

Declaration of Bill Lin In Support Of Petition for *Inter Partes* Review of U.S.
Patent No. 8,861,349

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

RED HAT, INC.
Petitioner,

v.

COMPETITIVE ACCESS SYSTEMS INC.
Patent Owner

U.S. Patent No. 8,861,349
Issued: October 14, 2014
Filed: June 22, 2012
Inventor: Eric M DeLangis
Title: Broadband Communications Device

**DECLARATION OF BILL LIN IN SUPPORT OF PETITION FOR *INTER*
PARTES REVIEW
UNDER 35 U.S.C. § 312 AND 37 C.F.R. § 42.104**

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LIST OF EXHIBITS¹

Exhibit No.	Description
1001	Declaration of Bill Lin, Ph.D. in support of <i>Inter Partes</i> Review
1002	<i>Curriculum Vitae</i> of Bill Lin
1003	Certified Copy of U.S. Patent No. 11,582,343
1004	Certified File History of U.S. Patent No. 11,582,343
1005	Certified Copy of U.S. Patent No. 11,418,641
1006	Certified File History of U.S. Patent No. 11,418,641
1007	Certified Copy of U.S. Patent No. 10,868,908
1008	Certified File History of U.S. Patent No. 10,868,908
1009	Certified Copy of U.S. Patent No. 9,350,649
1010	Certified File History of U.S. Patent No. 9,350,649
1011	Certified Copy of U.S. Patent No. 8,861,349
1012	Certified File History of U.S. Patent No. 8,861,349
1013	Certified Copy of U.S. Patent No. 8,228,801
1014	Certified File History of U.S. Patent No. 8,228,801
1015	Certified Copy of U.S. Patent No. 7,606,156
1016	Certified File History of U.S. Patent No. 7,606,156
1017	U.S. Patent Application Publication No. 2004/0001512 A1 (“Challener”)
1018	U.S. Patent Application Publication No. 2003/0026221 A1 (“Kotzin”)
1019	James Carlson, <i>PPP Design, Implementation, and Debugging</i> (2d ed. 2000) (“Carlson”)
1020	Gilbert Held, <i>Network Design Principles and Applications</i> , 2000 (“Held”)
1021	U.S. Patent No. 6,917,960 (“Decasper”)

¹ Unless otherwise specified, citations are to the original page, column, and line numbers in exhibits rather than the PDF page. Citations corresponding to the PDF pagination are indicated in [[brackets]]. Unless otherwise noted, all emphases and annotations are added.

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Exhibit No.	Description
1022	Johnny Chen, <i>New Approaches to Routing for Large-Scale Data Networks</i> (Rice University, 1999) (“Chen”)
1023	Declaration of Sylvia Hall-Ellis
1024	Webster's Ninth New Collegiate Dictionary, 1990
1025	Xin, W., Ishihara, S., and Mizuno, T., <i>A QoS-ensured Transmission Scheme with Content-based Priority for Mobile Cluster Users</i> , 2000 (“Xin”)
1026	U.S. Patent Application Publication No. 2002/0042274 A1 (“Ades”)
1027	U.S. Patent No. 7,003,580 (“Cook”)
1028	U.S. Patent No. 5,625,877 (“Dunn”)
1029	U.S. Patent Application Publication No. 2002/010866 A1 (“McCullough”)
1030	Candace Leiden & Marshall Wilensky, <i>TCP-IP for Dummies</i> (3d ed. 1999) (“Dummies”)
1031	U.S. Patent Application Publication No. 2003/0223450 A1 (“Bender”)
1032	U.S. Patent Application Publication No. 2004/0022224 A1 (“Billhartz”)
1033	Hung-Yun Hsieh & Raghupathy Sivakumar, <i>A Transport Layer Approach for Achieving Aggregate Bandwidths on Multi-homed Mobile Hosts</i> (2002) (“Hsieh”)
1034	U.S. Patent No. 6,778,495 (“Blair”)
1035	Cisco Systems, Inc., <i>Troubleshooting Async Multilink PPP Operations</i> (2001) (“Cisco”)
1036	U.S. Patent Application Publication No. 60/377,631 (“Tucker”)
1037	Konishi et al., <i>Web SHAKE: A fast WWW access method for mobile terminals on temporary cluster networks</i> , IEEE Proceedings April 28-May 2, 2002 (“Konishi”)
1038	RFC 1990: The PPP Multilink Protocol (MP), August 1996
1039	<i>Competitive Access Systems, Inc. v. Oracle Corporation, and Oracle America, Inc.</i> , 1:23-ca-00286-ADA, Dkt. 82 (W.D.TX. Aug. 10, 2023)
1040	<i>Red Hat, Inc. v. Competitive Access Systems, Inc.</i> , 4:24-cv-00130-D, Dkt. 1 (E.D.N.C. Sep. 3, 2024)

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Exhibit No.	Description
1041	<i>Red Hat, Inc. v. Competitive Access Systems, Inc.</i> , 4:24-cv-00130-D, Dkt. 1-10 (E.D.N.C. Sep. 3, 2024)
1042	Lai et al., <i>Measuring Bandwidth</i> , IEEE (1999)
1043	RFC 2663: IP Network Address Translator (NAT) Terminology and Considerations, August 1999
1044	U.S. Patent No. 5,878,040 (“Peirce”)
1045	“A Novel Mechanism for Data Streaming Across Multiple IP Links for Improving Throughput and Reliability in Mobile Environments,” IEEE INFOCOM 2002 (“Phatak”)
1046	RFC 2543: SIP: Session Initiation Protocol, March 1999
1047	RFC 2131: Dynamic Host Configuration Protocol, March 1997
1048	RFC 1945: Hypertext Transfer Protocol – HTTP/1.0, May 1996
1049	Endler, David, <i>Brute-Force Exploitation of Web Application Session IDs</i> , iALERT White Paper, Nov. 1, 2001 (“Endler”)
1050	Rappaport, Theodore S., et al., <i>Wireless Communications and Application Above 100 GHz: Opportunities and Challenges for 6G and Beyond</i> , IEEE Access, Vol. 7, 2019 (“Rappaport”)
1051	Reex. Control No. 90/019,265
1052	Gast, Matthew S., <i>802.11 Wireless Networks – The Definitive Guide</i> , 2002
1053	Shoemake, Matthew B., <i>Wi-Fi (IEEE 802.11b) and Bluetooth CoExistence Issues and Solutions for the 2.4 GHz ISM Band</i> , Texas Instruments, Feb. 2001, Ver. 1.1
1054	Furuskär, Anders, et al., <i>EDGE: Enhanced Data Rates for GSM and TDMA/136 Evolution</i> , IEEE Personal Communications, June 1990
1055	RFC 2326: Real Time Streaming Protocol (RTSP), April 1998
1056	Random House Webster’s Computer & Internet Dictionary, 3 rd ed., December 1998
1057	Andrew S. Tanenbaum, Computer Networks, Chps. 1 & 5 (3d ed. 1996)
1058	Adolfo Rodriguez <i>et al.</i> , TCP/IP Tutorial and Technical Overview, Chps. 1 & 14 (Prentice Hall PTR 2002)

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Exhibit No.	Description
1059	Richard O. LaMaire, et al., <i>Wireless LANs and Mobile Networking: Standards and Future Directions</i> , IBM, May 31, 1996

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I, Bill Lin, hereby declare as follow:

I. ASSIGNMENT

1. I have been retained as an expert witness on behalf of Red Hat, Inc. (“Red Hat”) to offer technical opinions regarding whether the claims of U.S. Patent No. 8,861,349 (“the ’349 Patent”) (Ex. 1011), would have been invalid to one of ordinary skill in the art as of October 15, 2002 in connection with the above-captioned Petition for *Inter Partes* Review (“IPR”).

2. For the purposes of my Declaration, I have been asked to assume that the priority date of the alleged invention recited in the ’349 Patent is October 15, 2002 (hereinafter the “Priority Date”).

3. I am not currently, and never have been, an employee of Red Hat. I received no compensation for this Declaration beyond my normal hourly compensation based on my time actually spent analyzing the ’349 Patent, the prior art cited below, and issues related thereto. I will not receive any added compensation based on the outcome of any IPR or other proceeding involving the ’349 Patent. I have no financial interest in Red Hat.

4. In forming the opinions expressed in this Declaration, I have also relied on my academic and professional experience. I also considered the viewpoint of a person having ordinary skill in the art as of the time of the alleged invention of the Challenged Patents. I also relied on the ’349 Patent and its file history, the reference

and other documents cited in the petition and in the declaration, as well as on the exhibits in the exhibit list.

II. BACKGROUND AND QUALIFICATIONS

5. I am an expert in the field of computer engineering and have been an expert in that field since before the Asserted Patents were filed. A copy of my curriculum vitae and prior testimony is attached to this report (Ex. 1002) and provides a comprehensive description of my relevant experience, including my academic and employment history, publications, professional activities, and speaking engagements.

