

Declaration of Bill Lin in Support of Petition for *Inter Partes* Review of U.S.
Patent No. 11,582,343

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. 11,582,343
Issued: February 14, 2023
Filed: August 15, 2022
Inventor: Eric M DeLangis
Title: Device 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.

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

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

I, Bill Lin, do 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. 11,582,343 (“the ’343 Patent”) (Ex. 1003), 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 ’343 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 ’343 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 ’343 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 ’343 Patent and its file history, the reference

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

II. BACKGROUND AND QUALIFICATIONS

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

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

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

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

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

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

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

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

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

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

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

III. UNDERSTANDING OF PATENT LAW

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

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

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

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

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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 '343 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 '343 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 '343 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 '343 Patent. It is my opinion that each and every Challenged Claim would have been obvious to a person of ordinary skill in the art (“POSITA”) at the time of the alleged invention in view of the knowledge of a POSITA and prior art cited in the Petition and as further explained in this declaration.

27. It is my opinion that Claims 1-20 are obvious in view of Challenger (Ex. 1017).

28. It is my opinion that Claims 1-20 are obvious in view of Challenger (Ex. 1017), Peirce (Ex. 1044), and Held (Ex. 1020).

29. It is my opinion that Claims 1-20 are obvious in view of Kotzin (Ex. 1018).

30. It is my opinion that Claims 1-20 are obvious in view of Kotzin (Ex. 1018), Peirce (Ex. 1044), and Held (Ex. 1020).

V. OVERVIEW OF THE TECHNOLOGY

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

VI. THE '343 PATENT

A. Claims

32. The '343 Patent titled "Devices and Methods for Multipath Communications" issued from U.S. Patent Application No. 17/887,922 ("922 Application"), which claims priority to Provisional Application No. 60/418,521 ("521 Application"), filed on October 15, 2002. The '343 Patent discloses devices and methods for combining voice, data, and video communications and transmitting these communications over multiple paths, thereby increasing available bandwidth and data throughput.

33. The '343 Patent has 20 claims, of which claims 1 and 12 are independent claims. The independent claims are directed to devices capable of providing broadband communications services.

34. Independent claim 1 of the '343 Patent claims a method for providing an effective bandwidth comprised of the bandwidth from two separate networks.

Claim 1 is reproduced below:

A computer-implement method for a first device to communicate via a wide area network, comprising the steps of:

connecting the first device to a first network with a first bandwidth via a second device;

connecting the first device to a second network having a second bandwidth using a third device;

establishing a connection through which data may be transferred between the first device and a fourth device by concurrently using a first portion of the first bandwidth and a second portion of the second bandwidth, the connection having an effective bandwidth including the first portion of the first bandwidth and the second portion of the second bandwidth;

and receiving by the first device a data set from the fourth device via the connection, wherein a portion of the data set is received through the first network and a portion of the data is received through the second network.

Ex. 1003, claim 1.

35. Independent claim 12 of the '343 Patent similarly claims a device for providing an effective bandwidth comprised of the bandwidth from two separate networks. Claim 12 is reproduced below:

A communication device capable of providing broadband communications services comprising:

a first connection via a first device to a first network having a first bandwidth including an allocated first portion of the first bandwidth;

a second connection via a second device to a second network having a second bandwidth including an allocated second portion of the second bandwidth; and

a third connection to a remote device via the first network and the second network, the third connection having an effective bandwidth including the allocated first portion of the first bandwidth and the allocated second portion of the second bandwidth;

wherein, in response to transmitting a request to the remote device via the third connection, the communication device receives a response from the remote device wherein a portion of the response is received via the first network and a portion of the response is received via the second network.

Id., claim 12.

B. Specification

36. According to the specification, Local Exchange Companies, (“LECs”) had a “strangle hold” over “the ‘last mile’ of copper over which almost all residential customers receive their communications services.” Ex. 1003, 1:30-34. Competitive Local Exchange Companies (“CLECs”) worked to resell existing services offered

by LECs but were not able to truly compete in the market. *Id.* 1:45-63. 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.* 2:14-17. 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.* 2:17-20. 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.* 2:20-30. 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.* 2:31-38. Accordingly, the specification identifies a need for residential customer access to higher speed connections that do not require DSL, cable modems, or replacing last mile communication infrastructure.

37. To address this problem in the art, the ’343 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.*

2:41-44. The RCG has additional capabilities of a hands-free speakerphone device with a touch display, which can provide video telephone services. *Id.* 2:45-50.

