

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. 10,868,908
Issued: December 15, 2020
Filed: May 23, 2016
Inventor: Eric M DeLangis
Title: Devices and Methods for Multipath Communications

**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.

Declaration of Bill Lin in Support of Petition for *Inter Partes* Review of U.S. Patent No. 10,868,908

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, <i>Computer Networks</i> , Chps. 1 & 5 (3d ed. 1996)
1058	Adolfo Rodriguez <i>et al.</i> , <i>TCP/IP Tutorial and Technical Overview</i> , Chps. 1 & 14 (Prentice Hall PTR 2002)

Declaration of Bill Lin in Support of Petition for *Inter Partes* Review of U.S. Patent No. 10,868,908

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

Declaration of Bill Lin in Support of Petition for *Inter Partes* Review of U.S. Patent No. 10,868,908

I, Bill Lin, hereby declare as follows:

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. 10,868,908 (“the ’908 patent”), 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 ’908 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 ’908 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 ’908 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 ’908 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 (EX1002) 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

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 '908 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 '908 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 '908 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 '908 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 8–12, 17, 4, 7 are obvious in view of Kotzin (EX1018) (Ground IA).

28. It is my opinion that claims 8–12, 17, 4, 7 are obvious in view of Kotzin (EX1018), Peirce (EX 043), Held (EX 1020), and Decasper (EX 1021) (Ground IB).

29. It is my opinion that claims 8–12, 17, 4, 7 are obvious in view of Phatak (EX 1045) (Ground IIA).

30. It is my opinion that claims 8–12, 17, 4, 7 are obvious in view of Phatak (EX 1045) and Held (EX 1020) (Ground IIB).

V. OVERVIEW OF THE TECHNOLOGY

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

VI. THE '908 PATENT

A. Claims

32. The '908 Patent titled “Devices and Methods for Multipath Communications” issued from U.S. Patent Application No. 15/161,787 (“’787 Application”) filed on May 23, 2016. The '908 Patent claims priority to Provisional Application No. 60/418,521 (“’521 Application”), filed on October 15, 2002. The '908 Patent discloses devices and methods for combining capabilities and features of IP routers, class 5 circuit switches and wireless LANs in a stand-alone external modem-like residential device to provide a user interface for advanced communication features as well as video telephone services.

33. The '908 Patent has 17 claims of which claims 1, 8, 13, 16, and 17 are independent claims. The independent claims are directed to client devices capable of multilink data packet communication with a server device. Claims 1-3, 5, 6, and 13-15 were rejected following reexamination (EX1051, Reex. Control No. 90/019,265), with appeal proceedings before the PTAB are pending, and are not challenged here. Only the claims not at issue in the reexamination or related appeal are challenged in the Petition, claims 8-12, 17, 4, and 7. Claim 1 is reproduced below to demonstrate its similarity to claim 17, a nearly-identical but narrower claim. As such, dependent claims 4 and 7 are listed after the challenged claim 17 where they are relevant.

34. Independent claim 1 of the '908 Patent claims a client device for multilink data packet communication with a server. Claim 1 is reproduced below:

A client device for multilink data packet communication with a server, the client device comprising:

a first network interface having a first data transfer rate associated with a first path from the server to the first network interface of the client device;

a second network interface having a second data transfer rate associated with a second path from the server to the second network interface of the client device; and

at least one processor configured to:

transmit a first message through the first network interface to the server, wherein the first message includes a multilink request a destination URL;

transmit a second message through the second network interface to the server, wherein the second message includes a multilink session identification the destination URL; and

receive data packets from the server through the first and second network interfaces of the client device during the multilink session wherein the first data transfer rate and the second data transfer rate provide an increased data transfer rate of the first path and the second path from the server to the client device.

EX1007, claim 1.

35. Independent claim 8 of the '908 Patent claims a server for multilink communication with a device. Claim 8 is reproduced below:

A server for multilink communication with a device, the server comprising:

at least one server network interface; and

one or more processors coupled to the at least one server network interface and configured to:

receive a first multilink packet over the at least one server network interface, the first multilink packet comprised of a request for a multilink communication and first information associated with first network communication interface of the

device that is capable of being used by the device to receive data packets;

sending a data packet including the multilink session identification to the first network communication interface of the device;

receive a second multilink packet over the at least one server network interface, the second multilink packet comprised of the multilink session identification and second information associated with a second network communication interface of the device that is capable of being used by the device to receive data packets; and

send different groups of data packets over the at least one server network interface to the first network communication interface of the device and to the second network communication interface of the device, wherein each of the different groups of data packets includes the multilink session identification.

EX1007, claim 8.

36. Independent claim 17 of the '908 Patent claims a client device for multilink communication. Claim 17 is reproduced below:

A client device for multilink communication, the client device comprising:

a first network interface having a first data transfer rate associated therewith;

a second network interface having a second data transfer rate associated therewith; and

at least one processor and configured to:

transmit a first message through the first network interface to at least one server, wherein the first message includes a multilink request and a destination URL;

transmit a second message through the second network interface to the at least one server, wherein the second message includes a multilink session identification that is unique to the multilink session and the destination URL; and

receive concurrently the different data packets from the server through the first network interface and the second network interface of the client device during the multilink session, wherein the first data transfer rate and the second data transfer rate provide an increase in the data transfer rate of the client device.

EX1007, claim 17.

B. Specification

37. 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.” EX1007, 1:24-28. Competitive Local Exchange Companies (“CLECs”) worked to resell existing services offered by LECs but were not able to truly compete in the market. *Id.* 1:40-63. 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.* 2:8-11. 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.* 2:8-14. 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.* 2:14-24. 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.* 2:25-33. 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.

38. To address this problem in the art, the '908 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.* 2:36-38. The RCG has additional capabilities of a hands-free speakerphone device with a touch display, which can provide video telephone services. *Id.* 2:38-44.

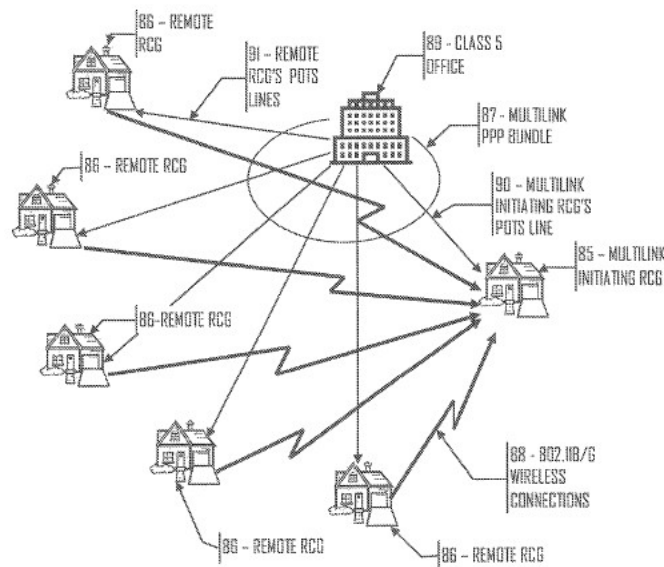
39. The alleged benefit of the RCG is that a Competitive Local Exchange Company (CLEC) can offer a variety of services to customers using the existing

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.* 3:11-26. 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.*, 3:27-31.

40. 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 house keeping and traffic routing tasks." *Id.*, 3:5-7. 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.*, 2:54-56. 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.*, 2:45-53.

41. The RCG also "implements broadband" over POTS by using an 802.11b/g wireless interface to configure a PPP multilink bundle. *Id.* 11:25-28. 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.* 11:38-41. 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.* 11:42-47. 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.* 11:47-56. For example, Figure 7 shows “an ad-hoc wireless LAN configuration with ppp multilink data distribution and wireless connectivity.”



Id., 4:20-21, Fig. 7.

42. 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.*, 2:54-3:3 (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), 1:21-24, 2:8-24, 2:36-40 (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), 11:25-41 (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), 12:2-14:9 (describing well-known Link Control and Multilink PPP protocols for sending packets and allocating bandwidth), 15:10-22 (describing routing tables used by IP router devices).

C. Prosecution History

43. I have reviewed the prosecution history of the '908 Patent. The '787 Application was filed on May 23, 2016, with five apparatus claims (three independent, two dependent) all directed to devices capable of multipath communications. EX1008, [[47]]-[[48]]. The prosecution, which included various narrowings and rejections, was followed by an *ex parte* reexamination request on October 4, 2023 against claims 1-3, 5, 6, and 13-15. EX1051 (Reex. Control No. 90/019,265). Only unchallenged claims 8-12, 17, 4, and 7 are challenged in the accompanying Petition.

44. I understand that during prosecution of the '908 Patent, the Examiner considered several prior art references, including Vilhuber (U.S. Patent 6,460,453), Yamada (U.S. Patent Application 20010007557), Pung (U.S. Patent Application 20020190099), Banga (U.S. Patent Application 20030135578), Baldwin (U.S. Patent Application 20140122656), McLampy, (U.S. Patent Application 20030016664), Eidenschink (U.S. Patent Application 2001003161), Kejriwal (U.S. Patent 6,704,794), Joyce (U.S. Patent Application 20020106065), Cain (U.S. Patent Application 20030202468), Goddard (U.S. Patent Application 2002-0055982), O'Sullivan (U.S. Patent 5,487,069), and Munger (U.S. Patent 6,502,135). EX1008, [[63]], [[126]], [[360]], [[367]], [[429]], [[510]]. I further understand that additional references were considered during the reexamination proceeding referenced above.

During the prosecution of the '908 Patent, the references presented in Grounds I-II of the Petition were not submitted by the Applicant to the USPTO, nor were they independently considered by the Examiner. These references include all elements found to be missing in the prior art.

D. Person of Ordinary Skill in the Art

45. 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.

46. In determining the characteristics of a hypothetical person of ordinary skill in the art of the '908 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 '908 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.

47. In my opinion, taking all of the factors into account, a person of skill in the art for the '908 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.

48. 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

49. 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.

50. 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.

51. 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

52. I have read 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 1-17 are Obvious in View of Kotzin, or Alternatively Obvious in View of Kotzin in Combination with Peirce, Held and/or Decasper, under §103

53. As discussed in detail below, it is my opinion that Kotzin alone (Ground IA) discloses or at least renders the Challenged Claims obvious. It is also my opinion that a POSITA would have found the Challenge Claims obvious based on Kotzin in combination with Peirce, Held and/or Decasper (Ground IB).