6. I received a B.S. in Electrical Engineering and Computer Sciences from the University of California, Berkeley, in 1985. I received an M.S. in Electrical Engineering and Computer Sciences in 1988 and a Ph.D. in Electrical Engineering and Computer Sciences in 1991, both from the University of California, Berkeley.

7. I am currently a Full Professor and the Department Chair of Electrical and Computer Engineering at the University of California, San Diego (“UCSD”), where I have been a professor since 1997.

8. At UCSD, my teaching and research has focused on computer architecture and computer networking problems, including the design of multiprocessor and multi-core processor architectures, multiprocessor and multi-core processor interconnection buses and networks, network processors, system-on-

chips, and data networks. I regularly teach senior-level design courses on advanced FPGA designs and the design of advanced processors, and I have taught graduate courses in hardware/software co-design and advanced special topics in computer architecture.

9. At UCSD, I am a Principal Investigator in the UCSD Center for Wireless Communications (CWC). CWC brings together researchers to work on a range of challenges in the design of future wireless communications systems. My contribution to CWC has been expertise in the design of multi-core processor architectures for wireless communications and mobile computing. I am also a Principal Investigator in the UCSD Center for Networked Systems (CNS). CNS brings together researchers to work on a range of challenges in the design of computer architecture solutions for packet processing and computer networking.

10. Before joining UCSD, I led the System Control and Communications Group at IMEC, Europe's largest independent microelectronics and information technology research center. At IMEC, I led a research team working on VLSI architecture, system design, and circuit techniques for system-on-chip applications. I also previously held positions at Hewlett Packard, Hughes Electronics, and Western Digital.

11. During my career, I have received or worked on research efforts that received millions of dollars in research funding from both government agencies and

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industry, including funding for research in multi-core processor design, hardware/software co-design, packet processing, and computer networks.

12. I have authored numerous publications, including books, chapters in books, and journal papers, and I have presented numerous invited lectures and keynote presentation around the world. A number of my publications have received best paper awards or distinguished paper citations, including best paper awards in the IEEE Transactions on VLSI Systems and the ACM/IEEE Design Automation Conference, and I have also been awarded five patents.

13. I have served as an Associate or Guest Editor for several prestigious journals published by the Association for Computer Machinery (“ACM”) and the Institute of Electrical and Electronics Engineers (“IEEE”). I have also served on the Editorial Board of the International Journal of Embedded Systems. Further, I have served as General Chair of several ACM/IEEE conferences, and on the Organizing or Steering Committees of many ACM/IEEE conferences, including the ACM/IEEE Symposium on Networks-on-Chips (NOCS) and the ACM/IEEE Symposium on Architectures for Networking and Communication Systems (ANCS). I have served on the Technical Program Committees of over 45 ACM/IEEE conferences.

III. UNDERSTANDING OF PATENT LAW

14. I am not an attorney, but I have been provided with an understanding of the patent law relevant to conducting the analysis given in this report. The following represents a summary of my understanding of these issues.

15. I have been informed and understand that patent claims are construed from the perspective of a person of ordinary skill in the art (“POSITA”) at the time the claimed invention was made and that, during this proceeding, terms are ordinarily to be given their plain and ordinary meaning as would be understood by a POSITA. I understand that this is the same standard as would be applied in District Court litigation.

16. I understand that claims in an IPR are construed under the case *Phillips v. AWH Corp.*, 415 F.3d 1303, decided by the Federal Circuit in 2005. I understand that under the rule in *Phillips*, words of claims are given their plain and ordinary meaning as understood by a person of ordinary skill in the art in view of the specification and prosecution history, unless those sources show an intent to depart from such meaning. No terms need to be construed for the purposes of this declaration. I reserve the right to respond to any constructions offered by the Patent Owner or adopted by the Board.

17. I understand that in IPR a claim is unpatentable if it is anticipated or obvious. Anticipation of a claim requires that every element of a claim be disclosed

expressly or inherently in a single prior art reference, arranged in the prior art reference as arranged in the claim. An element is inherent if it is necessarily present in the reference.

18. It is my understanding that a patent claim is unpatentable for obviousness if the claimed invention would have been obvious at the time the invention was made to a person having ordinary skill in the art.

19. I understand that, for the purpose of an IPR, the Board may only consider anticipation or obviousness based on prior printed publications or prior patents and patent applications. I understand that a publication is prior art under § 102(a) if that publication was known or used by others in the U.S., or was patented or published anywhere, prior to the date of invention of the '349 Patent. I understand that a publication is prior art under § 102(b) if that publication was patented or published anywhere, or was in public use, on sale, or offered for sale in this country, more than one year prior to the earliest U.S. filing date of the '349 Patent. I understand that a patent or patent application is prior art under § 102(e) if that patent or published patent application has an effective filing date that is prior to the date of invention of the '349 Patent.

20. I have been informed and understand that the subject matter of a patent claim is obvious if the differences between the subject matter of the claim 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 the subject matter pertains. I have also been informed that the framework for determining obviousness involves considering the following factors: (i) the scope and content of the prior art; (ii) the differences between the prior art and the claimed subject matter; (iii) the level of ordinary skill in the art; and (iv) any objective evidence of non-obviousness.

21. I further understand that a claim can be found obvious if it unites old elements with no change to their respective functions or alters prior art by mere substitution of one element for another known in the field, with that combination yielding predictable results. While it may be helpful to identify a reason for this combination, common sense should guide, and there is no rigid requirement for a teaching, suggestion, or motivation to combine. When a product is available, design incentives and other market forces can prompt variations of it, either in the same field or different one. If a person having ordinary skill in the relevant art can implement a predictable variation, obviousness likely bars patentability. Similarly, if a technique has been used to improve one device, and a person having ordinary skill in the art would recognize that the technique would improve similar devices in the same way, use of the technique is obvious. I further understand that a claim may be obvious if common sense directs one to combine multiple prior art references or add missing features to reproduce the alleged invention recited in the claims.

22. I also understand the following rationale may support a finding of obviousness:

- a. Combining prior art elements according to known methods to yield predictable results;
- b. Simple substitution of one known element for another to obtain predictable results;
- c. User of known technique to improve similar devices (methods, or products) in the same way;
- d. Applying a known technique to a known device (method, or product) ready for improvement to yield predictable results;
- e. “Obvious to try” — choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;
- f. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art;
- g. Some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

23. I also understand that it is impermissible to use the claimed invention itself as a blueprint for piecing together elements in the art. In other words, it is impermissible to use hindsight reconstruction to pick and choose among disclosures in the prior art to reconstruct the claimed invention.

24. I understand that so-called “secondary considerations of nonobviousness,” must be considered in an obviousness analysis. I understand that an analysis including these secondary considerations helps to prevent the forbidden use of hindsight in determining whether a patent claim is obvious. I understand that secondary considerations of non-obviousness include, among others: (a) a long-felt but unresolved need for the invention; (b) commercial success of the invention; (c) copying of the invention; (d) praise and recognition of the invention by others; (e) licensing of the rights to the invention; and (f) unexpected results.

25. In rendering my opinions, I followed these guidelines.

IV. SUMMARY OF OPINIONS

26. I have reviewed and agree with the analysis in the Petition for IPR of the '349 Patent. It is my opinion that each and every Challenged Claim would have been obvious to a person of ordinary skill in the art (“POSITA”) at the time of the alleged invention in view of the knowledge of a POSITA and prior art cited in the Petition and as further explained in this declaration.

27. It is my opinion that claims 1-20 are anticipated or obvious in view of Challenger (Ex. 1017) (Ground I).

28. It is my opinion that claims 1-20 are anticipated or obvious in view of Kotzin (Ex. 1018) (Ground II).

V. OVERVIEW OF THE TECHNOLOGY

29. I have read and agree with the technology overview in the Petition.

VI. THE '349 PATENT

A. Claims

30. The '349 Patent, titled "Broadband Communications Device," issued from U.S. Patent Application No. 12/531,294 ("294 Application"), which claims priority to Provisional Application No. 60/418,521 ("521 Application"), filed on October 15, 2002. The '349 Patent discloses devices and methods for combining voice, data, and video communications and transmitting these communications over multiple paths, thereby increasing available bandwidth and data throughput.

31. The '349 patent has 20 claims of which claims 1, 13, 16, and 20 are independent claims. The independent claims are directed to methods and devices for increasing bandwidth and data throughput.

32. Independent claim 1 of the '349 Patent claims a method for increasing bandwidth and data throughput. Claim 1 is reproduced below:

A method for increasing bandwidth and data throughput
comprising the steps of:

sending a multilink request from a first device to a second device to join a multilink connection, the first device being connected at a first location to a network, the second device being connected at a second location to the network, the second location being geographically separate from the first location, the first device and the second device being configured for accessing the network; and

when the multilink request is accepted by the second device, receiving at the first device first data from the network at the first location and during the multilink connection, concurrently receiving second data over a wireless connection from the second device, the second data being received at the second location from the network.