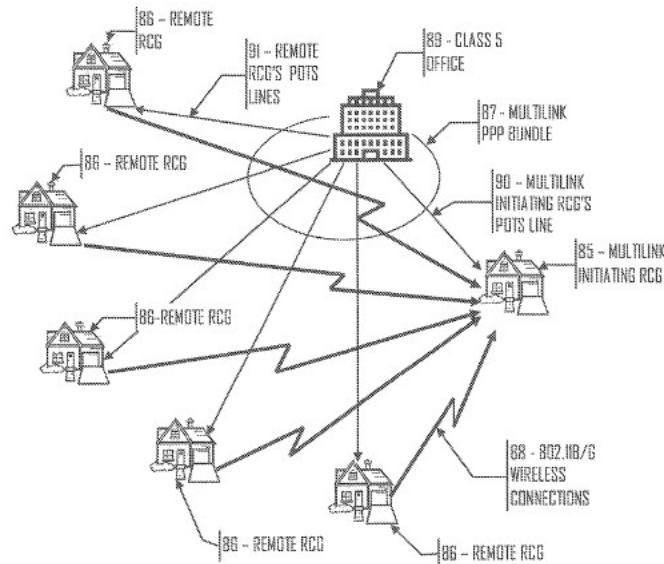
38. The alleged benefit of the RCG is that a Competitive Local Exchange Company (CLEC) can offer a variety of services to customers using the existing POTS line, and it doesn't require the expensive enhancements of the network infrastructure like DSL and Cable services. The specification further explains that the RCG can be readily deployed to quickly expand CLEC customer bases because extra equipment is not needed. *Id.* 3:17-31. 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.*, 3:32-36.

39. The specification describes an RCG receiving data over at least two separate communication paths and combines the paths to increase bandwidth. *Id.*, Abstract. It further indicates that the RCG has "a main system processor that is responsible for all house keeping and traffic routing tasks." *Id.* 3:11-13. 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.*, 2:60-62. Devices like telephones, FAX machines, computers, or Local

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Area Network (LAN) can be connected to the RCG via the built in Universal Serial Bus (USB) or the Ethernet interface. *Id.*, 2:51-59.

40. The RCG also “implements broadband” over POTS by using an 802.11b/g wireless interface to configure a PPP multilink bundle. *Id.* 11:28-30. 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.* 11:41-44. 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.* 11:45-50. 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.* 11:50-59. For example, Figure 7 shows “an ad-hoc wireless LAN configuration with ppp multilink data distribution and wireless connectivity.”



Id., 4:25-26, Fig. 7.

41. Elements like wired and wireless networks, residential voice and data services, including IP routers, Class 5 circuit switches, and wireless LANs, sharing and dynamically routing and allocating bandwidth including through standardized methods like Multilink PPP, sending packets and allocating bandwidth through protocols like the Link Control Protocol for Multilink PPP, and routing tables such as those available in IP router devices were well known in the art at that time. Indeed, the specification itself confirms these elements were widely used in the communications field. *See id.*, 2:60-3:9 (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), 1:27-30, 2:14-30, 2:42-44 (stating an RCG's primary function is

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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), 11:28-44 (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), 12:5-14:12 (describing well-known Link Control and Multilink PPP protocols for sending packets and allocating bandwidth), 15:13-25 (describing routing tables used by IP router devices).

C. Prosecution History

42. I have reviewed the prosecution history of the '343 Patent. I understand that the application leading to the '343 Patent was originally filed with 20 claims and that it was then allowed without any substantive prosecution.

43. I understand that the examiner indicated that Claim 1 is allowable over the prior art of record “since the cited references taken individually or in combination fail to particularly teach or fairly suggest establishing a connection between a first device and a fourth device by concurrently using a first portion of a first bandwidth and a second portion of a second bandwidth, and receiving a portion of the data sent through a first network and a portion of the data through a second network.” Ex. 1004 at [[104]] (December 15, 2022, Notice of Allowance).

44. I understand that Claim 12 was similarly allowed with the examiner noting “the cited references taken individually or in combination fail to particularly

teach or fairly suggest receiving a portion of a response via a first network and a second network in response to transmitting a request to a remote device via the third connection, the third connection to the remote device via the first network and the second network having an effective bandwidth including the allocated first portion of the first bandwidth and the allocated second portion of the second bandwidth.”

Id.

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

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

D. Person of Ordinary Skill in the Art

47. 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.

48. In determining the characteristics of a hypothetical person of ordinary skill in the art of the '343 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 '343 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.

49. In my opinion, taking all of the factors into account, a person of skill in the art for the '343 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.

50. 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

51. 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.

52. 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

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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.