54. I do not explain every aspect or every claim limitation of Kotzin, Peirce, Held and/or Decasper below. I have read and agree with the mapping of that prior art to the claim limitations provided in the Petition. However, to the extent that I believe context from the perspective of a POSITA is helpful, I provide below a

discussion of certain claim limitations and how a POSITA would understand them. I also explain why a POSITA would find claims 8–12, 17, 4, 7 obvious in view of Kotzin alone or in further view of Peirce, Held and/or Decasper, and why a POSITA would have been motivated to combine these.

1. Independent Claim 8

a. “A server for multilink communication with a device, the server comprising:

55. In my opinion, Kotzin discloses the preamble of claim 8. Kotzin discloses that “a network element 400, such as a cellular base station (BS), Internet Web server, or any other suitable unit within the second wireless communication system 104, **splits (i.e., distributes) a communication** destined for the wireless apparatus 106*a*, which is information to be communicated for the wireless apparatus 106*a*, when the wireless apparatus 106*a* indicates that it does not have sufficient bandwidth but that **other proximal units** within the short range local area network 102 **will receive portions** of the communication **on behalf of the destination wireless apparatus 106*a***.” EX1018, ¶[0035]. Kotzin discloses that the network element 400 is a *server* (e.g., Internet Web server). Accordingly, in my opinion, Kotzin discloses a *server* that provides *multilink communication* by splitting the data over multiple wireless units to send to a single *device*.

b. at least one server network interface; and

56. In my opinion, Kotzin discloses this limitation. Specifically, Kotzin discloses that its *server* has a wireless *interface* for communicating with Kotzin's wireless units, such as CDMA or GSM. *Id.* ¶[0034] (“For example, one system may be a CDMA system to access an enterprise database, while another system may utilize a GSM system.”). As another example, Kotzin explains that “[t]he wireless wide area network communication system 104, in an illustrative example, includes a digital radiotelephone system that includes, for example, a plurality of base stations that are networked as known in the art.” *Id.* ¶[0025]. Indeed, as any POSITA knows, in order for a network device such as an Internet web server to communicate with client devices, it must have a network interface over which it can transmit and receive data. Accordingly, in my opinion, Kotzin discloses *at least one server network interface* (communication interface between Internet Web server and wireless units).

c. one or more processors coupled to the at least one server network interface and configured to:

57. In my opinion, Kotzin alone (Ground IA) or Kotzin in view of Decasper (Ground IB) discloses or at least renders this limitation obvious. Under Ground IA, in my opinion, a POSITA would have understood and found obvious that Kotzin's server 104 (*i.e.*, Internet Web server 400) is controlled by *one or more processors* and that these processors are *coupled*, either directly or indirectly, with

the *server*'s output wireless *network interface* to enable the sending and receiving of data to and from Kotzin's wireless units. The relevant element here is the presence of *processors*. Any POSITA would find it obvious that a Web server has processor(s), as a Web server requires a processor to function. This was known and understood by and before the Priority Date.

58. Under Ground IB, Kotzin in view of Decasper (Ground IB) further discloses or at least renders limitation 8c obvious.

59. A POSITA would have been motivated to combine Kotzin with Decasper, as Decasper discusses the client-server model used for communications between clients and servers on the Web, which is in the same field of endeavor as Kotzin and directed toward the same concept. EX1021, 1:18-27. Decasper explains that a Web server will typically include "conventional components such as a processor, memory (e.g., RAM), a bus which coupled the processor and memory, a mass storage device (e.g., a magnetic or optical disk) coupled to the processor and memory through an I/O controller and a network interface, such as a conventional modem." EX1021, 1:18-27. A POSITA would find it obvious to use the well-known processor-based server architecture taught in Decasper in combination with Kotzin, with a reasonable expectation of success at implementation. This would required only combining these elements according to known methods and applying known techniques, yielding a predictable result. Accordingly, Kotzin alone or Kotzin in

view of Decasper discloses or at least renders obvious *one or more processors coupled to the at least one server network interface*.

- d. *receive a first multilink packet over the at least one server network interface, the first multilink packet comprised of a request for a multilink communication and first information associated with first network communication interface of the device that is capable of being used by the device to receive data packets;*

60. In my opinion, Kotzin discloses or renders this limitation obvious. To add context to the Petition, I find it helpful to address the limitation’s requirements of participation in a *multilink communication* and the *first information* received as part of that communication, including bandwidth information and the addresses used to receive packets.

61. Kotzin addresses when one of its wireless units wants to download information from an Internet Web server (or a similar network element) and wants to engage the participation of other proximal wireless units—in other words, engage in a *multilink* connection. In this situation, Kotzin discloses that the processor will send a request to the network element 104, which Kotzin describes may be embodied by an Internet Web server. EX1018, ¶[0035] (disclosing a “network element 400, such as a cellular base station (BS), Internet Web server, or any other suitable unit within the second wireless communication system 104”).

62. I have examined Figures 4 to 6 of Kotzin, which disclose that when wireless unit 106A (*i.e.*, UNIT 1) has insufficient bandwidth to receive the desired amount of data from Internet Web server 400, wireless unit 106A may recruit other wireless units to share their available bandwidths with wireless unit 106A, thereby increasing the total bandwidth made available to wireless unit 106A. Specifically, Kotzin explains that “[i]n this example, the wireless apparatus 106a is the destination unit within the wireless local area network 102. However, since it has *insufficient bandwidth* to receive the entire communication from the wide area network, other wireless apparatus 106b-106n that have agreed to participate to *share* their short range wireless *resources*, are used to *retransmit portions* of the communication that have been split by the wide area network 104 for distribution among the participating proximal wireless apparatus.” *Id.* ¶[0036]. Thus, in my opinion, a POSITA would have understood and found obvious that there is *multilink* communication within the network.

63. Moreover, in my opinion, a POSITA would have understood additional disclosures in Kotzin to support the conclusion that the bandwidth aggregation system sends a *request for a multilink communication* for this data transfer. Kotzin discloses that wireless unit 106A will send bandwidth distribution message 508 to Internet Web server 104, “notif[ying] the wide area network which of the plurality of proximal wireless units will participate in sharing the wireless resources for use

in facilitating communication with the wireless apparatus 106a.” *Id.* ¶[0039]. As a response to message 508, the Internet Web server splits the requested data that is ultimately intended for wireless unit 106A such that “each of the participating proximal wireless units receives their *respective subsets* of the total information for the destination unit (*i.e.*, wireless apparatus 106a).” *Id.* ¶[0040]. In my opinion, a POSITA would have understood and found obvious that message 508 constitutes a *request for a multilink communication*, because the message requests that the Internet Web server 104 split the requested data to be sent to wireless unit 106A across multiple links. The same is true of message 512 when unit 106A participates directly in the multilink communication—a POSITA would find obvious that in this circumstance, 106A will ask for a specific portion of the overall data by sending message 512. It would also be obvious to a POSITA that Kotzin would use packet-based messages, given that Kotzin’s wireless units can communicate with 802.11, Bluetooth, GSM, or CDMA, all of which use packets. EX1018, ¶[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).

64. Furthermore, in my opinion, a POSITA would have understood and found obvious that message 508 (*a first multilink packet comprised of a request for a multilink communication*) contains *first information associated with first network communication interface of the device that is capable of being used by the device to receive data packets* when network element 400 is an Internet Web server, in the form of at least URLs. It is my understanding that the '908 Patent broadly refers to URL as “a remote computer i.e. internet URL.” EX1007, 12:3-4. Accordingly, the term “URL” as used in the '908 Patent refers to the destination address of the server element. In my opinion, a POSITA would have understood and found obvious that a message that is intended for Internet Web server 400 needs to contain a destination address (*first information associated with first network communication interface*) in order to reach the intended destination on the network. A POSITA would have

understood and found obvious that this message 508, intended for Internet Web server 104, needs to include its intended address of Internet Web server 104.

65. Finally, in my opinion, a POSITA would have understood and found obvious that the destination URL (*first information associated with first network communication interface of the device that is capable of being used by the device to receive data packets*) would be one of an IP address or an http address, which is translated into numerical IP addresses via DNS servers on the Internet (*e.g., www.cnn.com*). EX1030, 200-01. In fact, HTTP is the protocol that a client typically uses to communicate with an Internet Web server, such as the type of communication disclosed by Kotzin. EX1030 (TCP/IP For Dummies), 161 (“Web clients, which are also called browsers, communicate with the servers via HTTP, or HyperText Transfer Protocol. A Web browser is an HTTP client that sends requests to web server software. When you type a **URL** (Uniform Resource Locator) or click on a hypertext link, your browser creates an **HTTP request and sends it to the IP address** that’s represented by the URL (or Web address).”).

66. Accordingly, in my opinion, Kotzin discloses *receive a first multilink packet* (bandwidth request message 508 from wireless unit 106A to Internet Web server 104) *over the at least one server network interface, the first multilink packet comprised of a request for a multilink communication* (request for server to split data across multiple links) *and first information associated with first network*

communication interface of the device that is capable of being used by the device to receive data packets (intended address of the receiving server).

67. Furthermore, in my opinion, it would have been obvious to a POSITA that Kotzin's bandwidth distribution message 508, the message notifying the wide area network which proximal wireless units will participate in sharing their bandwidth, would include *information associated with [the] first network communication interface of the device that is capable of being used by the device to receive data packets*. As an example, a POSITA would have understood that when Kotzin's server is an Internet Web server, the communication protocol employed would be TCP/IP and data would be sent as packets, with the TCP protocol running on top of the IP protocol which is used with Web browsing. EX1043 [RFC 2663], Abstract, §2.3.

68. Furthermore, in my opinion, a POSITA would have understood that any TCP/IP packet sent would include the IP address of destination wireless unit 106A's cellular interface, which constitutes *information associated with the first network communication interface* (the interface of UNIT 1 (*i.e.*, wireless unit 106A)). This is because TCP employs a tuple, which is comprised of source IP address/port number, destination IP address/port number and the protocol in use, in order to uniquely identify a particular communication session. RFC 2663, which is the 1999 standard on network address translation in Internet communications, explains that "TCP/UDP

sessions are *uniquely identified* by the tuple of (source IP address, source TCP/UDP port, target IP address, target TCP/UDP port).” EX1043 at §2.3 (note that UDP is a separate protocol that uses the same tuple as TCP). Thus, given that Kotzin expressly discloses Internet Web browsing and the need to differentiate between various communication sessions for the purpose of data sharing, a POSITA would have been motivated to use the TCP/IP tuple for identifying purposes, since the TCP/IP tuple would be present whenever wireless unit 106A communicates with Internet Web server 104.