Ex. 1011, claim 1.

33. Independent claim 13 of the '349 Patent claims a device comprising an interface and processor. Claim 13 is reproduced below:

A device comprising:

an interface that establishes a network connection at a first location to a first network and receives first data packets over the network connection;

a wireless interface that is configured to establish a wireless connection to a remote communications device, the remote communications device being connected at a second location to a second network; and

a processor that sends a multilink request over the wireless interface to the remote communications device to join the multilink connection, receives from the interface the first data packets from the first network and when the multilink request is accepted by the remote communications device,

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concurrently receives from the wireless interface second data packets from the second network, the second data packets being received at the second location from the second network.

Ex. 1011, claim 13.

34. Independent claim 16 of the '349 Patent claims a method for providing broadband communications services. Claim 16 is reproduced below:

A method for providing broadband communications services, comprising:

sending to a remote host an inquiry in whether the remote host is able to support a multilink connection;

receiving first data packets over a first connection to the Internet;

when the remote host indicates that the multilink connection is supported, receiving second data packets over a second connection, the first data packets being concurrently received with the second data packets during the multilink connection; and

wherein the first data packets create a first data stream and the second data packets create a second data stream.

Ex. 1011, claim 16.

35. Independent claim 20 of the '349 Patent claims a method for increasing bandwidth and data throughput. Claim 20 is reproduced below:

20. A method for increasing bandwidth and data throughput comprising the steps of:

sending a multilink request from a first device to a second device to join a multilink connection the first device being

connected at a first location to a first network, the wireless device being connected at a second location to the first network or a second network, the second location being geographically separate from the first location; and

when the multilink request is accepted by the second device, receiving at the first device first data from the first network at the first location and during the multilink connection, concurrently receiving second data over a wireless connection from the wireless device, the second data being received at the second location from the first network or the second network.

Ex. 1011, claim 20.

B. Specification

36. According to the specification, Local Exchange Companies, (“LECs”) had a “strangle hold” over “the ‘last mile’ of copper over which almost all residential customers receive their communications services.” Ex. 1011, 1:18-22. Competitive Local Exchange Companies (“CLECs”) worked to resell existing services offered by LECs but were not able to truly compete in the market. *Id.* 1:34-51. To attract customers, companies were attempting to provide Voice Over IP services (VoIP) “over high-speed or broad-band backbones just as DSL and cable modems, over Internet connections via a computer.” *Id.* 2:2-5. However, as the specification explains, the high-speed services required enhancing infrastructure to the local telephone companies’ facilities and cable plants, which is very expensive. *Id.* 2:5-8. The high-speed services also required installing expensive modems at the customer’s end. *Id.* These services were also difficult to install and were hard to use for the

average user so were primarily provided to corporate markets rather than residential users. *Id.* 2:12-22. While residential users could obtain high speed services through DSL and cable modems, the specification deems these solutions a failure because they “reach only a small segment of the population” and many DSL service providers failed during the collapse of the internet boom. *Id.* 2:19-25. Accordingly, the specification identifies a need for residential customer access to higher speed connections that do not require DSL, cable modems, or replacing last mile communication infrastructure.

37. To address this problem in the art, the '349 Patent proposes using a specialized Residential Communications Gateway (“RCG”), which is a stand-alone external device that having the capabilities and features of “IP routers, Class 5 circuit switches and wireless LANs in a small stand-alone external modem like device.” *Id.* 2:29-33. The RCG has additional capabilities of a hands-free speakerphone device with a touch display, which can provide video telephone services. *Id.* 2:31-36.

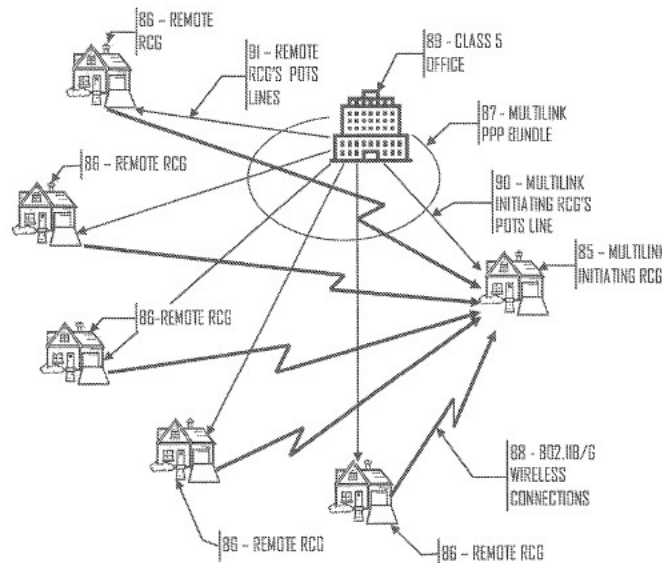
38. The alleged benefit of the RCG is that a Competitive Local Exchange Company (CLEC) can offer a variety of services to customers using the existing POTS line, and it doesn't require the expensive enhancements of the network infrastructure like DSL and Cable services. The specification further explains that the RCG can be readily deployed to quickly expand CLEC customer bases because extra equipment is not needed. *Id.* 3:1-15. Indeed, the specification states that “[t]he

RCG is designed to enhance, not replace, the existing phone line, enabling it to provide new combined packetized voice and data services” and will “continue to work seamlessly” with “all existing telecommunications infrastructure.” *Id.*, 3:16-20-36.

39. The specification describes an RCG receiving data over at least two separate communication paths and combines the paths to increase bandwidth. *Id.*, Abstract. It further indicates that the RCG has “a main system processor that is responsible for all housekeeping and traffic routing tasks.” *Id.* 2:62-64. The specification further explains that the RCG can be placed in a residence and be connected to a POTS line (a telephone line) coming from the Local Exchange Carrier (LEC). *Id.* Devices like telephones, FAX machines, computers, or Local Area Network (LAN) can be connected to the RCG via the built in Universal Serial Bus (USB) or the Ethernet interface. *Id.*, 2:37-44.

40. The RCG also “implements broadband” over POTS by using an 802.11b/g wireless interface to configure a PPP multilink bundle. *Id.* 11:2-4. The specification, however, clarifies that “[a]ny wireless interface scheme can be used to implement this device” and “[t]here is nothing special or specific to the 802.11 wireless interface that makes it particularly suited to this application.” *Id.* 11:15-18. The specification also explains that an individual RCG is also “used to provide a peer-to-peer wireless home networking environment to other 802.11 compatible

wireless component within the residence” while also “acting as an always on dialup Internet gateway[.]” *Id.* 11:19-24. During data transmission, in order to gain greater bandwidth, an RCG can request that other RCGs assist in transferring data by using their respective POTS lines. *Id.* 11:24-27. For example, Figure 7 shows “an ad-hoc wireless LAN configuration with ppp multilink data distribution and wireless connectivity.”



Id., 4:8-9, Fig. 7.

41. Elements like wired and wireless networks, residential voice and data services, including IP routers, Class 5 circuit switches, and wireless LANs, sharing and dynamically routing and allocating bandwidth including through standardized methods like Multilink PPP, sending packets and allocating bandwidth through protocols like the Link Control Protocol for Multilink PPP, and routing tables such

as those available in IP router devices were well known in the art at that time. Indeed, the specification itself confirms these elements were widely used in the communications field. *See id.*, 2:45-60 (describing wired and wireless networks and stating an RCG can be connected to a telephone line, LAN through a USB, firewire, or Ethernet ports and various devices through 802.11b/g interface for wireless communication), 1:15-18, 2:29-44, 3:1-3 (stating an RCG's primary function is to compete with existing companies for residential voice and data services and explaining that an RCG combines capabilities of IP routers, Class 5 circuit switches and wireless LANs), 11:2-18 (describing a well-known 802.11 b/g interface used to configure multilink PPP bundle consistent with RFC 1990 protocol to share and dynamically route and allocate bandwidth), 11:1-14:25 (describing well-known Link Control and Multilink PPP protocols for sending packets and allocating bandwidth), 14:54-65 (describing routing tables used by IP router devices).

C. Prosecution History

42. I have reviewed the prosecution history of the '349 Patent. The applicant originally submitted 20 apparatus claims all directed to communications devices aggregating data. Ex. 1012. Claim 1, in the version that was originally submitted by the applicant is reproduced below:

1. A communications device that is capable of providing broadband communications services, comprising:

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a wireless interface for connecting wirelessly to at least two remote communications devices; and

a processor that requests the at least two remote communications devices to assist in transferring data and aggregates the data from the at least two remote communications devices.

Id. at [[36]] (Patent Application, June 22, 2012).