53. 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

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

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

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

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

A. Ground I: Claims 1-20 Are Rendered Obvious By Challenger Alone Or In View Of Peirce And Held

1. Independent Claim 1

a. [1.1] “Connecting the first device to a first network having a first bandwidth via a second device;”

57. I agree with the various network mappings for the claimed “first network” that are set forth in the Petition:

Mapping	“First Device”	“Second Device”	“First Network”
1	End user terminal 108B	BSD 202B	The connection from 108B through BSD 202B and its telecommunications provider up to and including the Internet and the Internet server with which 108B is communication
2	End user terminal 108B	BSD 202A	The connection from 108B through BSD 202B, BSD 202A, and 202A’s telecommunications provider up to and including the Internet and the Internet server with which 108B is communication
3	BSD 202B	BSD 202A	The connection from BSD 202B through BSD 202A and 202A’s telecommunications provider up to and including the Internet and the Internet

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Mapping	“First Device”	“Second Device”	“First Network”
			server with which 108B is communication

58. Relating to how a POSITA would understand the requirement of a “network,” in my opinion a POSITA would understand that a network is simply two or more computers connected together. Ex. 1057 at 9-16. There can be intervening devices between these computers, such as routers and switches, and there can be a combination of different links, for example a combination of wired and wireless links. *Id.*

59. A POSITA would also understand that a network can be comprised of multiple networks. *Id.* at 52. The classic example of this type of network is the Internet, which is a global network comprised of hundreds of thousands of different networks. *Id.* at 16, 52. The ’343 patent itself acknowledges a network can be comprised of multiple networks. For example, claim 2 claims a network that “comprises at least one wireless network.” The use of both “comprises” and “at least one” indicates that a network can be made up of multiple different networks.

60. Turning to the specific mappings in the Petition, in my opinion, a POSITA would have found obvious and understood that in the Challenger system, user terminal 108B, the bandwidth sharing device 202B, and the telecommunications provider 102, including the internet and the internet server, with which 108B is in

communication create a network. Similarly, a POSITA would have found obvious and understood that user terminal 108B, the bandwidth sharing device 202A, and the telecommunications provider 102, including the internet and the internet server, with which 108B is in communication create a network. Finally, a POSITA would have found obvious and understood that the bandwidth sharing device 202A, the bandwidth sharing device 202B, and the telecommunications provider 102, including the internet and the internet server, with which 108B is in communication create a network.

61. Furthermore, Challenger’s system is designed with the explicit goal of aggregating and sharing bandwidth across these last mile connections, effectively integrating individual user networks into a larger, interconnected system. Ex. 1017 ¶ [0002]. In practical terms, this means that the local network formed by the bandwidth sharing device and its immediate connections operates as a component within the broader context of the Internet. This hierarchical network structure—where local segments are nested within larger networks—is a foundational principle in network engineering, supporting scalable and efficient data communication across diverse physical and logical domains.

62. Another claim term that I think would benefit from some discussion is “bandwidth.” A POSITA would have understood that bandwidth is the maximum amount of data that can be transmitted over a network per unit time. Bandwidth is a

primary property of any data network. When devices are using a network at the same time, bandwidth must be distributed among these devices.

63. When a network is comprised of multiple networks, the overall bandwidth of that network is limited by the network with the lowest respective bandwidth. Let us assume, for example, the Computer 1 and Computer 2 are connected together over Network A. Let us further assume that Network A is made up of Networks B, C, and D, and that the respective bandwidths are 100 mb/s, 50 mb/s, and 20 mb/s. The fastest rate at which Computer 1 can receive data from Computer 2 is 20 mb/s—the bandwidth of Network D—even though Networks B and C have high bandwidth. The reason is that Network D acts as a bottleneck, preventing data from reaching Computer 2 at any speed greater than 20 mb/s. Thus, a POSITA would say that composite Network A—which is made up of multiple different networks—has a bandwidth of 20 mb/s.

64. Thus, using MAPPING 1 as an example, a POSITA would understand that the overall connection between an Internet Web server and 108B (“first network”) has a bandwidth (the claimed “first bandwidth”) that is limited by the bandwidth of the last mile connection 110 between 202B and its telecommunications provider, as it has the lowest bandwidth of the multiple networks. Challenger itself explains that the “[d]ue to low bandwidth capability, the last mile telecommunications lines 110 prove to be a significant bottleneck precluding

broadband connectivity between the Internet 104 and the end user terminals 108, even though abundant transmission capacity is available on the broadband telecommunications lines 106.” Ex. 1017, ¶ [0036], *see also* ¶ [0006]. Accordingly, the bandwidth of bandwidth of the last mile connection 110 defines the total bandwidth of the entire “first network,” as it puts a limit on the total amount of data that can be transmitted to and from 108B over a given time period.

b. [1.2] “connecting the first device to a second network having a second bandwidth via a third device;”

65. I agree with the various network mappings for the claimed “second network” that are set forth in the Petition:

Mapping	First Device	Second Device	Third Device	First Network	Second Network
1	End user terminal 108B	BSD 202B	BSD 202C	The connection from 108B through BSD 202B and its telecommunications provider up to and including the Internet	The connection from 108B through BSD 202B, BSD 202C, via wireless connection 204, and 202C’s telecommunications provider up to and including the Internet and the Internet server with which 108B is communication
2	End user terminal 108B	BSD 202A	BSD 202C	The connection from 108B through BSD 202B, BSD 202A, and 202A’s telecommunications	The connection from 108B through BSD 202B, BSD 202C, and 202C’s telecommunications