- e. *sending a data packet including the multilink session identification to the first network communication interface of the device;*

69. In this section, it is helpful for me to add my opinion with respect to Kotzin’s teaching of a *session identification*, Peirce’s teaching of the same, and Held’s teaching of TCP/IP. In my opinion, a POSITA would have understood and found obvious that messages 512A-D would contain a multilink session identification. Kotzin explains that its wireless units share their bandwidth only for the duration of a particular communication session. EX1018, ¶[0021] (“Accordingly, a peer-to-peer communication technique is used to allow the plurality of proximal wireless units to use each other’s short range wireless communication resources for a given communication session including a data transmission session, voice or audio transmission session, or any other information

as desired.”). In my opinion, a POSITA would have understood and found obvious that Kotzin’s bandwidth aggregation system requires a unique session identifier that allows the bandwidth-sharing wireless units to differentiate the various communication sessions and participate only in the specific session in which they have agreed to participate.

70. For example, a POSITA would find it obvious that an arbitrary or randomly generated number may be used as a session ID, and such use was well known in the art as of the Priority Date. Since at least 2001, randomly generated session IDs have been used for web applications, including for example randomly generated IDs stored in cookies to “to associate a group of online actions with a specific user.” EX1049 (Endler) at 3. Before that, a randomly generated session ID was discussed for use in the Dynamic Host Configuration Protocol’s Transaction IDs in 1997 (EX1047 (RFC 2131), §2), the Real Time Streaming Protocol’s packet headers in 1998 (EX1055 (RFC 2326), §3.4 Session Identifiers), and the Session Initiation Protocol in 1999 (EX1046 (RFC 2543)).

71. As another example, as noted above in Section IX.A.1.d, TCP/IP employs a tuple, which is comprised of source IP address/port number, destination IP address/port number and the protocol in use, in order to uniquely identify a particular communication session. RFC 2663, which is the 1999 standard on network address translation in Internet communications, explains that “TCP/UDP sessions

are uniquely identified by the tuple of (source IP address, source TCP/UDP port, target IP address, target TCP/UDP port).” EX1043 at §2.3 (note that UDP is a separate protocol that uses the same tuple as TCP). Further, “[o]n the Internet, HTTP communication generally takes place over TCP/IP connections.” EX1048 (RFC 1945). Thus, given that Kotzin expressly discloses Internet Web browsing and the need to differentiate between various communication sessions for the purpose of data sharing, a POSITA would have been motivated to use the TCP/IP tuple for identifying purposes, since the TCP/IP tuple would be present whenever wireless unit 106A communicates with Internet Web server 104. Furthermore, a POSITA would have been motivated to include the identifier with all communications associated with a given session (including the messages used to set up the multilink communication), thereby enabling Kotzin’s bandwidth-sharing wireless units to identif[y] a specific multilink [communication] session.

72. Accordingly, Kotzin discloses sending a data packet (messages 512A-D from wireless units 106B-N) including the multilink session identification (TCP/IP tuple) to the first network communication interface (network element 104) of the device.

i. Ground IB: Peirce

73. Under Ground IB, in my opinion, Kotzin in view of Peirce also renders obvious the additional limitation of this claim. To the extent that Kotzin does not

disclose the mechanism of a session identifier, in my opinion, it would have been obvious to a POSITA to use Peirce's teaching of a "bundle mapping update packet" containing a session identifier with Kotzin's bandwidth sharing system. EX1044, 2:54-65. Peirce, another invention aimed at improving bandwidth sharing, discloses a mechanism for identifying and coordinating data streams on a *per-session basis*, namely through a "bundle mapping update packet" that includes a session identifier in the form of an "identification field [that] notifies the other termination units that if they should receive a portion of the data stream via a channel that belongs in the call originator's 'bundle', *representing the session*, they should forward their packets of data to the designated termination unit." EX1044, 2:59-65.

74. Note that Peirce discloses data packets including a bundle ID in the transport layer protocol payload, a protocol which for Peirce is UDP. EX1044, 5:60-6:21. A POSITA would find it obvious in light of Kotzin's need for a session identifier that Peirce's session identifier would be incorporated into Kotzin's transport layer protocol payload (*i.e.*, a TCP payload), such that other wireless units would be able to reference the session identifier in both receiving data from Internet Web server 400 and sending data to wireless unit 1.

75. A POSITA would have been motivated to combine Kotzin with Peirce.

76. First, in my opinion, a POSITA would have understood that Kotzin and Peirce are in the same field of endeavor and are directed to the same problem,

namely, developing a system for bandwidth sharing through the aggregation of multiple data streams. Kotzin expressly discloses that its wireless units share bandwidth only for a *particular communication session*. EX1018, ¶[0021] (“Accordingly, a peer-to-peer communication technique is used to allow the plurality of proximal wireless units to use each other’s short range wireless communication resources *for a given communication session* including a data transmission session, voice or audio transmission session, or any other information as desired.”). In my opinion, given that Kotzin expressly teaches the need for a session identifier, it would have been obvious to a POSITA to incorporate Peirce’s teaching of a session identifier that Kotzin’s wireless units would reference when they receive data from Internet Web server 104 and use to forward the received data to UNIT 1. In my opinion and based on my expertise, implementing Peirce’s session identifier would have been compatible with Kotzin’s disclosed architecture and a POSITA would not have needed to modify Kotzin’s bandwidth aggregation configuration to enable the use of Peirce’s session identifier. Furthermore, in my opinion, it would have been obvious to a POSITA to include such a session identifier with Kotzin’s messages 510 and 512 so that the session identifier would be included with all data packets as a coordinating reference to ensure that UNIT 1 receives all packets destined for it, while at the same time fulfilling Kotzin’s express requirement that its wireless units only share bandwidth for a particular session. In my opinion,

a POSITA would have also understood and found obvious that Peirce's session identifier would have been helpful in the upload direction, when Kotzin's UNIT 1 is uploading data to Internet Web Server 104, because the session identifier ensures that the bandwidth-sharing wireless units only forward packets to WAN server 400 for the specific session to which those packets belong. EX1018, ¶[0042], Fig. 7.

77. Second, in my opinion, a POSITA would have understood that both Kotzin and Peirce disclose similar techniques or characteristics of techniques such that integrating Peirce's teachings on the use of a session identifier into Kotzin's bandwidth aggregation system would have been obvious to try, as doing so was a known technique to improve similar devices and methods in the same way. Kotzin and Peirce both address using multiple links between a source and destination to send split data streams that are reconstructed into a single data stream at its destination. EX1018, Abstract; EX1044, Abstract. In my opinion, given both the architectural and functional similarities between the two inventions, a POSITA would have naturally looked to Peirce for a specific mechanism to implement Kotzin's express teaching of its need for a session identifier in order to restrict the participation of Kotzin's bandwidth-sharing wireless units only to a particular session. In my opinion, using a mechanism such as Peirce's session identifier with Kotzin's bandwidth sharing system would have been obvious to try and would have been nothing more than combining prior art elements according to known methods

to yield predictable results. Finally, based on my expertise, given that packet-based communications were well-known in the art, a POSITA would have had a reasonable expectation of success of implementing such a common and well-known technology as Peirce's session identifier with Kotzin's bandwidth sharing system using routine computer programming techniques.

ii. Ground IB: Held

78. Under Ground IB, in my opinion, Kotzin in view of Held further renders this limitation obvious. To the extent Kotzin does not disclose the use of TCP/IP, it would have been obvious to a POSITA to use TCP/IP with Kotzin as taught by Held.

79. Kotzin discloses that its network element 104 can be an Internet Web server. EX1018, ¶[0035]. Relatedly, Held discloses that Internet communications are based on TCP/IP: "The elimination of price discrimination between voice and data services can lead to dramatic reductions in the price of voice calls, precipitating significant changes in market structure. These changes were first evident in the emergence of the Internet, a ubiquitous network of applications based on the TCP/IP. Started as a text-based network for scientific communication, the Internet grew dramatically in the late 1980s and 1990s, once not-text-only applications became available. The Internet now reaches about half a billion computers, most of which are connected to it through the telephone network." EX1020, 142. Based on Kotzin's

express disclosure of Internet-Web-based communications and Held's disclosure that TCP/IP for Internet communications is "ubiquitous," it would have been obvious to a POSITA to use TCP/IP (which employs the tuple session identifier) when communicating with Kotzin's Internet Web server 104. In my opinion, the use of TCP/IP with Kotzin would have been obvious to try and would have been nothing more than combining prior art elements according to known methods and applying a known technique to a known device ready for improvement, both to yield a predictable result. Furthermore, given that TCP/IP was already well-known in the art at the time, in my opinion a POSITA would have had a reasonable expectation of success in implementing such a common and well-known technology as TCP/IP into Kotzin's system. Accordingly, Kotzin in view of Held renders obvious transmit[ting] a second message through the second network interface to the server (messages 512A-D from wireless units 106B-N to network element 104), wherein the second message includes a multilink session identification (TCP tuple or session identifier) [and] the destination URL (intended address of the receiving server).

- f. receive a second multilink packet over the at least one server network interface, the second multilink packet comprised of the multilink session identification and second information associated with a second network communication interface of the device that is capable of*

being used by the device to receive data packets; and

80. In my opinion, Kotzin discloses or renders this limitation obvious. I address here any ambiguity with respect to why a *second* multilink packet may also be received and include a session identification and why a *second network communication interface* is present. Kotzin discloses that UNIT 1 may upload data to Internet Web server 104 (which *receives* the data), and that UNIT 1 may upload this data through a *second network communication interface*, such as UNIT 2, 3, 4, or N in Figure 4. EX1018, ¶[0022] (“Each of the wireless units communicates in a peer-to-peer arrangement with each other using the wireless local area network communication transceivers, but also communicates individually with the wireless wide area network communication system 104.”). As I explained above, a POSITA would have understood and found obvious that a packet will include a session identification. As I also explained above, in my opinion, a POSITA would have understood and found obvious that when TCP/IP is used for Kotzin’s wireless communications, the TCP tuple, the unique *identifi[er]* for the *multilink [communication] session* between UNIT 1 (*i.e.*, wireless unit 106A) and Internet Server 104, would be included in the uploaded packet. *See* Section IX.A.1.d, IX.A.1.e.

81. As I also explained above, the uploaded packet would include the IP address of the destination wireless unit, where the IP address comprises *information*

associated with [the] second network communication interface. See Section IX.A.1.d.