43. I understand that during prosecution, the Examiner considered several prior art references, including Barany (U.S. Patent No. 7,068,623), Cain (U.S. Patent Application No. 20030202468), Leung (U.S. Patent Application No. 20030063591), Takahashi (U.S. Patent No. 6,941,151), Vehvilainen (U.S. Patent No. 7,426,316), Souisse (U.S. Patent Application No. 0020102987), Miloushev (U.S. Patent No. 7,562,110), Bi (U.S. Patent No. 7,113,173), Xu (U.S. Patent Application No. 20090150924), Jost (U.S. Patent 7,653,089). *See generally id.* During the prosecution of the '349 Patent, the references presented in Grounds I, IIA, and IIB of the Petition were not submitted by the Applicant to the USPTO, nor were they independently considered by the Examiner.

44. The Examiner rejected the application several times. For example, the Examiner issued a Final Rejection in December 2013, where the Examiner concluded Claims 17-23, 25-29 and 35-42 fail to comply with the enablement requirement of 35 U.S.C. 112, first paragraph. *Id.* at [[147]]-[[149]]. (Final

Rejection, Dec. 30, 2013). In particular, the examiner noted, the specification fails to disclose “concurrently receiving” data. *Id.*

45. In the response, the Applicant explained the meaning of the term “concurrently receiving.” The Applicant contended “concurrently receiving” means to “receive data over many different links at the same time.” *Id.* at [[166]] (Applicant Response March 11, 2014). Applicant further stated that in one embodiment “concurrently receiving” is referred to as a “Multilink PPP Connection” and it “is inherent in a ‘multilink PPP connection’ that the multilink initiating RCG 85 receives data concurrently thereby fulfilling one of the main purposes of the invention which is to increase bandwidth for a particular location.” *Id.* at [[167]].

46. The Examiner also issued a Final Rejection in August 2014, where the Examiner concluded Claims 17-23, 25-29, 35-37, and 39-43 fail to comply with enablement requirement of 35 U.S.C. 112, first paragraph. *Id.* at [[676]] (Final Rejection, Aug. 21, 2014). In particular, the examiner found that the specification fails to describe “sending multilink request from a first device to a second device to join a multilink connection,” which is present in claims 17, 35, and 43. *Id.* Further, the specification fails to describe “sending to a remote host an inquiry in whether the remote host is able to support a multilink connection,” which is present in claim 39. *Id.* at [[677]].

47. In the response, the Applicant further clarified that “multilink connections are described over sixty times throughout the specification” and by the term “multilink,” the Applicant meant what was cited in its specification. *Id.* at [[695]] (Applicant Response, Aug. 25, 2014). The specification is limited to multilink PPP, therefore, the applicant conceded the term multilink refers to “multilink PPP.” *See id.*, *see generally* Ex. 1011.

48. The Examiner issued a notice of allowance on September 8, 2014, without stating the reasons for allowance. *See* Ex. 1012 at [[706]] (Notice of Allowance, Sept. 8, 2014). The Patent issued on October 14, 2014. *Id.* at [[711]] (Issue Notification, Sept. 24, 2014).

49. I understand that the Examiner did not consider any of the prior art references now presented in the Petition for *inter partes* review of the '343 Patent.

50. As I discuss below, the Challener and Kotzin references both teach the claim limitations that the Examiner found missing from the cited prior art.

D. Person of Ordinary Skill in the Art

51. I understand that there are multiple factors relevant to determining the level of ordinary skill in the pertinent art, including the educational level of active workers in the field at the time of the alleged invention, the sophistication of the technology, the type of problems encountered in the art, and the prior art solutions to those problems.

52. In determining the characteristics of a hypothetical person of ordinary skill in the art of the '349 Patent at the time of the alleged invention, I considered several factors, including the type of problems encountered in this field, the swiftness with which innovations were made, the sophistication of the technology involved, and the educational background that would be necessary to understand the '349 Patent. Finally, I placed myself back in the relevant periods of time and considered the state of the art and the level of skill of those working in this field at those times.

53. In my opinion, taking all of the factors into account, a person of skill in the art for the '349 Patent would have had at least a bachelor's degree in electrical engineering, computer science, or a related field, and at least one year of experience with network design. Individuals with different education and additional experience could still be of ordinary skill in the art if that additional experience compensates for a deficit in their education and experience.

54. I also note that my opinions provided in this Declaration would not change in view of any minor modifications to this level of skill.

VII. CLAIM CONSTRUCTION

55. I understand that for the purposes of this *inter partes* review, the claims are to be construed under the so-called *Phillips* standard, under which claim terms are given their ordinary and customary meaning as would be understood by one of

ordinary skill in the art in light of the specification and prosecution history, unless the inventor has set forth a special meaning for a term.

56. I further understand that pursuant to 37 C.F.R. § 1.906, in *IPR* proceedings, claims are evaluated based on the requirements of 35 U.S.C. § 112 only with respect to subject matter added or deleted in the reexamination proceedings themselves. For example, it is my understanding that indefiniteness of a claim term cannot be raised in an *IPR*. Accordingly, I have not considered §112 challenges for this declaration, but I reserve the right to do so in litigation or any other forum. The fact that I have sought to express a meaning for each claim, or not otherwise challenged the definiteness of any terms, is not a concession that the term is not indefinite, and I reserve the right to render my opinion in litigation that certain limitations are indefinite.

57. In my view, there is no need to construe any terms for the purpose of the Petition or my Declaration. If Patent Owner raises claim construction arguments, I reserve the right to respond. Additionally, I reserve the right to render my opinion on claim construction in litigation.

VIII. OVERVIEW OF THE PRIOR ART

58. I have read the and agree with the characterization of the prior art in the Petition.

IX. SPECIFIC GROUNDS FOR PETITION UNDER 37 C.F.R. § 42.104(B)

A. Ground I: Claims 1-20 are Or Obvious in View of Kotzin

59. I do not provide in this Declaration a mapping of each claim limitation to the prior art. I have read and agree with the prior art mapping provided in Section VII of the petition, and incorporate this mapping herein by reference.

60. Instead, for each Ground, I discuss herein specific claim limitations where I believe context from the perspective of a POSITA would be helpful the Board.

1. Independent Claim 1

a. [1.pre.] “A method for increasing bandwidth and data throughput comprising the steps of:”

61. It is helpful for me to provide additional explanation regarding term “increasing data throughput.” In my opinion, a POSITA would have found it obvious that increased bandwidth increases “data throughput.” Indeed, “[t]he most popular technique [for measuring bandwidth] is to use throughput as an approximation of bandwidth.” Ex. 1042 at 236. Held confirms as much. EX1020, 495 (“*Capacity or throughput* is the measure of the network size and can be measured in terms of bandwidth[.]”). It was well known in the art at the time of the alleged invention that bandwidth measures data transfer capacity and “throughput” measures “the amount of data a transport protocol like TCP can transfer per unit of time.” *See id.* Thereby, a POSITA would have understood that increasing bandwidth increases links’ ability

to transport more data. Accordingly, a POSITA would have found it obvious that increasing bandwidth also increases throughput.

62. Moreover, “method[s] for increasing bandwidth and data throughput” were widely known at the time of the alleged invention. Multiple prior art references describe methods to increase bandwidth and data throughput and mention Multilink PPP specifically. For example, Multilink PPP protocol (RFC 1990) (Ex. 1038), which has been released as early as in 1996, aimed to “coordinate multiple independent links” and provide “**a virtual link with greater bandwidth than any of the constituent members.**” Ex. 1038 at 2-4, *see also* Ex. 1020, 200-01 (PPP multilink “allows **aggregation of channels** of any type at any speed.”). Indeed, the ’349 Patent specification itself mentions the Multilink PPP as one of the existing methods for increasing bandwidth and data throughput. Ex. 1011, 11:1-5.

- b. *[1.1] sending a multilink request from a first device to a second device to join a multilink connection, the first device being connected at a first location to a network, the second device being connected at a second location to the network, the second location being geographically separate from the first location, the first device and the second device being configured for accessing the network; and;*

63. I provide here additional context regarding the term “geographically separate.” Kotzin explains that “the wireless apparatus 106a-106n may be subscriber radios on completely different WAN systems” and further only requires that the units are in “close enough proximity to allow wireless local area network

communication.” Ex. 1018, ¶¶ [0022], [0035]. A POSITA would understand this to mean the wireless units are at geographically separate locations. Kotzin further notes that its wireless units may be mobile units would have obviously been at different geographic locations to a POSITA, such as PDAs, handheld units, and laptops. *Id.*, ¶ [0022], Accordingly, in my opinion, Kotzin discloses the limitation that wireless units can access the network from geographically separate locations.