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Mapping	First Device	Second Device	Third Device	First Network	Second Network
				provider up to and including the Internet	provider up to and including the Internet and the Internet server with which 108B is communication
3	BSD 202B	BSD 202A	BSD 202C	The connection from BSD 202B through BSD 202A and 202A's telecommunications provider up to and including the Internet	The connection from BSD 202B through BSD 202C and 202C's telecommunications provider up to and including the Internet and the Internet server with which 108B is communication

66. Turning to the specific mappings in the Petition, in my opinion, a POSITA would have found obvious and understood that in the Challenger system, user terminal 108B, the bandwidth sharing device 202B, the bandwidth sharing device 202C, and the telecommunications provider 102, including the internet and the internet server create a network. Similarly, a POSITA would have found obvious and understood that user terminal 108B, the bandwidth sharing device 202B, the bandwidth sharing device 202C, and the telecommunications provider 102, create a network. Finally, a POSITA would have found obvious and understood that the bandwidth sharing device 202B, the bandwidth sharing device 202C, and the

telecommunications provider 102 with which 202B is in communication create a network.

67. Hundreds of devices can be connected to a given network. Bandwidth is a primary property of network. When devices are using a network at the same time, bandwidth must be distributed among these devices. For the same reasons as I explained above, in my opinion, a POSITA would have understood that the bandwidth of the second network would have been limited to the bandwidth over this connection because the slave bandwidth sharing device would not be able to send or receive transmissions from the telecommunications provider 102 at a rate higher than that permitted by connection 110. Ex. 1017, ¶¶ [0018]; [0006]; [0036]; *see* § IX.A.1.a.

c. [1.3.ii] “concurrently using a first portion of the first bandwidth and a second portion of the second bandwidth”

68. I also think it is helpful for me to discuss this limitations use of the term “concurrently.” Based on the Challenger disclosure, in my opinion, a POSITA would have understood that when sending data packets over multiple different networks, those networks work independently and can be used independently. Accordingly, both networks can be used to send and receive data between 108B and an Internet server at the same time, i.e., concurrently. The concurrent and independent use of the networks is necessary to increase bandwidth and avoid the bottleneck problem

(i.e. being limited by the network with the least amount of bandwidth). Using each network serially would not increase the overall bandwidth. In other words, the bandwidth would be limited to the bandwidth of the network with the least amount of bandwidth. Under this scenario, data would be sent through the first network first, and after the completion of this transfer, data would be sent through the second network. If the second network experienced bottleneck issues, the overall bandwidth would be limited. Only by using two networks simultaneously, the bandwidth can be increased.

69. Indeed, Challenger discloses that the remote site (fourth device) “sends 704 some of the packets directly to the master bandwidth sharing device 202 and sends 704 some of the packets to one or more slave bandwidth sharing devices 202.” Ex. 1017, ¶ [0065], Fig. 7. “Thus, some of the packets are received 706 by the Master bandwidth sharing devices 202 and some are received 708 by the one or more slave bandwidth sharing devices 202.” *Id.* ¶ [0066]. “The packets received by the slave bandwidth sharing devices 202 are then transmitted 710, preferably wirelessly, to the master bandwidth sharing device 202” which “receives 712 and assembles 714 the packets.” *Id.* Challenger effectively teaches a method of using multiple networks simultaneously in order to increase bandwidth and avoid the bottleneck problems. Accordingly, it is my opinion that Challenger discloses the concurrent use of a portion of the first and second networks. Challenger explains that “bandwidth sharing

device **202B**, might be operating in master mode while the bandwidth sharing devices **202A** and **202C** are operating in slave mode.” *Id.* ¶ [0046]. I note here that “while” and “concurrent” both mean “at the same time.” Accordingly, in my opinion, a POSITA would have understood that the word “while” means that the links for both the master and the slave operations are being concurrently used. Using the networks concurrently is the only logical avenue since the concurrent use multiple networks is necessary to increase bandwidth and avoid the bottleneck problem.

2. Dependent Claim 2 and 3

- a. “[2.] The computer-implemented method of claim 1, wherein the second network comprises at least one wireless-network” and “The computer-implemented method of claim 2, wherein the wireless network comprises a cellular network.”*

70. As discussed in the table in Section IX.A.1.b, the second network includes wireless communication 204. Challenger describes network communication 204 as the wireless link used for communication between BSDs to aggregate bandwidth across multiple last mile telecommunications lines. The type of wireless network used for this communication is IEEE 802.11 (commonly known as Wi-Fi). Ex. 1017, ¶ [0039].

71. In my opinion, it would have been obvious to a POSITA for the wireless communications (network) 204 to be implemented as a cellular network. At the time

of the alleged invention, it was generally known in the art that there were several kinds of wireless networks. This is consistent with Challener's disclosure that many wireless networks are "commonly known in the prior art." *Id.* Cellular networks had been developed and were in use by the late 1970s and early 1980s. By the late 1990s, advancements in technology led to the expansion of digital wireless mobile networks.