- g. send different groups of data packets over the at least one server network interface to the first network communication interface of the device and to the second network communication interface of the device, wherein each of the different groups of data packets includes the multilink session identification.”*

82. In my opinion, Kotzin discloses or renders this limitation obvious. Here, it is helpful for me to address the sending of *different groups of data packets*, each containing *the multilink session identification*. Kotzin explains that the Internet Web server 104 can send packets through its cellular interface to each of UNIT 1’s two interfaces: (1) the cellular interface between UNIT 1 and Web server 104 (*i.e., first network communication interface*), and (2) the 802.11/Bluetooth interface between UNIT 1 and the other wireless units 2-N (*i.e., second network communication interface*). As I explained above, it would have been obvious to a POSITA to include a session identification with these packets. As I also explained above, the TCP tuple that uniquely *identifi[es]* the *multilink [communication] session* will be included in all communications sent between the server and UNIT 1. See Section IX.A.1.d, IX.A.1.e. Accordingly, in my opinion, Kotzin discloses *send[ing] different groups of data packets* (data is split over multiple links to reach destination wireless unit)) *over the at least one server network interface to the first*

network communication interface of the device (interface between wireless unit 106a and the server) *and to the second network communication interface of the device* (interface between wireless unit 106a and wireless units 106b-n), *wherein each of the different groups of data packets includes the multilink session identification* (TCP tuple/session identifier).

2. Dependent Claim 10

- a. “The server of claim 8, wherein the one or more processors is further configured to receive a third multilink packet, the third multilink packet is comprised of multilink information associated with a third network communication interface of the device that is capable of being used by the device to receive data packets; and*

83. In my opinion, Kotzin discloses or at least renders claim 10 obvious. Here, I find it helpful to address why claim 8 further extends to a *third multilink packet* and *interface*. Kotzin discloses that its UNIT 1 may use more than one other UNIT for bandwidth sharing. EX1018, ¶[0022] (“The wireless local area network communication system 102 includes a plurality of wireless units 106a-106n . . . wireless units 106b-106n are operative to communicate using a wireless local area network protocol with wireless unit 106a . . .”). In the situation where Kotzin’s UNIT 1 uses at least two other UNITS (*i.e.*, UNITS 2 and 3-N) for the bandwidth sharing session, the second of such UNITS acts as the *third device*, and UNIT 1’s interface with the second bandwidth sharing unit is the *third network communications interface*. Additionally, Kotzin discloses that its wireless units may support various

wireless protocols, including 802.11 and Bluetooth. *Id.* ¶¶[0003], [0022]. In my opinion, it would have been obvious to a POSITA for Kotzin’s wireless unit to use both protocols for each of its two interfaces communicating with the other wireless units (*i.e.*, one wireless unit that uses 802.11 and another wireless unit that uses Bluetooth), like other devices from before the Priority Date that can use multiple such interfaces at the same time (for example, routers and computers). In this situation, the additional interface would act as the *third network communication interface* and would receive multilink packets over this *interface* from the server. Accordingly, in my opinion, Kotzin discloses *one or more processors is further configured to receive a third multilink packet, the third multilink packet is comprised of multilink information associated with a third network communication interface (interface between UNIT 1 and UNIT 3-N) of the device that is capable of being used by the device to receive data packets.*

3. Dependent Claim 12

- a. “The server of claim 8, wherein the one or more processors is further configured to receive different multilink packets over the at least one server network interface at different periods of time.”*

84. In my opinion, Kotzin discloses or renders obvious claim 12. Here, I address only why Kotzin discloses the *different periods of time* portion of this limitation. Given that Kotzin discloses that data packets are uploaded to Internet Web server 400 via its cellular interface, and that they take different paths to do so

(see, e.g., Fig. 4), a POSITA would find it obvious that these packets would be received at *different periods of time*.

4. Independent Claim 17

- a. *[Preamble] “A client device for multilink communication, the client device comprising:*

85. In my opinion and to the extent the preamble is limiting, Kotzin discloses or renders the preamble of claim 17 obvious. Here, I find it helpful only to address the term *client device*. In particular, Kotzin discloses “wireless units” including “an Internet appliance, radiotelephone appliance, including, but not limited to, hand held apparatus, laptop computers, desk top computers, or any other suitable wireless communication apparatus.” EX1018, ¶[0022]. These wireless units would be understood by a POSITA to constitute client devices.

- b. *a first network interface having a first data transfer rate associated therewith;*

86. In my opinion, Kotzin discloses or at least renders this limitation obvious. I find it helpful here to address both Kotzin’s disclosure of a *first network interface* and an associated *first data transfer rate*. Based on the example in Kotzin’s Figure 4 of unit 106A (*i.e.*, UNIT 1), wireless unit 106A may connect to wide area network 104 over wireless link 120. EX1018, ¶[0022] (“[W]ireless unit 106a is in communication with the wireless wide area network 104 via link 120.”). In my opinion, a POSITA would have understood and found obvious that wireless unit

106A contains an *interface* for communicating over wireless link 120 and that such interface generally differs from the interface that wireless unit 106A uses to communicate with the other proximal wireless units. A POSITA would have understood that the “WAN transceiver” in Kotzin’s Figure 1 constitutes said *interface*. Specifically, Kotzin explains that “the wireless air *interface* between a wireless communication unit and the wide area network and other local subscriber apparatus will be *different*. For example, common standardized cellular air interfaces include GSM, IS-95, IS-136 etc.” EX1018, ¶[0003]. Additionally, Kotzin discloses that multiple different interfaces between wireless unit 106A and wide area network 104 are possible (*e.g.*, GSM or CDMA). *Id.*, ¶[0034]. Thus, Kotzin discloses a *first network interface* (interface between wireless unit 106A and wide area network 104).

87. Additionally, in my opinion, a POSITA would have understood and found obvious that Kotzin discloses a data transfer rate associated with the first network interface. Kotzin explains that there is an individual bandwidth associated with each wireless unit’s connection to a server on WAN 104. EX1018, ¶[0028] (“[E]ach of the wireless units that are in range of the wireless unit 106a is made aware of the amount of wireless bandwidth that it is willing to share to allow communication with the wireless wide area network 104.”). Kotzin further explains that this available bandwidth is indicated by the measurement of “megabits per

second,” EX1018, ¶[0038]. In my opinion, a POSITA would have understood and found obvious that this measurement represents a data transfer rate. A POSITA would have understood that this bandwidth constitutes a data transfer rate associated with the first network interface.

c. a second network interface having a second data transfer rate associated therewith;

88. In my opinion, Kotzin discloses or at least renders this limitation obvious. I address here both major requirements of this limitation—the *second network interface* and the associated *second data transfer rate*. Below I have annotated Figure 4 of Kotzin to demonstrate the existence of a *second network interface*. Kotzin discloses that its wireless unit 106A has a wireless LAN transceiver for connecting wirelessly with any of wireless units 106B, 106C, . . . 106N, each of which have their own transceivers. EX1018, Fig. 4, ¶[0022] (disclosing that “[e]ach of the wireless units 106a-106n, in this embodiment, includes [] a wireless local area network communication transceiver” and “[e]ach of the wireless units communicates in a peer-to-peer arrangement with each other using the wireless local area network communication transceivers”). Kotzin also discloses that wireless units 106B, 106C, . . . 106N are in turn connected to WAN 104 over wireless link 120. EX1018, ¶[0022] (“Each of the wireless units . . . also communicates individually with the wireless wide area network communication system 104”). In my opinion, a

POSITA would have understood and found obvious that wireless unit 106A can be connected to WAN 104 via a second path that is distinct from a direct connection over wireless link 120. Specifically, the second path comprises of the wireless connection from wireless unit 106A to any of wireless units 106B, 106C, . . . 106N followed by the wireless direct connection from any of wireless units 106B, 106C, . . . 106N to WAN 104.

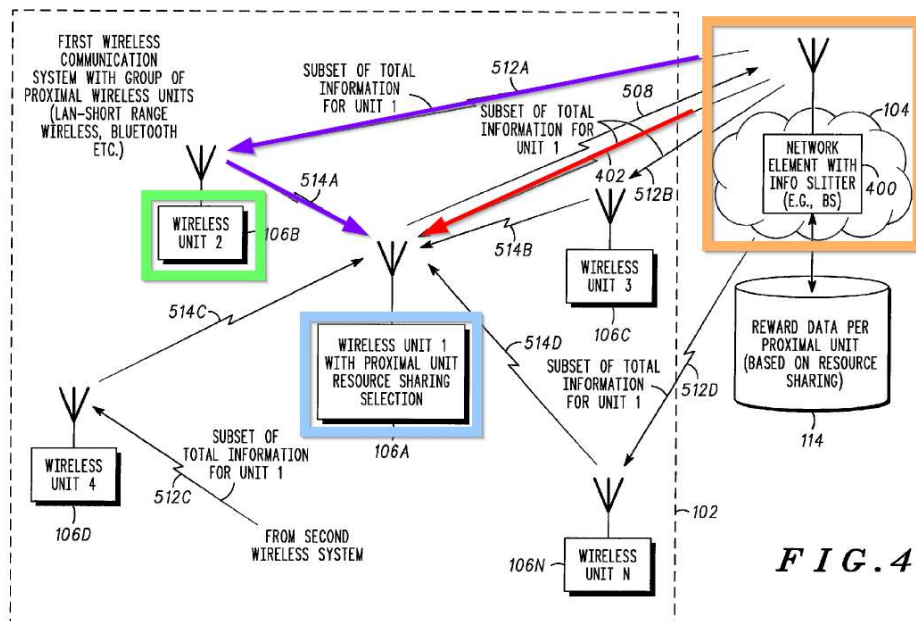


FIG. 4

As I have annotated in Figure 4, wireless unit 106A connects to WAN server 400 via two distinct paths: (1) a direct path (red arrow) and (2) a connecting-link path through wireless unit 106B (purple arrows).

89. In my opinion, a POSITA would have understood additional disclosures in Kotzin to further support the conclusion that Kotzin uses a *second*

interface to communicate with other wireless units. Specifically, Kotzin discloses that a *second interface* can include such things as “Blue Tooth, 802.11, Hiperlan, etc.,” and that this interface is distinct from the cellular interface used for communicating directly over link 120. *Id.* ¶¶[0003], [0022] (“Each of the wireless units communicates in a peer-to-peer arrangement with each other using the wireless local area network communication transceivers, but also communicates individually with the wireless wide area network communication system 104.”).

90. Furthermore, in my opinion, a POSITA would have understood and found obvious that this second interface has an associated second data transfer rate. As I explained above, Kotzin discloses that there is an individual bandwidth associated with each wireless unit’s connection to a server on WAN 104. EX1018, ¶[0028]; *see* ¶8787. Below I have annotated Figure 5 to illustrate the data rate between WAN server 400 and UNIT 1 (106A) via the path through UNIT 2 (106B) as 1 mb/sec. Figure 5 also demonstrates that each of the other paths between UNIT 1 and WAN server 400 has its own data rate (2 MB/sec through UNIT 3, 2 MB/sec through UNIT 4, and 5 MB/sec through UNIT N).