64. To the extent that Kotzin does not expressly teach geographically separate units, it would have been obvious to modify Kotzin’s system so that both locations are geographically separate. Kotzin teaches that a plurality of wireless units 106 that use a short-range wireless system 102 for sharing their bandwidth resources. The short-range wireless system 102 described in Kotzin, is a wireless LAN using “one or more” base stations as access points. Ex. 1018, ¶ [0035]. In my opinion, it was well-known to a POSITA that a wireless LAN would use multiple geographically separate network access points, access point A and B, and depicted on the illustration below.

65. Kotzin teaches that a plurality of wireless units 106 that use a short-range wireless system 102 for sharing their bandwidth resources. The short-range wireless system 102 described in Kotzin, is a wireless LAN using “one or more” base stations as access points. Ex. 1018, ¶ [0035]. In my opinion, it was well-known

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to a POSITA that a wireless LAN would use multiple geographically separate network access points, access point A and B, and depicted on the illustration below.

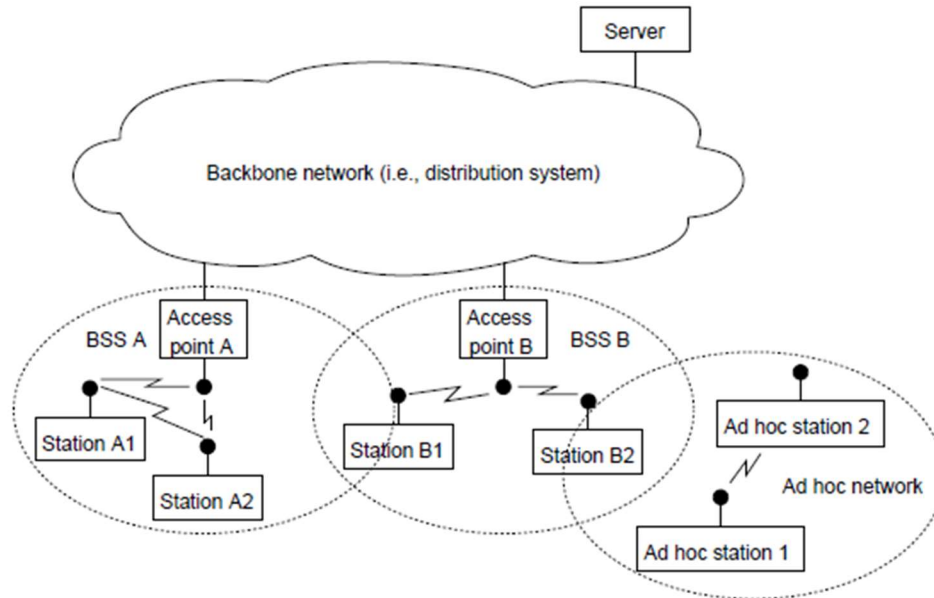


Figure 1: Wireless architecture.

66. Ex. 1059 (LaMaire, *Wireless LANs and Mobile Networking: Standards and Future Directions*, <https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=c4db5635a39ce7be51b6ce817f286cae40bdb250>) at 4.

67. Further, it was well known in the art that a wireless architecture with multiple access points was created to enable extended coverage of building or campus areas, for example, by providing overlapping radio coverage areas. *Id.* at 3. Accordingly, it was well known that a first wireless device can connect to the network at one part of a campus and a second wireless device to connect to the

network at a second part of the campus. Thus, the wireless devices would connect to network access points at locations, which are geographically separate.

2. Dependent Claim 6

- a. [6.2] *“when another multilink request is accepted by the third device, concurrently receiving third data during the multilink connection over a second wireless connection between the first device and the third device.”*

68. It is helpful for me to discuss that POSITA’s understanding that, when another multilink request is accepted by a wireless unit (e.g. UNIT 106C), for example, UNIT 106A may also concurrently receive that data. Kotzin teaches that each of the wireless units 106a-106n, in one embodiment, “includes both a wireless local area network communication transceiver, such as a Bluetooth™-based transceiver, and a wireless wide area network transceiver, such as a CDMA cellular transceiver.” EX1018, ¶[0022]; *see also* ¶[0003], and ¶[0035]. Indeed, devices with both 802.11 and Bluetooth interfaces were commonplace in the 2002 timeframes. Ex. 1045, 773 (“For instance, host *A* might be a laptop at an airport with access to the Internet via an 802.11 LAN (say interface A_1), a Bluetooth scatternet (A_2), and a cellular phone modem (A_3)).

3. Dependent Claim 8

- a. [8] *“The method of claim 1, wherein the first data and the second data are received as data packets.”*

69. It is helpful for me to explain here sending data as data packets. While Kotzin does not use the explicit term “packet,” the context and the described

methods/systems make it clear that packet-based communication is the intended environment. Kotzin describes splitting information into subsets to be sent to different proximal units, which then forward these subsets to the destination node. *See e.g.*, Ex. 1018 ¶ [0018]. This process is characteristic of packet-based communication, where data is divided into discrete units (packets) for transmission and later reassembled. Kotzin is described as operating over wireless LANs (such as Bluetooth, 802.11) and WANs (such as cellular networks, the Internet)—and Bluetooth, 802.11, data services for cellular networks, and the Internet are all fundamentally packet-based communication systems. *Id.*, ¶ [0022]; *see* EX1052 (802.11 Wireless Networks – The Definitive Guide 2002) at 54 (“Figure 3-13 shows how 802.2 LLC encapsulation is used to carry an *IP packet*.”); EX1053 (Shoemake-Wi-Fi and Bluetooth) at 14 (“Since acknowledgements are embedded Bluetooth *packets*, throughput can be improved by hopping through a sequence of good hop frequencies and thereby not needlessly retransmitting any data due to lost acknowledgements.”); EX1054 (Furuskar – Edge Enhanced Data Rates for GSM) (“The current GSM standard provides data services with user bit rates up to 14.4 kbps for circuit switched data and up to 22.8 kbps for *packet data*.”); EX1055 (Rappaport et al-Wireless Communications) (“Tantivy Communications, of Melbourne, FL, has developed an alternative approach to *packet-based CDMA* that also exploits the wireless channel using phased-array antennas.”); EX1058, 27

(“Protocols such as Bluetooth, IEEE 802.11, and Wireless Application Protocol (WAP) are paving the way towards a wireless Internet.”), 520 (listing GSM and CDMA as included in WAP)..

70. Thus, to the extent that Kotzin does not expressly disclose sending packets of the data, it would have been obvious to do so when operating over wireless LANs (such as Bluetooth, 802.11) and WANs (such as cellular networks, the Internet), all of which are inherently packet-based communication systems. Ex. 1018, ¶ [0022]. Further, per Kotzin disclosure, a POSITA would have found obvious to send packets of data, because GSM and CDMA networks—disclosed in Kotzin—also use packet-based communication. *Id.*, ¶ [0003].

4. Dependent Claim 12

- a. [12] “The method of claim 1, wherein the wireless connection is a cellular connection, a satellite connection, a Wi-Fi connection, a WiMax connection or a Bluetooth connection.”*

71. It is helpful for me to note that Kotzin teaches that the wireless LAN system used by wireless proximal units is “compliant, for example, with the Bluetooth™ standard, or any other suitable short range communication protocol including, but not limited to, 802.11 or optical communication protocols.” Ex. 1018, ¶ [0022]. Accordingly, a POSITA would have found it obvious that the wireless connection can be Bluetooth connections.

5. Independent Claim 13

- a. [13.4] “receives from the interface the first data packets from the first network and when the multilink request is accepted by the remote communications device, concurrently receives from the wireless interface second data packets from the second network, the second data packets being received at the second location from the second network.”

72. In my opinion, a POSITA would have understood the “*second data packets being received at the second location from the second network.*” As I discussed above in Section IX.A.1, pursuant to Kotzin’s disclosure, device 106a can receive data from devices 106b-106n and “the wireless apparatus 106a-106n may be subscriber radios on completely different WAN systems.” Ex. 1018, ¶ [0035].

6. Dependent Claim 15

- a. [15] “The device of claim 13, wherein the device is part of a home-based network system.”

73. I provide here additional context for POSITA understanding why Kotzin’s wireless LAN would be used as a home-based network system as it was well known in the art to use wireless LANs at homes. See EX1058, 27 (“Protocols such as Bluetooth, IEEE 802.11, and Wireless Application Protocol (WAP) are paving the way towards a wireless Internet.”). Wireless LANs are widely use at home to connect home computers to each other, to connect wireless printers to computers, or connect other network-accessible devices like smart speakers, video

monitors, and other home security devices. Accordingly, it would have been obvious to a POSITA to use the wireless LAN with the Kotzin's wireless devices.