72. Therefore, in my opinion a POSITA would have been familiar with cellular networks as one of the many types of wireless networks and would have understood that the second wireless network in Challener's system as a design option could comprise a cellular network. Moreover, it would have been obvious to a POSITA to modify Challener to use a wireless network to facilitate the communications in Challener's system which would confer benefits, like extended communication range, over other wireless technologies.

3. Dependent Claim 4

- a. "The computer-implemented method of claim 1, wherein the first network is selected from the group consisting of a public wired network, a private wired network, a public wireless network, and a private wireless network."*

73. It is helpful for me to discuss the terms public and private networks. Challener discloses that its last mile telecommunications lines 110 establish connectivity to telecommunications providers 102, which in turn interface with the Internet 104 via broadband telecommunications lines 106. *Id.*, ¶ [0034]- [0035], Fig.

2. A POSITA would have recognized that the Internet is inherently composed of a combination of interconnected networks, encompassing public wired networks, private wired networks, public wireless networks, and private wireless networks. Ex. 1057 at 9-16, 52. Consequently, by virtue of connecting to the Internet, Challenger's bandwidth sharing device (BSD) is capable of interfacing with each of these network types.

74. Additionally, Challenger discloses that its telecommunication provider networks are accessed by subscribers. *Id.* ¶ [0009]. Because one needs to be a subscriber, the network is private. It was well understood that connections may be classified as either private or public, depending on factors such as whether a subscription is required for access, or firewall or gateway configurations, which restrict or permit access to specific user groups. Ex. 1057 at 410-412. Further, Challenger's telecom networks are accessed through dedicated physical connections such as copper lines to individual residences, further confirming that they are private. *Id.* ¶¶ [0006], ¶ [0035]. Thus, Challenger's system renders it apparent to a POSITA that the first network may be a private or public, wired or wireless network, consistent with established networking practices.

75. Furthermore, Challenger discloses wireless or wired networks. Ex. 1017, ¶ [0039]. It states that "[i]n the preferred embodiment, the communications between the end user terminals 108 and the [BSDs] 202 can occur over land lines,

as in the case of a hardwired local area network, as well as through *wireless communications* over *wireless networks* as commonly known in the prior art.”. Thus, Challenger also renders obvious the *communications network* being a *private wireless network* or a *private wired network*.

4. Dependent Claim 10

- a. “The computer-implemented method of claim 1, wherein the step of connecting the first device to a first network having a first bandwidth via a second device includes the first network having current available bandwidth equal to or in excess of a minimum bandwidth.”

76. It is helpful for me to address the requirements of a first network having current available bandwidth equal to or in excess of a minimum bandwidth. In my opinion, a POSITA would have known that if a network has no bandwidth, it will not allow any devices to join. Additionally, referring to MAPPING 1 in the petition, a POSITA would have understood that 108B would connect to the Internet through BSD 202B (the claimed “first network”) only when 202B’s connection to its telecommunications provider has sufficient bandwidth to allow that connection, namely, there is an excess of a minimum bandwidth. Indeed, Challenger notes that the last mile telecommunications lines 110 are “bottlenecks” “precluding broadband connectivity between the Internet 104 and the end user terminals 108, even though abundant transmission capacity is available on the broadband telecommunications lines 106.” Ex. 1017, ¶ [0036], *see also* ¶ [0035]. Furthermore, referring to

MAPPINGS 2 and 3, a POSITA would have understood that BSD 202A will not share its bandwidth with 108B and 202B if it does not have sufficient bandwidth. Indeed, slave bandwidth sharing devices communicate the amount of bandwidth they will share with other devices and the bandwidth sharing in Challenger is not mandatory and a device can decline to share the bandwidth. Ex. 1017, ¶ [0046], [0048].

5. Dependent Claim 11

- a. “The computer-implemented method of claim 1, further comprising the step of assigning a session identifier to the connection.”*

77. I discuss here assigning session identifier to the connection, which would provide additional context to the analysis in the petition. In practical network implementations, Challenger’s bandwidth aggregation system requires a session identification mechanism to manage multiple concurrent sessions. Ex. 1017, ¶ [0049]. This is efficiently achieved using standard techniques such as random or protocol-derived session IDs, which are well-established in network protocol design.

78. Session identifiers (“session IDs”) were well-known and were regularly used to correctly route packets at the time of the invention. An arbitrary or randomly generated number has been a common and straightforward example of such session identifies. The use of such arbitrary or randomly generated numbers for tracking sessions was well known in the art as of 2002. Further, randomly generated session

IDs have been used with web-based applications since at least 2001. For example, session IDs were generated by the web server and stored in a cookie in order to “to associate[] a group of online actions with a specific user.” Ex. 1049 at 3. Further, the Real Time Streaming Protocol (RFC 2326), a protocol used since 1998, generated session IDs and included them in the packet headers of packets send between client and server. Ex. 1055, §3.4. Random session IDs are also used in other well-known protocols: The Session Initiation Protocol used from 1999, and the Dynamic Host Configuration Protocol from 1997. Ex. 1046 (RFC 2543); Ex. 1047 (RFC 2131), §2 (using a random number “Transaction ID” that is “used by the client and the server to associate messages and responses between a client and a server”).