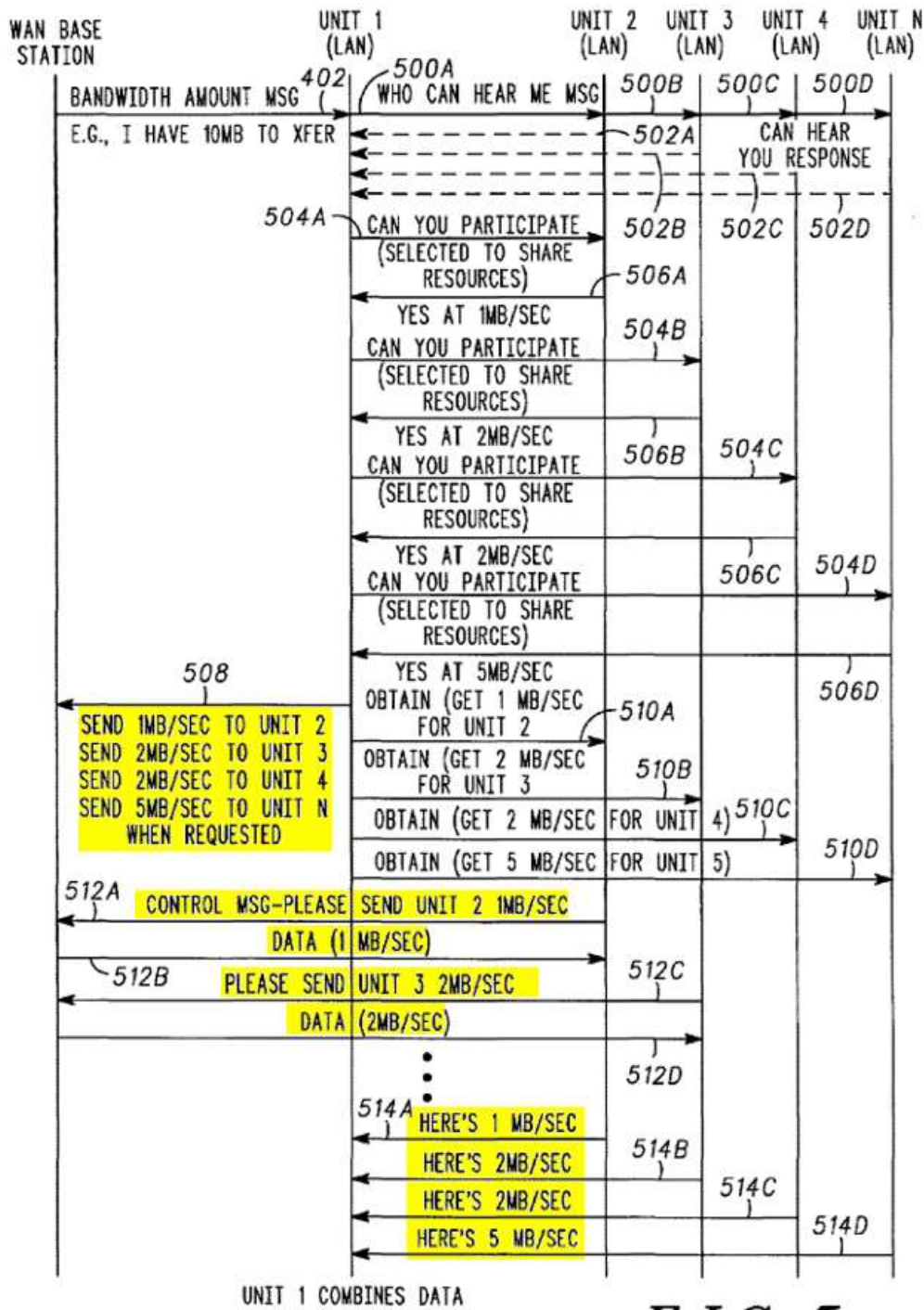
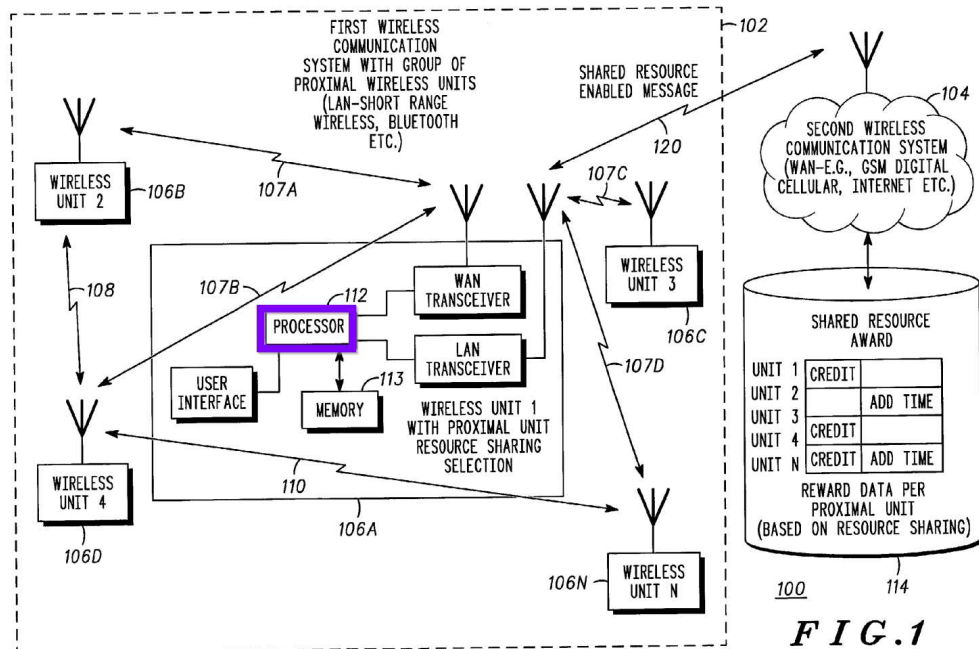


FIG. 5

Id. Fig. 5.

d. and at least one processor configured to:

91. In my opinion, Kotzin discloses or at least renders this limitation obvious. I find it helpful here to focus on the limitation’s requirement of a *processor*. Kotzin discloses that wireless unit 106A includes a processing apparatus 112 “such as a digital signal processor, microprocessor, discrete logic or any other suitable circuitry that provides the proximal unit resource sharing selection.” EX1018, ¶[0023]. Below I have annotated Figure 1 to demonstrate Kotzin’s disclosure of “processor 112” (purple).



92. Kotzin discloses that “[a]s described herein, and as previously noted, each of the wireless apparatus may include a wireless wide area network transceiver and a wireless local area network transceiver along with a *processing device* that is

operatively coupled to the wireless wide area network transceiver and to the wireless local area network transceivers wherein the processing device is operative to perform the above-identified operations. Accordingly, the *processing devices* may be programmed with executable instructions that when executed cause the processing device or devices to perform the operations described herein. As used herein, processing device includes one or more processing devices.” EX1018, ¶[0059]. In my opinion, a POSITA would have understood and found obvious that the processor disclosed in Kotzin is responsible for the bandwidth sharing functionality of its wireless units, which includes setting up bandwidth sharing, transmitting packets over the shared links, and receiving and assembling the packets over the shared links. *Id.* ¶¶[0023] (“For example, the processing apparatus 112 may execute instructions that are stored in memory 113 that cause the processing apparatus 112 to, among other things, determine whether the wireless apparatus 106a will allow shared use of its wireless local area network wireless resources with proximal wireless units 106b-106n.”); [0026] (“Memory 113 is operatively coupled to processor 112 and includes executable instructions that when executed by the processing device 112 causes the processing device 112 to, among other things, receive the data indicating whether the user desires to participate in allowing a wireless apparatus to share its wireless resources with proximal wireless units . . . [T]he processing device 112 also controls locating the proximal wireless units that

are in the local area network in response to determining that the wireless apparatus 106a is designated as a shared wireless resource.”). Accordingly, in my opinion, Kotzin discloses a *processor*.

- e. *transmit a first message through the first network interface to at least one server, wherein the first message includes a multilink request and a destination URL;*

93. In my opinion, Kotzin discloses or at least renders this limitation obvious. Here, I find it helpful to address the transmission of a *first message* and in particular its contents, including both the *multilink request* and the *destination URL*. Kotzin addresses when one of its wireless units wants to download information from an Internet Web server (or a similar network element) and wants to engage the participation of other proximal wireless units—in other words, engage in a *multilink* communication. In this situation, Kotzin discloses that the processor will send a request to the network element 104, which Kotzin describes may be embodied by an Internet Web server. EX1018, ¶[0035] (disclosing a “network element 400, such as a cellular base station (BS), Internet Web server, or any other suitable unit within the second wireless communication system 104”).

94. I have examined Figures 4 to 6 of Kotzin, which disclose that when wireless unit 106A (i.e., UNIT 1) has insufficient bandwidth to receive the desired amount of data from Internet Web server 400, wireless unit 106A may recruit other wireless units to share their available bandwidths with wireless unit 106A, thereby

increasing the total bandwidth made available to wireless unit 106A. Specifically, Kotzin explains that “[i]n this example, the wireless apparatus 106a is the destination unit within the wireless local area network 102. However, since it has insufficient bandwidth to receive the entire communication from the wide area network, other wireless apparatus 106b-106n that have agreed to participate to share their short range wireless resources, are used to retransmit portions of the communication that have been split by the wide area network 104 for distribution among the participating proximal wireless apparatus.” *Id.* ¶[0036]. Thus, in my opinion, a POSITA would have understood and found obvious that there is multilink communication within the network.

95. Moreover, in my opinion, a POSITA would have understood additional disclosures in Kotzin to support the conclusion that the bandwidth aggregation system sends a multilink request for this data transfer. Kotzin discloses that wireless unit 106A will send bandwidth distribution message 508 to Internet Web server 104, “notif[ying] the wide area network which of the plurality of proximal wireless units will participate in sharing the wireless resources for use in facilitating communication with the wireless apparatus 106a.” *Id.* ¶[0039]. As a response to message 508, the Internet Web server splits the requested data that is ultimately intended for wireless unit 106A such that “each of the participating proximal wireless units receives their respective subsets of the total information for the

destination unit (i.e., wireless apparatus 106a).” *Id.* ¶[0040]. In my opinion, a POSITA would have understood and found obvious that message 508 constitutes a multilink request, because the message requests that the Internet Web server 104 split the requested data to be sent to wireless unit 106A across multiple links.

