoI - -, therefor.

In Column 5, Line 47, delete “(Qols)” and insert - - (QoIs) - -, therefor.

In Column 5, Line 51, delete “Qol” and insert - - QoI - -, therefor.

In Column 5, Line 58, delete “(Qols)” and insert - - (QoIs) - -, therefor.

In Column 5, Line 62, delete “Qol” and insert - - QoI - -, therefor.

In Column 6, Line 4, delete “(Qols)” and insert - - (QoIs) - -, therefor.

In Column 6, Line 8, delete “Qol” and insert - - QoI - -, therefor.

In Column 6, Line 14, delete “Qol metrics” and insert - - QoI metrics - -, therefor.

In Column 6, Line 15, delete “Qol measurement,” and insert - - QoI measurement, - -, therefor.

MAILING ADDRESS OF SENDER (Please do not use customer number below):

6300 Legacy, MS EVR 1-C-11
Plano, TX 75024
972-583-8656

This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. 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 1.0 hour 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: Attention Certificate of Corrections Branch, 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 CERTIFICATE OF CORRECTION

Page 3 of 6

PATENT NO. : 8,798,006 B2

APPLICATION NO. : 12/973,300

ISSUE DATE : August 5, 2014

INVENTOR(S) : van den Berg, et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In Column 6, Line 22, delete “(Qol).” and insert - - (QoI). - -, therefor.

In Column 6, Line 26, delete “Qol” and insert - - QoI - -, therefor.

In Column 6, Line 28, delete “Qols” and insert - - QoIs - -, therefor.

In Column 6, Line 33, delete “Qol” and insert - - QoI - -, therefor.

In Column 9, Line 63, delete “(Qol),” and insert - - (QoI), - -, therefor.

In Column 10, Line 37, delete “(Qol)” and insert - - (QoI) - -, therefor.

In Column 10, Line 52, delete “Qol” and insert - - QoI - -, therefor.

In Column 11, Line 15, delete “Qol.” and insert - - QoI. - -, therefor.

MAILING ADDRESS OF SENDER (Please do not use customer number below):

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Plano, TX 75024
972-583-8656

This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. 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 1.0 hour 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: Attention Certificate of Corrections Branch, 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 CERTIFICATE OF CORRECTION

Page 4 of 6

PATENT NO. : 8,798,006 B2

APPLICATION NO. : 12/973,300

ISSUE DATE : August 5, 2014

INVENTOR(S) : van den Berg, et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In Column 11, Line 20, delete "Qol" and insert - - QoI - -, therefor.

In Column 11, Line 32, delete "Qol" and insert - - QoI - -, therefor.

In Column 11, Line 45, delete "Qol" and insert - - QoI - -, therefor.

In Column 11, Line 50, delete "Qol" and insert - - QoI - -, therefor.

In Column 11, Line 52, delete "Qol." and insert - - QoI. - -, therefor.

In Column 13, Line 30, delete "Qol" and insert - - QoI - -, therefor.

In Column 13, Line 32, delete "Qol" and insert - - QoI - -, therefor.

In Column 13, Line 34, delete "Qol" and insert - - QoI - -, therefor.

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972-583-8656

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

UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

Page 5 of 6

PATENT NO. : 8,798,006 B2

APPLICATION NO. : 12/973,300

ISSUE DATE : August 5, 2014

INVENTOR(S) : van den Berg, et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In Column 13, Line 44, delete "Qol because the Qol" and insert - - QoI because the QoI - -, therefor.

In Column 13, Line 46, delete "Qol" and insert - - QoI - -, therefor.

In Column 13, Line 47, delete "Qol" and insert - - QoI - -, therefor.

In Column 14, Line 5, delete "Qol" and insert - - QoI - -, therefor.

In Column 14, Line 7, delete "Qol" and insert - - QoI - -, therefor.

In Column 14, Line 11, delete "Qol" and insert - - QoI - -, therefor.