79. Moreover, in my opinion, the tuple, a session identifier used in TCP/IP would be present in Challenger’s system and would have been known and obvious to a POSITA. Challenger discloses the use of TCP/IP protocol for wireless communications among its BSDs. Ex. 1017 ¶ [0015] (“[T]he logic unit is preferably configured to allow for packet transmission among multiple [BSDs] using commonly employed protocol families, such as **TCP/IP** and ATM.”). The TCP protocol running on top of the IP protocol is known as TCP/IP and this protocol is used with Web browsing. Ex. 1043 (RFC 2663), Abstract. TCP employs a tuple, which is comprised of source IP address/port number, destination IP address/port number (and the protocol identifier) 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).” Ex. 1043 §2.3 (note that UDP is a separate protocol that uses the same tuple as TCP). Further, TCP/IP operates underneath the HTTP protocol that is used to browse Web pages. Ex. 1043 §2.3. Thus, given that Challenger 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. A POSITA would have also understood and known to use the tuple could, just like a randomly generated session ID, in Challenger as part of the data payload in communications associated with a particular session—including the messages exchanged with the bandwidth-sharing units. It would help the bandwidth-sharing units identify a specific multilink communication session. *See* Ex. 1043.

80. Furthermore, given the widespread adoption of TCP/IP and HTTP protocols for Internet communications, as described in Held, a network engineer would have implemented session identification using established methods such as the TCP/IP tuple, which is technically compatible with the bandwidth sharing framework in Challenger. For example, Challenger states that it’s invention “relates to

the field of . . . bandwidth aggregation and sharing of ‘last mile’ telecommunications lines among end-users on the Internet.” Ex. 1017, ¶ [0002], *see also* ¶¶ [0018], [0046], [0063]-[0066], Figs. 6 (illustrating a “method of sending communications to a remote site on the Internet during the bandwidth sharing”), Fig. 7 (illustrating a “method of receiving communications from a remote site on the Internet during the bandwidth sharing”). Similarly, 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.” Ex. 1020, 142. Based on Challenger’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).

81. In my opinion, the use of TCP/IP with Challenger 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. Challenger discloses the use of TCP/IP for communications among BSDs. Ex. 1017, ¶¶ [0015], [0052]. 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 Challenger's system.

82. 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.” Ex. 1044, 2:59-64. Thus, Peirce discloses that its bundle mapping update packet includes a bundle ID that identifies the particular session. *Id.* 2:57-65.

83. Both Peirce and Challenger address the technical challenge of utilizing multiple communication links between a source and destination to transmit a partitioned data stream, which is subsequently reassembled at the destination. Ex. 1017, Abstract; Ex. 1044, 2:57-65. This architectural approach is fundamental to bandwidth aggregation systems. A POSITA would have recognized that Peirce's

mechanism for session identification—specifically, the use of a session identifier within a bundle mapping update packet—serves as an effective means of tracking and coordinating data packets across multiple links. Ex. 1044, 2:59-64 (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”). Integrating such a session identification mechanism into Challenger’s bandwidth sharing framework would have been a straightforward application of established techniques, facilitating reliable packet reconstruction and session management. The implementation of this feature would have been well within the routine capabilities of a POSITA, leveraging common packet-based communication protocols to ensure that all data fragments are correctly associated with their respective sessions. The predictability and compatibility of this integration underscore its technical obviousness.

84. Moreover, in my opinion, Peirce and Challenger both relate to using multiple links between a source and destination to send a split data stream that is later reconstructed into a single data stream at the destination. Ex. 1017, Abstract; Ex. 1039, Abstract. Accordingly, in my opinion, a POSITA would have found it obvious to use Peirce’s teaching to implement monitoring and keeping track of

Challener's packets. In my opinion, using a mechanism such as Peirce's session identifier with Challener'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 Challener's bandwidth sharing system using routine computer programming techniques.