96. Furthermore, in my opinion, a POSITA would have understood and found obvious that message 508 contains a destination URL when network element 400 is an Internet Web server. It is my understanding that the ’908 Patent broadly refers to URL as “a remote computer i.e. internet URL.” EX1007, 12:3-4. Accordingly, the term “URL” as used in the ’908 Patent refers to the destination address of the server element. In my opinion, a POSITA would have understood and found obvious that a message that is intended for Internet Web server 400 needs to contain a destination address in order to reach the intended destination on the network. A POSITA would have understood and found obvious that this message 508, intended for Internet Web server 104, needs to include its intended address of Internet Web server 104.

97. Finally, in my opinion, a POSITA would have understood and found obvious to use one of an IP address or a domain name as the destination URL, which is translated into numerical IP addresses via DNS servers on the Internet (e.g., www.cnn.com). EX1030, 200-01. In fact, HTTP is the protocol that a client typically uses to communicate with an Internet Web server, such as the type of communication

disclosed by Kotzin. EX1030 (TCP/IP For Dummies), 161 (“Web clients, which are also called browsers, communicate with the servers via HTTP, or HyperText Transfer Protocol. A Web browser is an HTTP client that sends requests to web server software. When you type a URL (Uniform Resource Locator) or click on a hypertext link, your browser creates an HTTP request and sends it to the IP address that’s represented by the URL (or Web address).”). To the extent Kotzin does not disclose use of HTTP and URLs specifically, it would be obvious to a POSITA to do so in light of Held given Kotzin’s teaching of communication with an Internet Web server, doing so would have been a routine use of a well-known technology, and it would have yielded predictable results with a reasonable likelihood of success. *See* EX1020 (Held), 765-66 (“When users access a Web page, they transmit a universal resource locator (URL) address that represents the document they wish to view. This address is transported using the HTTP within a packet. The HTTP consists of an address that totals fewer than 100 characters, which are used to frame the address to which the message is being transported, as well as the address of the originator of the request. The destination Web server uses the document address to locate the requested page on the server, retrieves it from disk, and forms a packet using the source address from the incoming packet as the destination address for the outgoing packets.”). Accordingly, in my opinion, Kotzin discloses transmit[ting] a first message through the first network interface to *[the]* server (bandwidth request

message 508 from wireless unit 106A to Internet Web server 104), *wherein the first message includes a multilink request* (request for server to split data across multiple links) *[and] the destination URL* (intended address of the receiving server).

f. transmit a second message through the second network interface to the at least one server, wherein the second message includes a multilink session identification that is unique to the multilink session and the destination URL; and

98. In my opinion, Kotzin discloses or at least renders this limitation obvious. I address here why Kotzin extends further to a *second* network interface and message including a session ID, as well as why that session ID would be the TCP/IP tuple. Continuing the example of wireless unit 106A in Kotzin's Figures 4-6 where wireless unit 106A selects additional proximal wireless units to participate in a multilink communication, wireless unit 106A subsequently sends a message to Internet Web server 400 via each of the other elements instructing the server to send a specific amount and rate of data to the other participating wireless units on behalf of wireless unit 106A. Specifically, Kotzin discloses that messages 510A-D in Kotzin's Figure 5 operate as control messages informing wireless units 106B-N (*i.e.*, Units 2-N) the amount of data that each unit is designated to obtain from Internet Web server 104 on behalf of wireless unit 106A. EX1018, ¶[0040]. Below I have annotated Kotzin's Figure 5 to illustrate how messages 510A-D operate as control messages.

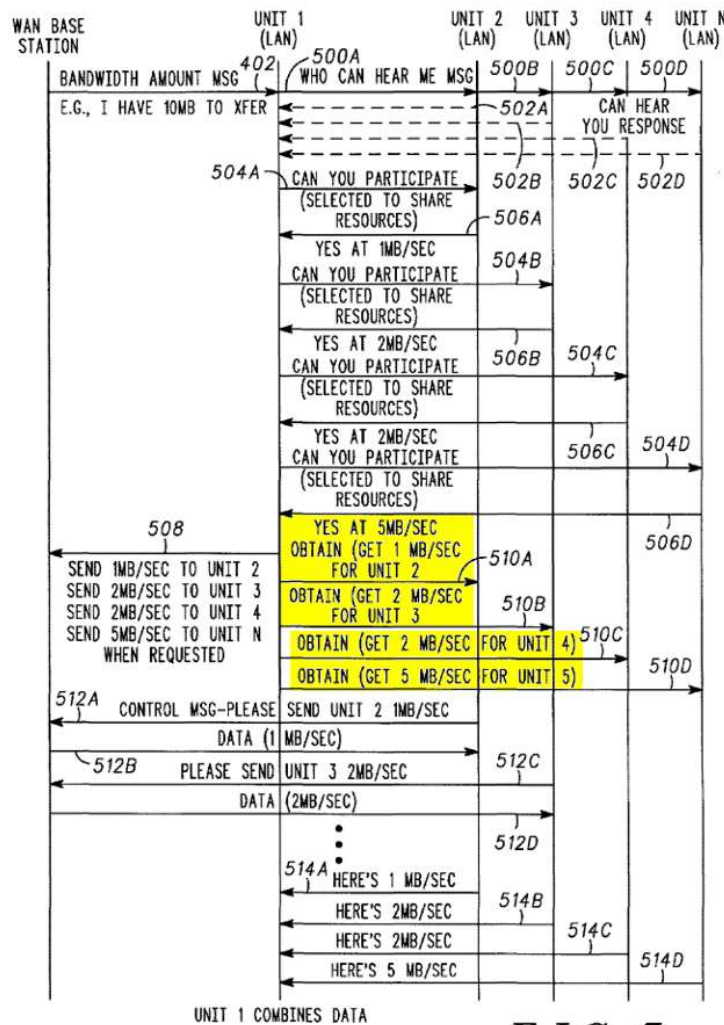


FIG. 5

99. *Id.* Fig. 5. Upon receiving messages 510A-D, wireless units 106B-N (*i.e.*, Units 2-N) subsequently relay this information (*i.e.*, the amount of data each unit is to receive on behalf of wireless unit 106A) to the network element 104 in the form of messages 512A-D. *Id.* In my opinion, a POSITA would have understood and found obvious that this relay mechanism is identical to the relay mechanism described in the '908 Patent. EX1007, 12:51-63 (disclosing that the initiating RCG

sends each of the participating remote RCGs a “multilink initialization packet” and that these remote RCGs then send the packet to the destination URL). Furthermore, in my opinion, a POSITA would have understood and found obvious that these messages 512A-D constitute a *second message*. Additionally, in my opinion, messages 510A-D also meet this limitation because they contain information that is relayed to Internet Web server 104 originating from UNIT 1.

100. Moreover, in my opinion, a POSITA would have understood and found obvious that messages 512A-D would contain both a multilink session identification and a destination URL. As I explained above, when network element 104 is an Internet Web server, the address of that Web server will be in the form of a URL. *See* ¶64. Furthermore, the other proximal wireless units need a way of knowing how to contact the Web server in order to properly relay the message from wireless unit 106A. Therefore, a POSITA would have understood and found obvious that messages 510A-D and relay messages 512A-D include the URL address of the Internet Web server, the intended destination.

101. Furthermore, in my opinion, a POSITA would have understood and found obvious that messages 512A-D would contain a multilink session identification. Kotzin explains that its wireless units share their bandwidth only for the duration of a particular communication session. EX1018, ¶[0021] (“Accordingly, a peer-to-peer communication technique is used to allow the

plurality of proximal wireless units to use each other's short range wireless communication resources for a given communication session including a data transmission session, voice or audio transmission session, or any other information as desired.”). In my opinion, a POSITA would have understood and found obvious that Kotzin's bandwidth aggregation system requires a unique session identifier that allows the bandwidth-sharing wireless units to differentiate the various communication sessions and participate only in the specific session in which they have agreed to participate.

102. For example, a POSITA would have understood and found obvious that the tuple used in TCP is a type of session identifier that is present in Kotzin's system. The TCP protocol running on top of the IP protocol is known as TCP/IP and this protocol is used with Web browsing. EX1043 [RFC 2663], Abstract. TCP employs a tuple, which is comprised of source IP address/port number, destination IP address/port number and the protocol in use, in order to uniquely identify a particular communication session. RFC 2663, which is the 1999 standard on network address translation in Internet communications, explains that “TCP/UDP sessions are uniquely identified by the tuple of (source IP address, source TCP/UDP port, target IP address, target TCP/UDP port).” EX1043 at §2.3 (note that UDP is a separate protocol that uses the same tuple as TCP). TCP/IP operates underneath the HTTP protocol that is used to browse Web pages. EX1048 (RFC 1945) (“On the

Internet, *HTTP communication generally takes place over TCP/IP connections.*”).

Thus, given that Kotzin expressly discloses Internet Web browsing and the need to differentiate between various communication sessions for the purpose of data sharing, a POSITA would have been motivated to use the TCP/IP tuple for identifying purposes, since the TCP/IP tuple would be present whenever wireless unit 106A communicates with Internet Web server 104. Furthermore, a POSITA would have been motivated to include the identifier with all communications associated with a given session (including the messages used to set up the multilink communication), thereby enabling Kotzin’s bandwidth-sharing wireless units to identif[y] a specific multilink [communication] session. This tuple also will be included whenever wireless unit 106A uploads data to Internet Web server 104 through another wireless unit 106B-N. Kotzin discloses that its system aggregates bandwidth not only in the downlink direction, but also in the uplink direction: “Once the wireless apparatus 106a has determined which of the wireless units in the local area network are proximal wireless units that have allowed sharing of their wireless resources, the wireless unit suitably splits the information that is destined for the wide area network among the wireless resources of the participating wireless apparatus . . . Each of the plurality of proximal wireless units then retransmits or conveys at least some of the transmitted split information to the wide area network as shown by messages 700a-700d.” EX1018, ¶[0042]. In my opinion, a POSITA

would have understood and found obvious that these uplink messages 700A-D initiate multilink communication and that each of these messages will include the address of the Internet Web server (destination URL) so that it can reach its intended destination and the TCP tuple which uniquely identifies that particular communication session (multilink session identification).

103. Under Ground IB, in my opinion, Kotzin in view of Peirce also renders obvious the session identification of this limitation. To the extent that Kotzin does not disclose the mechanism of a session identifier, in my opinion, it would have been obvious to a POSITA to use Peirce’s teaching of a “bundle mapping update packet” containing a session identifier with Kotzin’s bandwidth sharing system. *See* Section IX.A.1.e.