In Column 14, Line 13, delete "Qol" and insert - - QoI - -, therefor.

In Column 14, Line 34, delete "Qol metrics" and insert - - QoI metrics - -, therefor.

MAILING ADDRESS OF SENDER (Please do not use customer number below):

6300 Legacy, MS EVR 1-C-11
Plano, TX 75024
972-583-8656

This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. 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 1.0 hour 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: Attention Certificate of Corrections Branch, 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 CERTIFICATE OF CORRECTION

Page 6 of 6

PATENT NO. : 8,798,006 B2

APPLICATION NO. : 12/973,300

ISSUE DATE : August 5, 2014

INVENTOR(S) : van den Berg, et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In Column 14, Line 35, delete "Qol measurement." and insert - - QoI measurement. - -, therefor.

In Column 14, Line 37, delete "Qol-such" and insert - - QoI-such - -, therefor.

In Column 14, Line 42, delete "Qol." and insert - - QoI. - -, therefor.

In Column 14, Line 43, delete "Qol," and insert - - QoI, - -, therefor.

MAILING ADDRESS OF SENDER (Please do not use customer number below):

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972-583-8656

This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. 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 1.0 hour 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: Attention Certificate of Corrections Branch, 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				
Application Number:		12973300		
Filing Date:		20-Dec-2010		
Title of Invention:		REAL-TIME COMPARISON OF QUALITY OF INTERFACES		
First Named Inventor/Applicant Name:		Eric van den Berg		
Filer:		Steven Ware Smith/Kara Coffman		
Attorney Docket Number:		091523A		
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Certificate of Correction	1811	1	100	100

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				100

Electronic Acknowledgement Receipt	
EFS ID:	21393452
Application Number:	12973300
International Application Number:	
Confirmation Number:	1628
Title of Invention:	REAL-TIME COMPARISON OF QUALITY OF INTERFACES
First Named Inventor/Applicant Name:	Eric van den Berg
Customer Number:	89739
Filer:	Steven Ware Smith/Kara Coffman
Filer Authorized By:	Steven Ware Smith
Attorney Docket Number:	091523A
Receipt Date:	04-FEB-2015
Filing Date:	20-DEC-2010
Time Stamp:	10:51:59
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$100
RAM confirmation Number	18693
Deposit Account	501379
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 1.20 (Post Issuance fees)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	P52121-US1_2015-02-04_CoC_Request_Letter.pdf	93202 81c35eddb2179df1f89bba1a77faa010acd36cc79	no	7
Warnings:					
Information:					
2	Request for Certificate of Correction	P52121-US1_2015-02-04_CoC_PTO-1050.pdf	128890 99c805cd72a535e7163aed3cbaf688ab8bd16acb	no	7
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30349 85beb7a2f3874b2e2ed6ee3ca6d3561c5b7a91c4	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			252441		

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.

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF: U.S. Patent No. 8,798,006

USPTO CONFIRMATION CODE: 1628

APPLICATION NO.: 12/973,300

FILED: December 20, 2010

EXAMINER: Mills; Donald

GROUP ART UNIT: 2462

FOR: REAL-TIME COMPARISON OF QUALITY OF INTERFACES

37 CFR 1.322 & 37 CFR 1.323 REQUEST FOR CERTIFICATE OF CORRECTION
FOR USPTO AND/OR APPLICANT MISTAKE

HONORABLE COMMISSIONER OF PATENTS & TRADEMARKS

SIR:

The following is a request for a certificate of correction in Serial Number 12/973,300, now Patent Number 8,798,006.

A certificate of correction under 35 USC 254 is respectfully requested in the above-identified patent.

All errors were the fault of the applicant and, accordingly, please charge **\$100.00** to our Deposit Account No. 50-1379. In the event that a further fee is required, please charge the amount to the same Deposit Account.