7. Independent Claim 16

- a. [16.1] *“sending to a remote host an inquiry in whether the remote host is able to support a multilink connection;”*

74. It is helpful for me to provide additional explanation of the term “remote host.” A POSITA would have understood that the devices communicating with remote computers and other devices on Internet or other external network are remote hosts. The '349 Patent itself recognizes that the RCG sends an inquiry to the remote host as it states that the term “remote” refers to a computer located on the Internet and not to the distance between the devices that share bandwidth. Ex. 1011 at 11:46-50. I note here that the '349 Patent does not impose distance requirements in relation to the term “remote.” The specification indicates that the RCG's can be spaced apart, by, for example, being in different households so long as they are in the same wireless communication range of each other. This is consistent with Kotzin's disclosure. Kotzin teaches that the wireless units can be spaced apart from each other, so long as they remain in the same wireless communication range, for example 802.11 or BluetoothTM. Ex. 1018, ¶¶ [0003], [0022] (“Each of the wireless units 106a-106n . . . includes both a wireless local area network communication

transceiver, such as a Bluetooth™-based transceiver, and a wireless wide area network transceiver, such as a CDMA cellular transceiver.”).

75. Furthermore, a POSITA would have known that the wireless devices are hosts, as they provide bandwidth sharing services.

b. [16.4] “*wherein the first data packets create a first data stream and the second data packets create a second data stream.*”

76. I provide here additional context regarding POSITA understanding that the first data creates a first data stream, and the second data creates a second data stream. It was well known in the art to send a stream of data to transmit a large amount of data and would have been obvious to implement in Kotzin’s system. Ex. 1018, ¶ [0018] (describing splitting information into subsets and forwarding them, which implies the existence of multiple data streams); Fig. 1 (illustrating multiple flows of information between units, supporting the concept of multiple data streams); ¶ [0035] (describing multiple wireless units on different WAN systems, supporting the existence of separate data streams). Indeed the ’349 Patent itself acknowledges this, when discussing receiving a data stream and streaming a video. Ex. 1011, 11:34-38, 13:12-16. Accordingly, a POSITA would have understood that when the streams are combined, they form the complete data stream. Finally, in my opinion, a POSITA would have known that each data packet could create a “data

stream.” Indeed, Challenger explains that a series of data packets are sent via multiple paths or links—data streams. Ex. 1017, ¶ [0063].

8. Dependent Claim 18

- a. [18] *“The method of claim 16, wherein the first data packets are received by a consumer-based network system, and wherein the second packets are received over the second connection at the consumer-based network system.”*

77. It is helpful for me to provide additional explanation that regarding POSITA understanding that Kotzin’s wireless LAN can be a consumer-based network system. Kotzin expressly discloses that its wireless units 106a-n are consumer networking devices such as “radiotelephone appliance, including, but not limited to, hand held apparatus, laptop computers, desk top computers....” Ex. 1018, ¶ [0022]. A POSITA would have further known that when consumer networking devices connect to a network, the network be a consumer-based network.

B. Ground II: Claims 1-20 Are Obvious in View of Challenger

1. Independent Claim 1

- a. [1.1] *“sending a multilink request from a first device to a second device to join a multilink connection, the first device being connected at a first location to a network, the second device being connected at a second location to the network, the second location being geographically separate from the first location, the first device and the second device being configured for accessing the*

network”

78. I provide here the additional explanation regarding term “multilink request.” A POSITA would have found obvious that the request in Challenger’s system is a multilink request. The request for a slave bandwidth sharing device is a request to join a “connection includ[ing] ***multiple physical links***,” that is, the master and slave bandwidth sharing devices are each connect to the network via different physical link. As Challenger explains, bandwidth sharing devices participating in the connection, are “connected to phone lines of a plurality of Internet users.” Ex. 1017, ¶ [0014]. Further, Challenger discloses a bandwidth sharing system that consists of end user terminals connected to the Internet through transmission lines and bandwidth sharing devices installed at each connection, between the end user interface and a transmission line. *Id.* ¶ [0018], *see also id.*, ¶¶ [0017], [0019]-[0021], [0034].

79. Similarly, Challenger’s disclosure of packet sending method requires multiple links. Challenger states that after the master bandwidth sharing device generates packets for transmission, the device sends some packets directly to the recipient at a remote site of the Internet and some packets to a slave bandwidth sharing device, which then forwards the packets to the end recipient. *Id.*, ¶¶ [0063]-[0064]. Because, per Challenger’s disclosure, the master bandwidth sharing device sends packets to at least two different devices (the end recipient at the remote site on

the internet and to a slave bandwidth sharing device) multiple links are required. Challenger also discloses a method to aggregate multiple links. For example, Challenger proposes “sharing bandwidth among a plurality of end users [to] increase[] the bandwidth available to each user.” *Id.*, Abstract.

80. Second, Challenger discloses that both the first and second devices are connected to a network, “Internet” 104, at first and second “geographically separate” locations. Just like in ’349 Patent, Challenger explains that devices 202B and 202C are connected by wireless communications 204, to “phone lines of a plurality of Internet users” to share bandwidth between the users. *Id.*, ¶ [0014], *see also* Fig. 2. In my opinion, a POSITA would have known that a plurality of Internet users and their phone lines are in “geographically separate” locations, *e.g.*, different houses in a neighborhood. Indeed, the wireless connections between those devices would not be implemented if they were not “geographically separate.” Ex. 1017, Fig. 2, ¶ [0037]. Challenger also discloses the difficulties the end users face while connecting their devices over “last mile” telecommunications lines 110, namely the bottleneck problems present in these connections. This further confirms that the devices are located in geographically separate locations.

- b. [1.2] “when the multilink request is accepted by the second device, receiving at the first device first data from the network at the first location and during the multilink connection, concurrently receiving second data over a wireless connection from the second device, the second data being received at the second location from the

network.”

81. I also think it is helpful for me to discuss this limitations use of the term “concurrently.” Based on the Challenger disclosure, in my opinion, a POSITA would have understood that when sending data packets over multiple different networks, those networks work independently and can be used independently. Accordingly, both networks can be used to send and receive data between 108B and an Internet server at the same time, i.e., concurrently. The concurrent and independent use of the networks is necessary to increase bandwidth and avoid the bottleneck problem (*i.e.* being limited by the network with the least amount of bandwidth). Using each network serially would not increase the overall bandwidth. In other words, the bandwidth would be limited to the bandwidth of the network with the least amount of bandwidth. Under this scenario, data would be sent through the first network first, and after the completion of this transfer, data would be sent through the second network. If the second network experienced bottleneck issues, the overall bandwidth would be limited. Only by using two networks simultaneously, the bandwidth can be increased.

82. Indeed, Challenger discloses that the remote site (fourth device) “sends 704 some of the packets directly to the master bandwidth sharing device 202 and sends 704 some of the packets to one or more slave bandwidth sharing devices 202.” *Id.*, ¶ [0065], Fig. 7. “Thus, some of the packets are received 706 by the Master

bandwidth sharing devices 202 and some are received 708 by the one or more slave bandwidth sharing devices 202.” *Id.* ¶ [0066]. “The packets received by the slave bandwidth sharing devices 202 are then transmitted 710, preferably wirelessly, to the master bandwidth sharing device 202” which “receives 712 and assembles 714 the packets.” *Id.* Challenger effectively teaches a method of using multiple networks simultaneously in order to increase bandwidth and avoid the bottleneck problems. Accordingly, it is my opinion that Challenger discloses the concurrent use of a portion of the first and second networks. Challenger explains that “bandwidth sharing device **202B**, might be operating in master mode while the bandwidth sharing devices **202A** and **202C** are operating in slave mode.” *Id.* ¶ [0046]. I note here that “while” and “concurrent” both mean “at the same time.” Accordingly, in my opinion, a POSITA would have understood that the word “while” means that the links for both the master and the slave operations are being concurrently used. Using the networks concurrently is the only logical avenue since the concurrent use multiple networks is necessary to increase bandwidth and avoid the bottleneck problem.

2. Dependent Claim 2

- a. [2] “*The method of claim 1, wherein the first location and the second location are physically isolated from each*

other.”