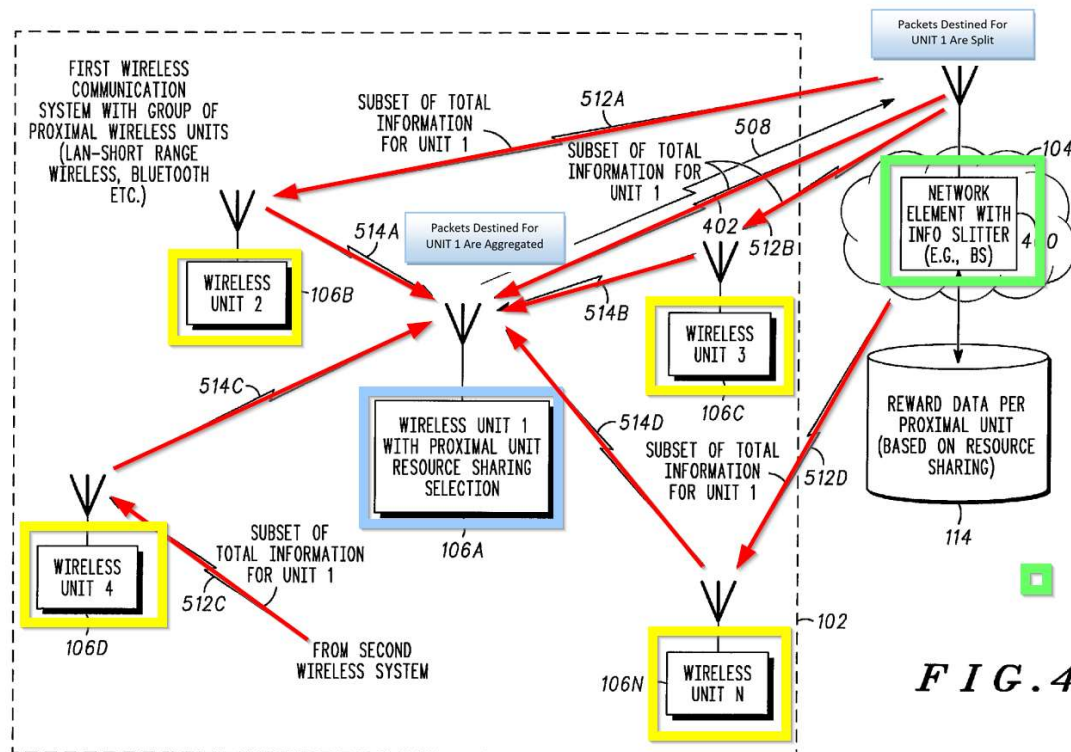
104. Under Ground IB, in my opinion, Kotzin in view of Held further renders this limitation obvious. To the extent Kotzin does not disclose the use of TCP/IP, it would have been obvious to a POSITA to use TCP/IP with Kotzin as taught by Held. Kotzin discloses that its network element 104 can be an Internet Web server. *See* ¶55. Relatedly, Held discloses that Internet communications are based on TCP/IP: “The elimination of price discrimination between voice and data services can lead to dramatic reductions in the price of voice calls, precipitating significant changes in market structure. These changes were first evident in the emergence of the Internet, a ubiquitous network of applications based on the TCP/IP.

Started as a text-based network for scientific communication, the Internet grew dramatically in the late 1980s and 1990s, once not-text-only applications became available. The Internet now reaches about half a billion computers, most of which are connected to it through the telephone network.” EX1020, 142. Based on Kotzin’s express disclosure of Internet-Web-based communications and Held’s disclosure that TCP/IP for Internet communications is “ubiquitous,” it would have been obvious to a POSITA to use TCP/IP (which employs the tuple session identifier) when communicating with Kotzin’s Internet Web server 104. In my opinion, the use of TCP/IP with Kotzin would have been obvious to try and would have been nothing more than combining prior art elements according to known methods and applying a known technique to a known device ready for improvement, both to yield a predictable result. Furthermore, given that TCP/IP was already well-known in the art at the time, in my opinion a POSITA would have had a reasonable expectation of success in implementing such a common and well-known technology as TCP/IP into Kotzin’s system. *See* Section IX.A.1.e. Accordingly, Kotzin in view of Held renders this limitation obvious.

- g. *receive concurrently the different data packets from the server through the first network interface and the second network interface of the client device during the multilink session, wherein the first data transfer rate and the second data transfer rate provide an increase in the data*

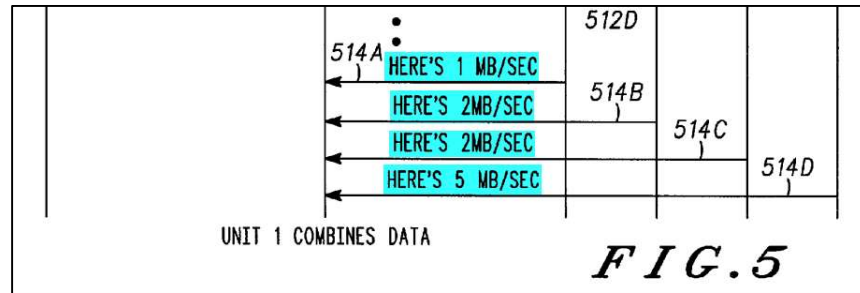
transfer rate of the client device.”

105. In my opinion, Kotzin discloses or at least renders this limitation obvious. I focus here not only on the limitations requirement of *provid[ing] an increase in the data transfer rate of the client device*, but also on the requirement unique to claim 17 over claim 1, the term *concurrently*. Below I have annotated Figure 4 to demonstrate the example of how UNIT 1 (wireless unit 106A) receives data directly from network element 104 (*e.g.*, an Internet Web server). As I explained above, UNIT 1 interfaces directly with WAN 104 using the claimed *first interface* (*e.g.*, a cellular interface). *See* Section IX.A.4.b. I have also annotated Figure 4 to demonstrate how UNIT 1 also receives data packets from the Internet Web server 104 over a *second interface* (*i.e.*, the 802.11 or Bluetooth interface(s) with another UNIT, or wireless units 106B-N). *See* Section IX.A.4.c.



EX1018, Fig. 4.

Using step 512B of Kotzin's Figure 5 as an example, which describes the system of Figure 4, Internet Web server 104 sends 1MB/SEC of data to UNIT 2 (*i.e.*, wireless unit 106B). EX1018, Fig. 5. Subsequently, in step 514A, UNIT 2 forwards this 1MB/SEC of data to UNIT 1 (*i.e.*, wireless unit 106A). At the same time, UNITS 3, 4 . . . N also forward data to UNIT 1 if they were initially selected to participate in the bandwidth sharing session. *Id.* As I also explained above, Kotzin discloses that the interface between UNIT 1 and each of the other UNITS is a non-cellular interface (*e.g.*, 802.11 or Bluetooth), rendering this interface the *second interface*. *See* Section IX.A.4.c.



EX1018, Fig. 5.

106. In my opinion, Kotzin also discloses *wherein the first data transfer rate and the second data transfer rate provide an increase in the data transfer rate of the client device*. Specifically, Kotzin illustrates in Figures 4 and 5 that UNIT 1 (i.e., wireless unit 106A) aggregates the data received from UNITS 2, 3, . . . N (i.e., wireless units 106B-N) with the data that UNIT 1 received directly from external network 104. As depicted in Figure 4, Kotzin discloses that “the wireless apparatus **106a itself may also participate in receiv[ing] a portion of the message destined for it.**” EX1018, ¶[0039], Fig. 4. Furthermore, Kotzin explains that UNIT 1 (i.e., wireless unit 106A) can direct the base station or server message 508 as to how “to split the portions of message so that apparatus 106a knows how to combine the message 514a-d” received from the other wireless units. Id. ¶[0041]. In this situation where UNIT 1 receives packets directly from the Internet Web server 104 and receives additional packets from the other participating wireless units, UNIT 1 aggregates the received packets to compile the overall communication. In my opinion, a POSITA would have understood and found obvious that the overall data

transfer rate to UNIT 1 is increased where UNIT 1 uses multiple links in parallel instead of the previously used single link. Accordingly, in my opinion, Kotzin discloses *receive ... the different data packets from the server through the first network interface and the second network interface* (interface between UNIT 1 and Internet Web server 104 and interface between UNIT 1 and another wireless unit connected to Internet Web server 104) *of the client device during the multilink session, wherein the first data transfer rate and the second data transfer rate provide an increase in the data transfer rate of the client device* (aggregate transfer rates from multiple parallel links being greater than transfer rate of single link).

107. It is my understanding that during the prosecution of related U.S. Patent No. 8,861,349, Patent Owner unambiguously stated that 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.” EX1012 (3/11/2014 Remarks), [[167]]. In my opinion, a POSITA would have understood that multilink PPP was merely one approach for concurrently receiving data over a multilink connection to increase bandwidth.

108. In my opinion, Kotzin discloses or renders obvious this *concurrent* limitation. Kotzin discloses that its wireless unit (*e.g.*, wireless unit 106A) can concurrently receive packets over multiple various interfaces and thereby increase

overall bandwidth. EX1018, ¶[0035] (disclosing that “other proximal units within the short range local area network 102 will receive portions of the communication on behalf of the destination wireless apparatus 106a,” which “increases system capacity and operational performance by aggregating the capabilities of several independent wireless apparatus 106b-106n”). As an example, Kotzin teaches that the data sent over the multilink connection can be in the form of voice or audio data. EX1018, ¶[0037] (“[T]he network element 400 receives a message in the form of data indicating an amount of data (i.e. **voice**, non-voice etc.) to be sent via the wide area network 104 for the wireless apparatus 106a.”); ¶[0021] (“Accordingly, a peer-to-peer communication technique is used to allow the plurality of proximal wireless units to use each other’s short range wireless communication resources for a given communication session including a data transmission session, **voice or audio** transmission session, or any other information as desired.”). In my opinion, a POSITA would have understood that in the circumstance of voice or audio data, the data being transferred is time-sensitive such that wireless unit 106A would *concurrently receive* the data directly from the network 104 (*the first data from the network*) with the data indirectly from the proximal wireless unit sharing its bandwidth (*the second data over a wireless connection from the second device*) (e.g., wireless unit 106B).

109. Furthermore, as I explained above, packets are transmitted from the Internet Web server to UNIT 1 (*i.e.*, wireless unit 106A) over multiple paths and through multiple interfaces with varying data transfer rates. *See* Section IX.A.4.g. In my opinion, a POSITA would have understood and found obvious that UNIT 1's receipt of packets is controlled by the various rates of transfer of the various interfaces. Thus, a POSITA would have further understood and found obvious that there are instances when Kotzin's UNIT 1 will receive data packets from the server on two interfaces at the same time (*i.e.*, *concurrently*).