The exact locations where the errors appear in the patent and patent application are as follows:

On the Face Page, in Field (56), under “OTHER PUBLICATIONS”, in Column 2, Line 5, delete “bandwifth” and insert - - bandwidth - -, therefor.
(LIST OF REFERENCES CITED BY APPLICANT AND CONSIDERED BY EXAMINER DATED DECEMBER 7, 2012, SHEET 2 (PAGE 119 OF FW), UNDER “NON-PATENT LITERATURE DOCUMENTS”, ENTRY 1, LINE 1)

On the Face Page, in Field (57), under “ABSTRACT”, in Column 2, Line 7, delete “Qol” and insert - - QoI - -, therefor.
(ORIGINALLY FILED SPECIFICATION, IN THE ABSTRACT DATED DECEMBER 20, 2010, PAGE 45 (PAGE 194 OF FW), LINE 5)

In Column 1, Line 8, delete “(Qol),” and insert - - (QoI), - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010, PAGE 1, LINE 4)

In Column 3, Line 61, delete “Labal” and insert - - Label - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010, PAGE 6, LINE 4)

In Column 4, Line 33, delete “T. Anjani et al.,” and insert - - T. Anjali et al., - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010, PAGE 7, LINE 9)

In Column 4, Line 36, delete “T. Anjani et al.,” and insert - - T. Anjali et al., - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010, PAGE 7, LINE 12)

In Column 5, Line 26, delete “Qol” and insert - - QoI - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010, PAGE 9, LINE 8)

In Column 5, Line 36, delete “(Qols)” and insert - - (QoIs) - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010, PAGE 9, LINE 16)

In Column 5, Line 40, delete “Qol” and insert - - QoI - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010, PAGE 9, LINE 18)

In Column 5, Line 47, delete “(Qols)” and insert - - (QoIs) - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010, PAGE 9, LINE 24)

In Column 5, Line 51, delete “Qol” and insert - - QoI - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010,
PAGE 9, LINE 26)

In Column 5, Line 58, delete “(Qols)” and insert - - (QoIs) - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010,
PAGE 10, LINE 6)

In Column 5, Line 62, delete “Qol” and insert - - QoI - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010,
PAGE 10, LINE 8)

In Column 6, Line 4, delete “(Qols)” and insert - - (QoIs) - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010,
PAGE 10, LINE 16)

In Column 6, Line 8, delete “Qol” and insert - - QoI - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010,
PAGE 10, LINE 18)

In Column 6, Line 14, delete “Qol metrics” and insert - - QoI metrics - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010,
PAGE 10, LINE 23)

In Column 6, Line 15, delete “Qol measurement,” and insert - - QoI measurement,
- -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010,
PAGE 10, LINE 23)

In Column 6, Line 22, delete “(Qol).” and insert - - (QoI). - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010,
PAGE 11, LINE 1)

In Column 6, Line 26, delete “Qol” and insert - - QoI - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010,
PAGE 11, LINE 4)

In Column 6, Line 28, delete “Qols” and insert - - QoIs - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010,
PAGE 11, LINE 6)

In Column 6, Line 33, delete “Qol” and insert - - QoI - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010,
PAGE 11, LINE 11)

In Column 9, Line 63, delete “(Qol),” and insert - - (QoI) - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010,
PAGE 18, LINE 10)

In Column 10, Line 37, delete “(Qol)” and insert - - (QoI) - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010,
PAGE 19, LINE 14)

In Column 10, Line 52, delete “Qol” and insert - - QoI - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010,
PAGE 19, LINE 25)

In Column 11, Line 15, delete “Qol.” and insert - - QoI. - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010,
PAGE 20, LINE 18)

In Column 11, Line 20, delete “Qol” and insert - - QoI - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010,
PAGE 20, LINE 22)

In Column 11, Line 32, delete “Qol” and insert - - QoI - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010,
PAGE 21, LINE 3)

In Column 11, Line 45, delete “Qol” and insert - - QoI - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010,
PAGE 21, LINE 13)