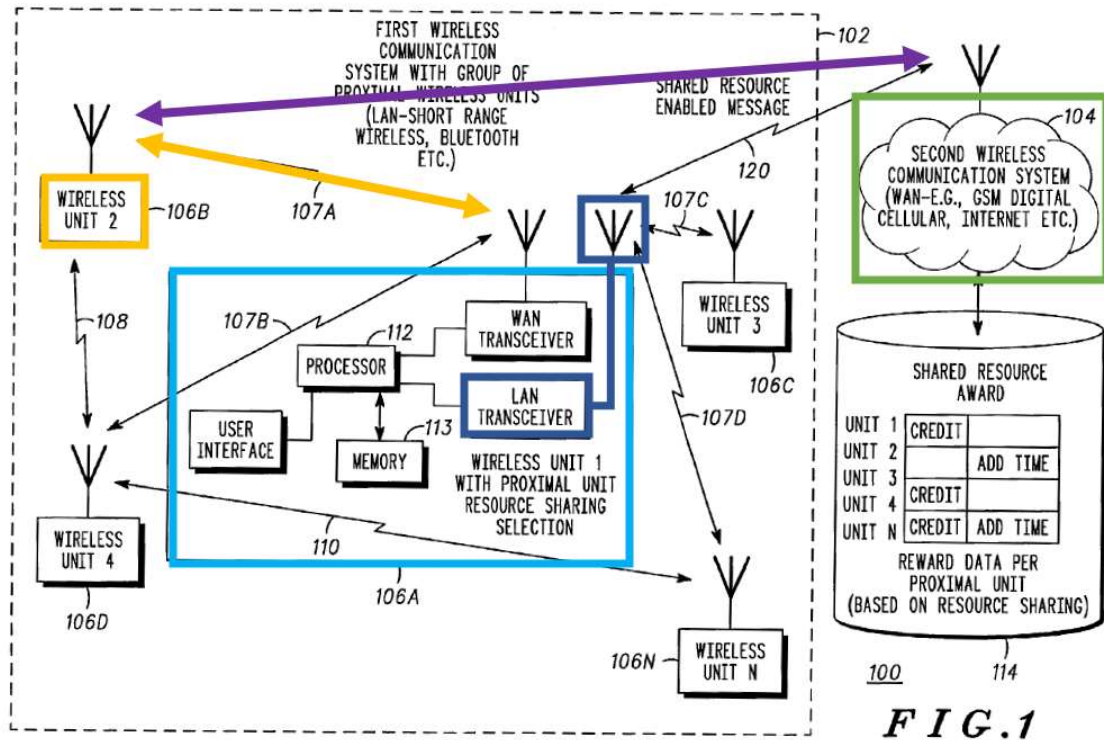
B. Ground II: Claims 1-20 Are Obvious Over Kotzin Alone Or In View Of Peirce And Held

1. Independent Claim 1

- a. [1.pre] "A computer-implemented method for a first device to communicate via a wide area network, comprising the steps of:"*

85. I think it is helpful for me to provide here an additional explanation why Kotzin renders obvious a computer implemented method. In my opinion, a POSITA would have understood and found it obvious that Kotzin's method is computer implemented. Per Kotzin's Fig 1, which I have annotated to highlight the components of the Kotzin's wireless unit, the wireless unit 1 (106A, light blue) includes a LAN transceiver (dark blue) allowing it to connect to one or more other wireless units (*e.g.*, unit 2, 106B, orange). Ex. 1018, Fig. 1. These wireless units, in

turn, use their WAN transceivers to connect (purple) unit 1 to a wide area network
such as the Internet (green):



86. Ex. 1018, Fig 1; *see also id.*, ¶ [0022]. Kotzin further explains that the wireless units including 106A include “a processing apparatus 112, such as a digital signal processor, microprocessor, discrete logic or any other suitable circuitry that provides the proximal resources sharing selection” and may “execute instructions that are stored in memory.” *Id.*, ¶ [0023]. In my opinion, a POSITA would have understood or, at the very least, found it obvious that such components confirm that Kotzin’s method is computer implemented. I briefly explain here why a POSITA would have understood that a network (like WAN#1 and WAN#2) has an associated bandwidth. As I explained above, a POSITA would have understood that bandwidth

is the maximum amount of data that can be transmitted over a network per unit time.

Bandwidth is a primary property of any data network. The overall bandwidth of a network is distributed among the devices. Accordingly, a device being connected to a network uses the associated bandwidth of that network.

b. [1.3.ii] “concurrently using a first portion of the first bandwidth and a second portion of the second bandwidth”

87. It is helpful for me to discuss this limitations use of the term “concurrently.” In my opinion, a POSITA would have understood that when sending data packets over multiple different networks, those networks work independently and can be used independently. Accordingly, both WAN # 1 and WAN # 2 can be used to send and receive data between the units and an Internet server at the same time, *i.e.*, concurrently. As I explained above, the concurrent and independent use of the networks is necessary to increase bandwidth. *See* IX.A.1.c.

88. Indeed, Kotzin explains that the communication from the internet is split across “the participating proximal wireless apparatus,” including the apparatuses forming the first and second networks.” Ex. 1018, ¶[0036]; *see also id.*, at Figs. 4-6. Kotzin explicitly states that these different portions of the communication correspond to “differing portions of the bandwidth for the destination apparatus,” *e.g.*, the first device. *Id.* ¶[0041]. Accordingly, Kotzin teaches that wireless unit 1 concurrently uses the bandwidth allocated to wireless

unit 2 (on WAN #1) and wireless unit 4 (on WAN #2) to receive data from Internet web server 400. It is through sending the packets concurrently over WAN #1 and WAN #2 that the overall bandwidth is increased.