5. Dependent Claim 4

- a. "The client device of claim 1, wherein the first information is comprised of at least one of an Internet address associated with the first network interface, and the second information is comprised of at least one of an Internet address associated with the second network interface."*

110. Note that claim 4 depends from claim 1 of the '908 patent; however, given that claim 17 recites at least the same limitations as claim 1, I find claim 1 obvious for the same reasons.

111. It is my understanding that there is no antecedent basis for *first information* and *second information* in this claim. It is my understanding that Petitioner submits that this claim is invalid for this reason. For the purposes of this claim, I find it helpful to address the presence of an *Internet address*.

112. In my opinion, it would have been obvious to a POSITA that when using TCP/IP, each network interface of wireless unit 106A would have an IP address (*i.e., Internet address*). This is how TCP/IP works: packets that are transmitted must have both a source IP address and a destination IP address. Further, when a device has more than one interface on which it can receive or transmit data, each interface must have its own IP address. This is a necessary, and non-optional part of the TCP/IP protocol. EX1030, 60-61.

113. Further, in the absence of a valid IP destination address, a TCP/IP packet would be undeliverable, and such a packet would be dropped by the network. *See id.* Thus, when Kotzin uses the TCP/IP protocol, it would be obvious that packets sent to each interface on wireless unit 106a would include the IP address of that interface as an IP destination address.

114. Accordingly, in my opinion, Kotzin discloses an *Internet address* (IP address) *associated with both the first network interface, and . . . the second network interface.*

B. Ground II: Claims 1-17 are Obvious in View of Phatak, or Alternatively Obvious in View of Held

115. As discussed in detail below, it is my opinion that Phatak (Ground IA) discloses or at least renders the Challenged Claims obvious. It is also my opinion

that a POSITA would have found the Challenge Claims obvious based on Phatak in combination with Held (Ground IB).

116. I do not explain every aspect or every claim limitation of Phatak and Held below. I have read and agree with the mapping of that prior art to the claim limitations provided in the Petition. However, to the extent that I believe context from the perspective of a POSITA is helpful, I provide below a discussion of certain claim limitations and how a POSITA would understand them. I also explain why a POSITA would find claims 8–12, 17, 4, 7 obvious in view of Phatak alone or in further view of Held, and why a POSITA would have been motivated to combine these.

1. Independent Claim 8

- a. “A server for multilink communication with a device, the server comprising:”*

117. In my opinion, Phatak discloses the preamble of claim 8. I find it helpful to address here the presence of a *server* providing *multilink communication*. Specifically, a POSITA would find it obvious that Host A acts as a server to Host B at least when it provides, e.g., streaming data to Host B. EX1045, 773 (“Suppose *A* wants to stream data to *B* across multiple interfaces to enhance the overall bandwidth.”). The communication between Host A and Host B is a multilink communication, as Phatak describes that both hosts have multiple interfaces that can both transmit and receive data. EX1045, Fig. 1; 773-775.

- b. one or more processors coupled to the at least one server network interface and configured to*

118. In my opinion, Phatak discloses or renders obvious this limitation. I primarily address here the disclosure and obviousness of the limitation term *processor*. Phatak notes that Host A may be, *e.g.*, a laptop computer. EX1045, 773 (“For instance, host *A* might be a laptop at an airport with access to the Internet via an 802.11 LAN (say interface *A1*), a Bluetooth scatternet (*A2*), and a cellular phone modem (*A3*).”). A POSITA would find it obvious that laptop computers include *processors*, such as a CPU, which control the network communications of the laptop (Host A). Before the Priority Date, it was well-known that laptops had processors; indeed, a processor designated the Central Processing Unit (CPU) was required for a laptop to function at all. Indeed, CPUs were a well-known invention to POSITAs at the time.

119. Further, in my opinion, a POSITA would have understood and found obvious that a server, such as Phatak’s Host A, is controlled by *one or more processors*, for all the same reasons that I explained above with regard to Kotzin and Decasper. *See* Section IX.A.1.c.

- c. receive a first multilink packet over the at least one server network interface, the first multilink packet comprised of a request for a multilink communication and first information associated with first network communication interface of the device that is capable of*

being used by the device to receive data packets

120. In my opinion, Phatak discloses this limitation or renders it obvious. Here, I find it helpful to address the presence of *a first multilink packet* and, in particular, the *first information* in that packet, including an IP address.

121. To initiate the multilink communication, Host B may send a request to Host A using TCP/IP, such as a SYN packet. EX1045, Abstract, 775. A POSITA would find obvious that this request will include the TCP/IP tuple, as all TCP/IP communications do, and the tuple will include Host B's IP address. EX1045, 775. In particular, the IP address will be related to the interface used by Host B to send the request, *e.g.*, its 802.11 interface. This IP address constitutes *first information associated with first network communication interface of the device*. A POSITA would find it obvious that the interface *is capable of being used by the device to receive data packets* because, as noted in Phatak, Host B's interfaces (including its 802.11 interface) can receive video from Host A. EX1045, 773-775.

d. sending a data packet including the multilink session identification to the first network communication interface of the device;

122. In my opinion, Phatak discloses or renders this limitation obvious. I find it helpful to address here the *session identification* disclosed by Phatak, *i.e.*, the TCP/IP tuple.

123. As noted above, the TCP/IP tuple will be included in the multilink communications from Host A to Host B. *See* Section IX.B.1.c. Phatak uses IP-in-IP tunneling to encapsulate a TCP/IP packet inside another IP packet, where the inner packet includes the TCP/IP tuple, as all TCP/IP packets do. EX1045, 775. Note that the tuple is obviously unique to a specific communication session, as stated by Phatak. EX1045, 775 (“When the packet reaches its destination, *B*, it is not recognized as belonging to an established connection since a TCP connection is uniquely identified by the tuple (source IP address, source port, destination IP address, destination port.).”).

2. Dependent Claim 11

- a. “The server of claim 8, wherein the one or more processors is further configured to receive a multilink packets comprised of multilink information associated with which one of the first network communication interface of the device, the second network communication interface of the device and the third network communication interface of the device is to be removed from the multilink session.”*

124. In my opinion, Phatak discloses or renders obvious claim 11. Here, I find it helpful to discuss primarily Phatak’s means of communicating IP addresses, *i.e., multilink information*, as well as which device *is to be removed from the multilink session*.

125. Phatak notes that a host may use unused TCP/IP header fields to communicate the addresses of which interfaces may receive data. EX1045, 775

(“The first issue is how to make *A* and *B* aware of any multiple IP addresses the other may have. To accomplish this, IP and/or TCP headers and their processing would have to be modified. This is similar to the solution in SCTP which allows initialization chunks to list multiple addresses. While such modifications would interfere with interoperability and typically break ‘something else’, we believe that using some more of the full header length allowed (by TCP, IPv4 and IPv6) and employing some of the unused fields is a fairly transparent solution.”). Phatak further discusses rerouting packets on the multipath connection (“[i]f the route through an interface becomes congested packets can simply be sent through an alternate interface”), which a POSITA would find obvious to include adding and removing interfaces. EX1045, 774. In other words, a POSITA would have found obvious that given this disclosure, Host A receives multilink information about the status of each participating interface of Host B, and uses it to remove the relevant (suboptimal) interfaces. It would be obvious to a POSITA that Host B would be the host notifying Host A of whether its interfaces are no longer available and should be removed.

3. Dependent Claim 12

- a. “The server of claim 8, wherein the one or more processors is further configured to receive different multilink packets over the at least one server network interface at different periods of time.”*

126. In my opinion, Phatak discloses or renders obvious claim 12. Here, I address only why Phatak discloses the *different periods of time* portion of this

limitation. Phatak allows Host A to use a single interface to communicate with multiple of Host B's interfaces. EX1045, 774. In that situation, it would have been obvious to a POSITA that the packets sent by multiple of Host B's interfaces would be sent *at different periods of time*, and would be received serially. A POSITA would have understood that data packets received serially would by definition be received one after another, necessitating that they are received at different periods of time.

4. Independent Claim 17

- a. transmit a first message through the first network interface to at least one server, wherein the first message includes a multilink request and a destination URL;*

127. In my opinion, Phatak discloses or renders this limitation obvious. I find it helpful to address here the presence of a *destination URL* in the *first message*.

128. As noted with respect to claim 8, when using an 802.11 interface and, *e.g.*, streaming video via Host A, Host B will send a request including the TCP/IP tuple. *See* Section IX.B.1.c. In my opinion, it would be obvious to a POSITA that this request would contain a destination URL. As defined in the '908 specification, a "URL" is "a remote computer i.e. internet URL." EX1007, 12:3-4. The request would only reach a web server if an address was included, and a POSITA would find it obvious that such an address would be included in a URL. A POSITA would further find it obvious that such an address could be an IP address or, alternatively, a domain name, the protocol usually used to communicate with Internet servers,

which is then translated to an IP address via Internet DNS servers. EX1030, 200-01; *see, e.g.*, EX1030 (TCP/IP For Dummies), 161 (on typical use of HTTP). Phatak notes that the Internet is one such use case for its solution. EX1045, 773. A POSITA would thus find it obvious that Host B's HTTP requests to the server (Host A) include a destination URL. *See* EX1020 (Held), 765-66.

129. For the same reasons discussed in Sections IX.A.4.e and IX.A.4.f above with regard to Kotzin, a POSITA would have been motivated to use Held's teaching of HTTP and URLs with Phatak, given Phatak's above-mentioned teaching of Internet server communication.

- b. receive concurrently the different data packets from the server through the first network interface and the second network interface of the client device during the multilink session, wherein the first data transfer rate and the second data transfer rate provide an increase in the data transfer rate of the client device."*

130. In my opinion, Phatak discloses or renders this limitation obvious. I find it helpful to address here the *concurrently* term in this limitation. *See* EX1045, Abstract ("We have analyzed the performance characteristics of the aggregation scheme and demonstrated significant gain when the links being aggregated have similar bandwidth and latency."), 773 ("this paper investigates the simultaneous use of multiple network interfaces to enhance the overall bandwidth available to a wireless node."). A POSITA would understand Phatak's disclosure of *simultaneous*

use of multiple network interfaces to encompass the *concurrently* term of this claim limitation. It would be obvious to a POSITA that packets would be transmitted over multiple network interfaces at the same time given that the purpose of Phatak is bandwidth aggregation (*see* EX1045, Abstract), and as they are, it would be obvious to a POSITA that these packets would be received *concurrently*.

X. SECONDARY CONSIDERATIONS

131. 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 '649 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

132. For all the reasons discussed above, it is my opinion that each and every claim of the '908 patent is invalid.

133. 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

Declaration of Bill Lin in Support of Petition for *Inter Partes* Review of U.S. Patent No. 10,868,908

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 1, 2025

Respectfully submitted,

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

Bill Lin