In Column 11, Line 50, delete “Qol” and insert - - QoI - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010,
PAGE 21, LINE 17)

In Column 11, Line 52, delete “Qol.” and insert - - QoI. - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010,
PAGE 21, LINE 19)

In Column 13, Line 30, delete “Qol” and insert - - QoI - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010,
PAGE 24, LINE 28)

In Column 13, Line 32, delete “Qol” and insert - - QoI - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010,
PAGE 24, LINE 29)

In Column 13, Line 34, delete “Qol” and insert - - QoI - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010,
PAGE 25, LINE 3)

In Column 13, Line 44, delete “Qol because the Qol” and insert - - QoI because the QoI - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010, PAGE 25, LINES 9-10)

In Column 13, Line 46, delete “Qol” and insert - - QoI - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010, PAGE 25, LINE 11)

In Column 13, Line 47, delete “Qol” and insert - - QoI - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010, PAGE 25, LINE 12)

In Column 14, Line 5, delete “Qol” and insert - - QoI - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010, PAGE 26, LINE 13)

In Column 14, Line 7, delete “Qol” and insert - - QoI - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010, PAGE 26, LINE 14)

In Column 14, Line 11, delete “Qol” and insert - - QoI - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010, PAGE 26, LINE 17)

In Column 14, Line 13, delete “Qol” and insert - - QoI - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010, PAGE 26, LINE 18)

In Column 14, Line 34, delete “Qol metrics” and insert - - QoI metrics - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010, PAGE 27, LINE 5)

In Column 14, Line 35, delete “Qol measurement.” and insert - - QoI measurement. - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010,
PAGE 27, LINE 5)

In Column 14, Line 37, delete “Qol-such” and insert - - QoI-such - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010,
PAGE 27, LINE 7)

In Column 14, Line 42, delete “Qol.” and insert - - QoI. - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010,
PAGE 27, LINE 10)

In Column 14, Line 43, delete “Qol,” and insert - - QoI, - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 20, 2010,
PAGE 27, LINE 11)

The requested corrections are attached on Form PTO 1050.

Respectfully Submitted

, 2015

DATE

/Ronald J. Ward, Reg#54870/

Ronald J. Ward
Registration No. 54,870
Attorney of Record

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 8,798,006 B2
APPLICATION NO. : 12/973300
DATED : August 5, 2014
INVENTOR(S) : van den Berg et al.

Page 1 of 3

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

On the Title Page, in item (56), under "OTHER PUBLICATIONS", in Column 2, Line 5, delete "bandwifth" and insert -- bandwidth --, therefor.

On the Title Page, in item (57), under "ABSTRACT", in Column 2, Line 7, delete "Qol" and insert -- QoI --, therefor.

In the Specification

In Column 1, Line 8, delete "(Qol)," and insert -- (QoI), --, therefor.

In Column 3, Line 61, delete "Labal" and insert -- Label --, therefor.

In Column 4, Line 33, delete "T. Anjani et al.," and insert -- T. Anjali et al., --, therefor.

In Column 4, Line 36, delete "T. Anjani et al.," and insert -- T. Anjali et al., --, therefor.

In Column 5, Line 36, delete "(Qols)" and insert -- (QoIs) --, therefor.

In Column 5, Line 40, delete "Qol" and insert -- QoI --, therefor.

In Column 5, Line 47, delete "(Qols)" and insert -- (QoIs) --, therefor.

In Column 5, Line 51, delete "Qol" and insert -- QoI --, therefor.

In Column 5, Line 58, delete "(Qols)" and insert -- (QoIs) --, therefor.

In Column 5, Line 62, delete "Qol" and insert -- QoI --, therefor.

In Column 6, Line 4, delete "(Qols)" and insert -- (QoIs) --, therefor.

In Column 6, Line 8, delete "Qol" and insert -- QoI --, therefor.