83. It is helpful for me to provide context regarding the term “physically isolated from each other.” Challenger discloses that bandwidth sharing devices are connected *wirelessly* to different “last mile” transmission lines. Ex. 1017, Fig. 2, ¶ [0037]. Challenger also discloses that in order to share bandwidth between the end users, the bandwidth sharing devices are connected to “phone lines of a plurality of Internet users.” *Id.*, ¶ [0014]. A POSITA would have known that a plurality of Internet users and their phone lines are “physically isolated from each other.” These locations could, for example, be different houses in a neighborhood. In this scenario, the wireless connections, as illustrated in Figure 2, between those devices would not be implemented if they were not “physically isolated from each other.” *Id.*, Fig. 2, ¶ [0037]. Further, Challenger discloses the difficulties the end users face while connecting their devices over “last mile” telecommunications lines 110, namely the bottleneck problems present in these connections. This further confirms that the devices are located in geographically separate locations. *Id.*

3. Dependent Claim 4

- a. [4] “*The method of claim 1, wherein a connection at the first location and a connection at the second location are network connection points.*”

84. I provide here an explanation of the term “network connection points,” which would be helpful to understand the context of the analysis provided in the petition. A POSITA would have understood that per Challenger’s disclosure, the

connections at the first and second locations are “network connection points.” Challenger discloses that bandwidth sharing device 202B at a first location is connected to the second bandwidth sharing device 202C through network last mile telecommunications lines 110 via telecommunications provider 102, which are network connection points. Ex. 1017, Fig. 2 *see also id.*, ¶¶ [0034]-[0035]. Challenger explains that both master and slave bandwidth sharing devices are connected to a local telecommunications line. *Id.*, Abstract. It also explains that a bandwidth sharing device includes a connection terminal “that allows for physical connection to a telecommunications provider 102 over a last mile telecommunications line” and that a bandwidth sharing device can also be connected through a wired or wireless connection to an end user terminal. *See id.*, ¶¶ [0040] [0041]. A POSITA would have found it obvious that last mile communications lines, which connect the bandwidth sharing devices to telecommunications provider (the network) are network connection points.

85. Alternatively, Challenger discloses that a bandwidth sharing device 202B (first location) is connected to a bandwidth sharing device 202C (second location) telecommunications provider 102 and the internet 104, which both are network connection points via broadband telecommunications lines 106 and 110. *Id.*, Abstract, Fig. 2, ¶¶ [0034]-[0035], [0040]-[0041]. Challenger explains that both master and slave bandwidth sharing devices are connected to a local

telecommunications line. *Id.*, Abstract. It also explains that the local telecommunications providers are further connected to the Internet via broadband telecommunications lines and to the end user terminals. *Id.*, ¶¶ [0034]-[0035], *see also id.*, ¶¶ [0040], [0041]. A POSITA would have found it obvious that last mile communications lines and broadband communications lines, which connect the bandwidth sharing devices to telecommunications provider and to the internet (the network) are network connection points.

4. Dependent Claim 7

- a. [7] *“The method of claim 6, further comprising the step of aggregating the first data, the second data and the third data.”*

86. I provide here the explanation of the term “aggregating the first data, the second data and the third data” to provide more context to the analysis provided in the petition. Challenger discloses aggregating the first, second, and third data. Challenger explicitly states that “[t]he master bandwidth sharing device wirelessly communicates with slave bandwidth sharing devices, each having a connection to a local telecommunications line, and **aggregates** the available bandwidth of the **multiple telecommunications lines.**” Ex. 1017, Abstract; ¶ [0037] (describing the process of aggregating packets from multiple links); Fig. 7 (illustrating the aggregation of data streams). A POSITA would have found it obvious that the first, second, and third data can be aggregated especially because Challenger teaches

“aggregating” data between the bandwidth requesting device (202B) and bandwidth sharing devices 202C and 202A. *Id.*, Fig. 2.

5. Dependent Claim 12

- a. [12] *“The method of claim 1, wherein the wireless connection is a cellular connection, a satellite connection, a Wi-Fi connection, a WiMax connection or a Bluetooth connection.”*

87. I think it would be helpful here to explain that Challenger discloses that the wireless connection is one of a cellular connection, a satellite connection, a Wi-Fi connection, a WiMax connection or a Bluetooth connection. Challenger explains that communications between end user terminals could occur “through wireless communications over wireless networks as commonly known in the prior art. One such network, for instance, employs the **IEEE 802.11 standard.**” Ex. 1017, ¶ [0039]. Indeed, the IEEE 802.11 standard is a well-known and widely used standard for Wi-Fi. In my opinion, a POSITA would have understood that the connection disclosed by Challenger can be a Wi-Fi connection. The ’349 Patent itself explains the IEEE 802.11 standard is for wireless home networking. Ex. 1011, 2:40-44 (Stating the RCG “has an 802.11b/g wireless interface for wireless home networking as well as broadband-to-the-home services.”).

6. Independent Claim 13

- a. [13.1] *“an interface that establishes a network connection at a first location to a first network and*

receives first data packets over the network connection;”

88. I think it is helpful to provide here additional context related to the term “*network connection at a first location to a first network.*” Challenger explains that a bandwidth sharing device 202 includes a telecommunications line connection terminal 302 that allows for physical connection to a telecommunications provider 102 over a last mile telecommunications line 110. Ex. 1017, ¶ [0040], *see also* ¶¶ [0065]-[0066] (explaining that packets are sent over a connection between the bandwidth sharing device and the remote site on the Internet). In my opinion, a POSITA would have understood that the telecommunications line connection terminal 302 is an interface that establishes the claimed *network connection at a first location to a first network.* As I explained above in section IX.B.1.a, a POSITA would have understood that the devices would be connected at “locations,” such as houses in a neighborhood that are serviced by different telephone lines. Ex. 1017, Fig-2, ¶ [0037]. Further, a POSITA would further have understood that the connection between, for example, 202B and the Internet 104 forms the first network.

b. [13.2] “*a wireless interface that is configured to establish a wireless connection to a remote communications device, the remote communications device being connected at a Second location to a second network; and*”

89. I provide here context regarding POSITA understanding of that users are connected at first and second locations. Per Challenger’s disclosure, the devices

202B and 202C are connected by wireless communications 204. *Id.*, Fig-2. Just like the '349 Patent, Challenger discloses that they are connected to “phone lines of a plurality of Internet users” to share bandwidth between the users. *See id.*, ¶ [0014]; Ex. 1011, 2:37-38. In my opinion, a POSITA would have known that a plurality of different Internet users (communicating over their respective phone lines) are connected at first and second locations (for example, they can be located in different houses in a neighborhood). Otherwise, the wireless connections used to between those the devices would not be needed. Ex. 1017, Fig. 2, ¶ [0037].

c. [13.3] *“a processor that sends a multilink request over the wireless interface to the remote communications device to join the multilink connection,”*

90. It is helpful for me to provide explanation of the term “processor” and “send[ing] multilink request.” First, a POSITA would have understood that a bandwidth sharing device, including device 202B, which can be a master bandwidth sharing device, has a “processor.” As illustrated by Figure 3 that I have reproduced below, a bandwidth sharing device has a “logic unit 310” and a “wireless transceiver” 312.

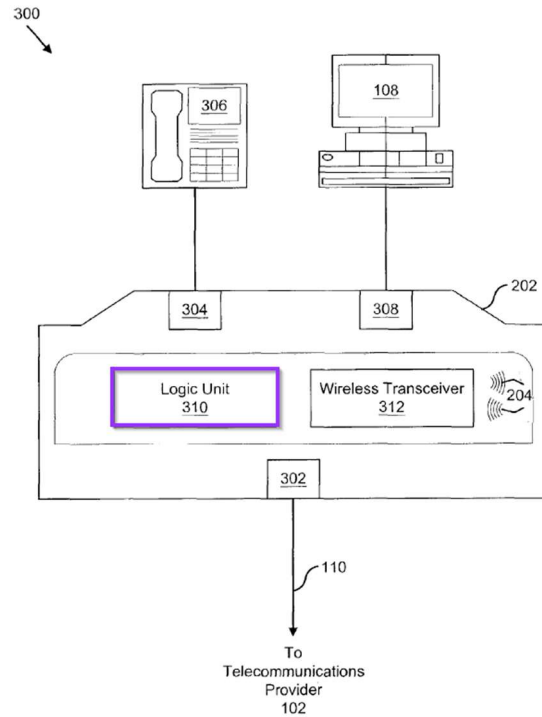


Fig. 3

Id., Fig. 3.

91. Challenger specifies that a bandwidth sharing device is “controlled by a logic unit within the device.” *Id.*, ¶ [0015]. Further, Challenger explains that the logic unit can be “programmed, hardwired, or otherwise provided within a plurality of modules,” including “a master module, a slave module 404, a detection module 406, a bandwidth definition module 408, an arbitration module, a sharing module 410, a pro rata sharing module 412, and a release module 514” and states that the modules can be “implemented in software for execution by various types of *processors*.” *Id.*, ¶¶ [0043], [0068]; Fig. 3. Therefore, in my opinion, a POSITA would have understood that the logic unit 310 is a processor.

7. **Dependent Claim 14**

- a. [14] *“The device of claim 13, wherein the device is one of a modem, cellular phone, a router, a computer, hotspot device and a tablet.”*

92. I think it also helpful for me to provide additional context regarding terms “modem, cellular phone, a router, a computer, hotspot device and a tablet.” A POSITA would have known that the bandwidth sharing device in Challenger’s system is a modem or a router, as it has basic capabilities of a modem or router, namely, it is configured to allow other devices to connect to the internet. For example, Challenger explains that a bandwidth sharing device can “automatically and wirelessly aggregate and arbitrate available bandwidth with a second bandwidth sharing device” and it sits between an internet provider and end-user terminal in a bandwidth sharing system “to aggregate the available bandwidth of a plurality of last mile transmission lines for use by a single end user subscriber.” Ex. 1017, ¶¶ [0014], [0018], *see also* ¶¶ [0015]-[0016], [0019]-[0021]. Challenger further explains that “the communications between the end user terminals 108 and the bandwidth sharing devices 202 can occur over land lines, as in the case of a hardwired local area network, as well as through wireless communications over wireless networks” including over Wi-Fi. *Id.*, ¶ [0039].