Signed and Sealed this
Twenty-first Day of April, 2015



Michelle K. Lee
Director of the United States Patent and Trademark Office

CERTIFICATE OF CORRECTION (continued)
U.S. Pat. No. 8,798,006 B2

Page 2 of 3

In Column 6, Line 14, delete “Qol metrics” and insert -- QoI metrics --, therefor.

In Column 6, Line 15, delete “Qol measurement,” and insert -- QoI measurement, --, therefor.

In Column 6, Line 22, delete “(Qol).” and insert -- (QoI). --, therefor.

In Column 6, Line 26, delete “Qol” and insert -- QoI --, therefor.

In Column 6, Line 28, delete “Qols” and insert -- QoIs --, therefor.

In Column 6, Line 33, delete “Qol” and insert -- QoI --, therefor.

In Column 9, Line 63, delete “(Qol),” and insert -- (QoI), --, therefor.

In Column 10, Line 37, delete “(Qol)” and insert -- (QoI) --, therefor.

In Column 10, Line 52, delete “Qol” and insert -- QoI --, therefor.

In Column 11, Line 15, delete “Qol.” and insert -- QoI. --, therefor.

In Column 11, Line 20, delete “Qol” and insert -- QoI --, therefor.

In Column 11, Line 32, delete “Qol” and insert -- QoI --, therefor.

In Column 11, Line 45, delete “Qol” and insert -- QoI --, therefor.

In Column 11, Line 50, delete “Qol” and insert -- QoI --, therefor.

In Column 11, Line 52, delete “Qol.” and insert -- QoI. --, therefor.

In Column 13, Line 30, delete “Qol” and insert -- QoI --, therefor.

In Column 13, Line 32, delete “Qol” and insert -- QoI --, therefor.

In Column 13, Line 34, delete “Qol” and insert -- QoI --, therefor.

In Column 13, Line 44, delete “Qol because the Qol” and insert -- QoI because the QoI --, therefor.

In Column 13, Line 46, delete “Qol” and insert -- QoI --, therefor.

In Column 13, Line 47, delete “Qol” and insert -- QoI --, therefor.

In Column 14, Line 5, delete “Qol” and insert -- QoI --, therefor.

In Column 14, Line 7, delete “Qol” and insert -- QoI --, therefor.

In Column 14, Line 11, delete “Qol” and insert -- QoI --, therefor.

In Column 14, Line 13, delete “Qol” and insert -- QoI --, therefor.

In Column 14, Line 34, delete “Qol metrics” and insert -- QoI metrics --, therefor.

CERTIFICATE OF CORRECTION (continued)
U.S. Pat. No. 8,798,006 B2

Page 3 of 3

In Column 14, Line 35, delete “Qol measurement.” and insert -- QoI measurement. --, therefor.

In Column 14, Line 37, delete “Qol-such” and insert -- QoI-such --, therefor.

In Column 14, Line 42, delete “Qol.” and insert -- QoI. --, therefor.

In Column 14, Line 43, delete “Qol,” and insert -- QoI, --, therefor.

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
 Stylesheet Version v1.2

EPAS ID: PAT6767321

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT
CONVEYING PARTY DATA	
Name	Execution Date
TOSHIBA AMERICA RESEARCH, INC.	06/11/2021
RECEIVING PARTY DATA	
Name:	FOUR BATONS WIRELESS, LLC
Street Address:	14 WALL STREET
Internal Address:	20TH FL
City:	NEW YORK
State/Country:	NEW YORK
Postal Code:	10005
PROPERTY NUMBERS Total: 58	
Property Type	Number
Patent Number:	6999434
Patent Number:	7031278
Patent Number:	7035236
Patent Number:	7039028
Patent Number:	7072340
Patent Number:	7075910
Patent Number:	7139285
Patent Number:	7369576
Patent Number:	7463892
Patent Number:	7502348
Patent Number:	7505433
Patent Number:	7508788
Patent Number:	7576694
Patent Number:	7587598
Patent Number:	7606602
Patent Number:	7720581
Patent Number:	7729325
Patent Number:	7738882
Patent Number:	7768982