93. Furthermore, in my opinion, a POSITA would have known that the bandwidth sharing device in Challenger’s system is a type of a computer as it has a

processor that executes code, which is a basic element of a computer. As I explained and as illustrated by Figure 3, a bandwidth sharing devices has a “logic unit” 310 and a “wireless transceiver” 312. Challenger specifies that the logic unit controls the bandwidth sharing device 202 and the device sends wireless communications using a wireless transceiver that is “capable of transmitting and receiving communication to and from a plurality of bandwidth sharing devices (network-edge devices) 202 in order to share bandwidth made available from a plurality of last mile telecommunication lines 110.” *Id.*, ¶¶ [0015], [0042].

94. The logic unit in the bandwidth sharing device consists of several modules that allow the bandwidth sharing device to perform various actions. *See* ¶ [0043] (“The logic unit 310 is programmed, hardwired, or otherwise provided within a plurality of modules.”), ¶ [0044] (“The master module 402 is configured to operate with a first bandwidth sharing device 202 in a master mode and to allow the first bandwidth sharing device 202 to control a second bandwidth sharing device 202 that is operating in slave mode.”), ¶ [0045] (“The slave module 404 is configured to operate with a second bandwidth sharing device 202 in a slave mode that allows the second bandwidth sharing device 202 to be controlled by a first bandwidth sharing device.”), ¶ [0047] (“The detection module 406 is configured to detect the availability of any and all other last mile telecommunications lines 110 that are connected to operational band-width sharing devices 202.”), ¶ [0050] (“[A] master

bandwidth sharing device 202 may be allowed to use the entire amount of bandwidth available on a last mile telecommunications line 110. In this situation, the sharing module 410 is employed.”), ¶ [0053] (“The logic unit 310 also includes a release module 414 that is configured to terminate wireless communications 204 over a connection to a last mile telecommunications line”), ¶ [0056] (“[T]he logic unit 310 includes an arbitration module 416 configured to arbitrate the wireless communications 204 between the first and second bandwidth sharing devices 202.”), *see also* ¶¶ [0046], [0048]-[0049], [0051]-[0052], [0054]-[0056], Fig. 2. Challenger also explains that “a module may be implemented as a hardware circuit comprising custom VLSI circuits or gate arrays, off-the-shelf semiconductors such as logic chips, transistors, or other discrete components. A module may also be implemented in programmable hardware devices such as field programmable gate arrays, programmable array logic, programmable logic devices or the like.” *Id.* ¶ [0067]. Alternatively, Challenger explains, “[m]odules may also be implemented in software for execution by various types of processors. An identified module of executable code may, for instance, comprise one or more physical or logical blocks of computer instructions which may, for instance, be organized as an object, procedure, or function.” *Id.* ¶ [0068], *see also* ¶ [0069]. Accordingly, a POSITA would have understood that Challenger’s bandwidth sharing device is a type of computer.

95. Finally, in my opinion, a POSITA would have known that a bandwidth sharing device in Challenger's system is a type of hotspot, as it has basic capabilities of a hotspot, namely, it can serve as a network access point with wireless or wired connectivity. Challenger explains that bandwidth sharing devices are connected to internet providers via last mile telecommunications lines and the telecommunication providers are further connected to the Internet. Ex. 1017, Fig. 2, [0037]-[0039]. Bandwidth sharing devices can also connect to other bandwidth sharing devices via wired or wireless connections. *Id.* Further, in my opinion, a POSITA would have understood that a bandwidth sharing device can serve as network access point as bandwidth sharing devices allow for connection with telecommunications providers, internet, and other bandwidth sharing devices, which all can constitute networks.

8. Dependent Claim 15

a. [15] "The device of claim 13, wherein the device is part of a home-based network system."

96. I provide here an explanation of POSITA understanding that the device in Challenger's system is a part of a "home-based network system," which would provide additional context to the analysis in the petition. As Challenger provides a method of aggregating and improving bandwidth of connections in residences poorly served by "last mile" communications. Indeed, Challenger's stated goal is providing high bandwidth for Internet users, especially those who have limited access to high broadband Internet connections like these using fiber optic cable. Ex. 1017, ¶¶

[0004]-[0006]. Challenger also discloses that the bandwidth sharing device can be a “stand-alone unit with standard data and voice interconnections with typical telephone, computer, and service provider equipment and connectors,” thereby Challenger states that a bandwidth sharing device can be a router used to connect personal home devices. *Id.*, ¶ [0016], *see also id.*, Fig. 3.

9. **Independent Claim 16**

- a. [16.1] “*sending to a remote host an inquiry in whether the remote host is able to support a multilink connection;*”

97. I explain here the term “remote host” and its application to the Challenger system. In my opinion, a POSITA would have found it obvious that the second bandwidth sharing device is “a remote host” when acting as a “slave” to a “master” bandwidth sharing device. Challenger discloses a slave bandwidth sharing device, which can be located remotely from the master bandwidth sharing device. Indeed, as I explained in detail above, a POSITA would have known that a plurality of Internet users and their phone lines are “physically isolated from each other.” These locations could, for example, be different houses in a neighborhood. Challenger also explains that “[t]he bandwidth sharing device 202 includes a telecommunications line connection terminal 302 that allows for physical connection to a telecommunications provider 102 over a last mile telecommunications line 110. *An existing telephone line into a house* or office is

representative of the type of last mile telecommunications line 110 that would be connected to the telecommunications line connection terminal 302.” Ex. 1017, ¶ [0040].

10. Dependent Claim 17

- a. “The method of claim 16, wherein the first data packets are received at a home-based network system, and wherein the second packets are received over the second connection at the home-based network system.”*

98. In my opinion, Challenger discloses or renders obvious receiving data packets at a home-based network system. Challenger is directed to “end users,” which a POSITA would have understood includes users at their “homes.” Indeed, Challenger provides a method of aggregating and improving bandwidth of connections in home-based network systems. Challenger’s stated goal is providing high bandwidth for Internet users, especially those who have limited access to high broadband Internet connections like these using fiber optic cable. Ex. 1017, ¶¶ [0004]-[0006]. Challenger also discloses that the bandwidth sharing device can be a “stand-alone unit with standard data and voice interconnections with typical telephone, computer, and service provider equipment and connectors,” which are devices suitable for home-based network systems. *Id.*, ¶ [0016], *see also* Fig. 3.

11. Dependent Claim 18

- a. “The method of claim 16, wherein the first data packets are received by a consumer-based network system, and wherein the second packets are received over the second*

connection at the consumer-based network system.”

99. I provide here additional explanation of the term “consumer-based network system.” Challenger provides a method of aggregating and improving bandwidth of connections in consumer-based network systems. Challenger’s stated goal is providing high bandwidth for Internet users, especially those who have limited access to high broadband Internet connections like these using fiber optic cable. Ex. 1017, ¶¶ [0004]-[0006]. Challenger also discloses that the bandwidth sharing device can be a “stand-alone unit with standard data and voice interconnections with typical telephone, computer, and service provider equipment and connectors,” which are devices suitable for consumer-based network systems. *Id.*, ¶ [0016]. In my opinion, a POSITA would have found it obvious to implement Challenger’s system as a “consumer-based network system.” *See also* Fig. 3.

X. SECONDARY CONSIDERATIONS

100. I have seen no evidence of, and I am not aware of any evidence of secondary considerations that have a nexus to the claimed inventions that would overcome the combinations of prior art cited above in showing the obviousness of the claims of the ’349 Patent. The sheer number of independently developed, simultaneous inventions, developed within in a relatively short time-period are persuasive indicia of obviousness. However, should Patent Owner assert any secondary considerations of non-obviousness, I reserve the right to respond.

XI. CONCLUSION

101. For all the reasons discussed above, it is my opinion that each and every claim of the '349 Patent is invalid.

Declaration of Bill Lin In Support Of Petition for *Inter Partes* Review of U.S.
Patent No. 8,861,349

102. I hereby declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct, and that all statements made of my own knowledge are true and that all statements made on information and belief are believed to be true. I understand that willful false statements are punishable by fine or imprisonment or both. *See* 18 U.S.C. §1001.

Dated: August 4, 2025

Respectfully submitted,

A handwritten signature in dark ink, appearing to be 'Bill Lin', written over a horizontal line.

Bill Lin