Property Type	Number
Patent Number:	7778773
Patent Number:	7826424
Patent Number:	7843867
Patent Number:	7848312
Patent Number:	7860019
Patent Number:	7860978
Patent Number:	7885185
Patent Number:	7899592
Patent Number:	7936719
Patent Number:	7948918
Patent Number:	7974602
Patent Number:	7975300
Patent Number:	8006089
Patent Number:	8036176
Patent Number:	8036192
Patent Number:	8046829
Patent Number:	8073436
Patent Number:	8107960
Patent Number:	8160021
Patent Number:	8165088
Patent Number:	8218512
Patent Number:	8239671
Patent Number:	8270948
Patent Number:	8306026
Patent Number:	8332923
Patent Number:	8385937
Patent Number:	8463308
Patent Number:	8514808
Patent Number:	8554915
Patent Number:	8565185
Patent Number:	8688834
Patent Number:	8717931
Patent Number:	8781473
Patent Number:	8798006
Patent Number:	8817990
Patent Number:	8908540
Patent Number:	8929330
Patent Number:	9046595

Property Type	Number
Patent Number:	9526040

CORRESPONDENCE DATA

Fax Number:
Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.

Phone: 2123237442

Email: skolmykov@kskiplaw.com

Correspondent Name: SERGEY KOLMYKOV

Address Line 1: 305 BROADWAY

Address Line 2: 7TH FL

Address Line 4: NEW YORK, NEW YORK 10007

NAME OF SUBMITTER:	SERGEY KOLMYKOV
SIGNATURE:	/Sergey Kolmykov/
DATE SIGNED:	06/17/2021
	This document serves as an Oath/Declaration (37 CFR 1.63).

Total Attachments: 3
source=Patent Transfer Agreement -Patent Assginment (TARI) TARI sign#page1.tif
source=Patent Transfer Agreement -Patent Assginment (TARI) TARI sign#page2.tif
source=Patent Transfer Agreement -Patent Assginment (TARI) TARI sign#page3.tif

PATENT ASSIGNMENT AGREEMENT

THIS PATENT ASSIGNMENT AGREEMENT (the “Agreement”), is made and entered into this 14 day of June, 2021 (the “Effective Date”), by and between Toshiba America Research, Inc., (“Assignor”), a corporation organized under the laws of the State of Delaware, having offices at 1251 Avenue of the Americas, New York, NY 10020, United States, and Four Batons Wireless, LLC, a limited liability company organized under the laws of the State of Delaware, having offices at 14 Wall Street, 20th Floor, New York, NY 10005, United States (“Assignee”) (each a “Party” and collectively the “Parties”).

WHEREAS, Assignor wishes to assign the United States patents as listed on Schedule A (United States patent properties) hereto (collectively the “Patents”) to Assignee;

WHEREAS, Assignor and Assignee have entered into a Patent Transfer Agreement (the “Transfer Agreement”) dated June 9, 2021, wherein Assignor has agreed to sell and Assignee has agreed to purchase the Patents subject to all prior encumbrances and licenses;

NOW, THEREFORE, in consideration of the mutual covenants and agreements of the Parties and pursuant to the Transfer Agreement, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, it is hereby agreed as follows:

“Encumbrances” means any commitments, patent licenses, immunities, releases or other rights relating to any of the Patents, whether express, implied or otherwise, that are made, entered into or granted by, or that arise from any actions taken by Assignor, any current or former Affiliate of Assignor, or any other Person, on or before the date of this agreement.

I. ASSIGNMENT

1. To all whom it may concern, be it known that for good and valuable consideration, Assignor has sold, assigned, transferred, and set over, and by these presents does sell, assign, transfer, and set over unto said Assignee, subject to all Encumbrances, its whole right, title, and interest in and to all of the Patents, said whole right, title, and interest in and to said Patents including all past, present, and future causes of action and claims for damages derived by reason of patent infringement thereof (to the extent such damages are not already paid, awarded or contractually owed to Assignor, its Affiliates or any predecessor of Assignor or Assignor’s Affiliates), for said Assignee’s own use and for the use of its assigns, successors, and legal representatives to the full end of the term of each of the Patents. For clarity, the foregoing assignment does not include (i) any trademarks, trade dress, trade names, or other indicia of origin; (ii) except for rights in the Patents, any inventions or discoveries, whether patentable or not, or registrations, invention disclosures, patents and applications therefor; (iii) any trade secrets, confidential information or know-how; (iv) any works of authorship, whether copyrightable or not; and (v) any other intellectual property or proprietary rights of Assignor, its Affiliates or any predecessor of Assignor or Assignor’s Affiliates.
1. Assignor hereby authorizes and requests the Commissioner of Patents and Trademarks of the United States and any official of any country or countries foreign to the United States, whose

duty is to issue patents or other evidence or forms of industrial property on applications as aforesaid, to issue the same to Assignee, its successors, assigns and legal representatives, or to such nominees as it may designate.

2. Assignor agrees that, whenever reasonably requested by Assignee and at Assignee's sole cost and expense, Assignor will execute all papers, take all rightful oaths, and do all acts which may be reasonably necessary for vesting title thereto in Assignee, its successors, assigns and legal representatives or nominees.
3. Assignor authorizes and empowers Assignee, its successors, assigns and legal representatives or nominees, to invoke and claim for any application for patent the benefit of the right of priority to the Patents provided by the Paris Convention for the Protection of Industrial Property, as amended, or by any convention which may henceforth be substituted for it, or any other international agreement or the domestic laws of the country in which any such application is filed, as may be applicable, and to invoke and claim such right of priority without further written or oral authorization from Assignor.
4. Assignor hereby consents that a copy of this Agreement shall be deemed a full legal and formal equivalent of any assignment, consent to file or like document that may be required in any country for any purpose and more particularly in proof of the right of Assignee or nominee to claim the aforesaid benefit of the right of priority provided by the Paris Convention for the Protection of Industrial Property, as amended, or by any convention which may henceforth be substituted for it.

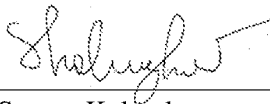
In Testimony Whereof, the Parties, by its fully authorized representatives have executed this Assignment as of the dates indicated below.

Toshiba America Research Inc.

By: 
Name: Hiroyuki Hieda
Title: President

Date: June 11th, 2021

Four Batons Wireless, LLC

By: 
Name: Sergey Kolmykov
Title: General Counsel

Date: June 12, 2021

SCHEDULE A
UNITED STATES PATENTS

US 6,999,434	US 7,974,602
US 7,031,278	US 7,975,300
US 7,035,236	US 8,006,089
US 7,039,028	US 8,036,176
US 7,072,340	US 8,036,192
US 7,075,910	US 8,046,829
US 7,139,285	US 8,073,436
US 7,369,576	US 8,107,960
US 7,463,892	US 8,160,021
US 7,502,348	US 8,165,088
US 7,505,433	US 8,218,512
US 7,508,788	US 8,239,671
US 7,576,694	US 8,270,948
US 7,587,598	US 8,306,026
US 7,606,602	US 8,332,923
US 7,720,581	US 8,385,937
US 7,729,325	US 8,463,308
US 7,738,882	US 8,514,808
US 7,768,982	US 8,554,915
US 7,778,773	US 8,565,185
US 7,826,424	US 8,688,834
US 7,843,867	US 8,717,931
US 7,848,312	US 8,781,473
US 7,860,019	US 8,798,006
US 7,860,978	US 8,817,990
US 7,885,185	US 8,908,540
US 7,899,592	US 8,929,330
US 7,936,719	US 9,046,595
US 7,948,918	US 9,526,040