2. Dependent Claim 4

- a. “The computer-implemented method of claim 1, wherein the first network is selected from the group consisting of a public wired network, a private wired network, a public wireless network, and a private wireless network.”*

89. In my opinion, Kotzin discloses the additional limitation of claim 4. Kotzin discloses that each UNIT may communicate over “a digital cellular communication system, *the Internet*, or any other suitable communication system.” Ex. 1018, ¶¶ [0022], [0035]-[0037], [0040] (describing operation of LAN 102 and cellular base station transmitting over cellular network), Figs. 1, 4. In my opinion, a POSITA would have understood that the cellular networks are private networks, because only subscribers can access them. *Id.* ¶ [0003] (stating that wireless units are subscribers).

3. Dependent Claim 9

- a. “The computer-implemented method of claim 1, wherein the first portion of the first bandwidth comprises substantially all the first bandwidth.”*

90. I think it is helpful for me to explain here why the first portion of the first bandwidth comprises substantially all the first bandwidth. In Kotzin, the system is structured so that each wireless unit participating in a bandwidth sharing session

is encouraged to contribute as much of its available bandwidth as possible to the collective communication effort. Kotzin enables each proximal wireless unit to specify the amount of bandwidth it is willing to share for a given session, and the overall design is aimed at maximizing the total throughput and efficiency of the aggregated connection. As a result, a POSITA would understand that a wireless unit involved in such a session may allocate “substantially all” of its available bandwidth to the group, since the protocol and system incentives are aligned to promote maximal sharing. This is further supported by the implementation of a “reward data” mechanism, as described in Kotzin (Ex. 1018, ¶ [0025]), which compensates users for sharing their bandwidth. The reward system provides a direct incentive for users to contribute as much bandwidth as possible, reinforcing both the technical and practical motivations for each unit to donate the majority, if not all, of its available bandwidth during a session.

4. Dependent Claim 11

- a. “The computer-implemented method of claim 1, further comprising the step of assigning a session identifier to the connection.”*

91. I think it is helpful for me to provide additional context here for the step of assigning a session identifier to the connection. Kotzin explains that its wireless units share their bandwidth only for the duration of a particular communication session. Kotzin further explains that it uses “a peer-to-peer communication

technique . . . to allow the plurality of proximal wireless units to use each other's short-range wireless communication resources for a given communication session.”

Ex. 1018, ¶ [0021]. A POSITA would therefore understand that Kotzin's system must include a way to identify a particular session, thereby allowing the wireless units to identify and engage only in the specific sessions they have agreed to participate in. As discussed in detail in Section IX.A.4, such a session ID may be simply an arbitrary or randomly generated number.

92. In the context of Kotzin's system, which explicitly supports Internet web browsing, a POSITA would understand and find obvious to use the TCP/IP five-tuple as a robust session identifier, enabling precise differentiation and management of simultaneous data exchanges. Ex. 1043 (RFC 2663), Abstract. The tuple is comprised of source IP address/port number, destination IP address/port number (and the protocol identifier 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).” Ex. 1043 §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. Ex. 1043 §2.3. Given that Kotzin explicitly describes Internet Web browsing and highlights the necessity of

distinguishing between multiple communication sessions for effective data sharing, a POSITA would have been motivated to employ the TCP/IP tuple as a session identifier. The TCP/IP tuple, which is inherently present whenever wireless unit 106A communicates with Internet Web server 104, provides a robust mechanism for uniquely identifying each session. This mechanism within the protocol stack enables precise tracking of individual sessions, thereby supporting accurate routing and efficient resource allocation among participating wireless units. A POSITA would have understood and found obvious for the primary flow between Kotzin's wireless unit and the Internet, to use the tuple, just like a randomly generated session ID, as part of the data payload in communications associated with that session—including the messages exchanged with the wireless units. The bandwidth-sharing wireless units would thereby be able to identify a specific multilink communication session. *See* Ex. 1043.

93. 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. Ex. 1044, 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." Ex. 1044, 2:59-65. The use of a session ID as taught by Peirce would have been compatible with Challener's disclosed architecture, and the session ID would be included with all data packets as a coordinating reference that ensures 108B receives all packets destined for it while at the same time satisfying Challener's express teaching that the wireless units may share bandwidth with multiple other devices at the same time.

94. Data packets in Peirce's system include a bundle ID in the transport layer protocol payload, which in the case of Peirce's disclosure is UDP. Ex. 1044, 5:60-6:21. Given Kotzin's express teaching of the need for a session identifier, it would have been obvious to a POSITA to incorporate Peirce's teaching of a session identifier into the TCP layer payload that the other wireless units would reference when they receive data from Internet Web server 400, and based upon which they forward the data to UNIT 1.

95. A POSITA would have been motivated to combine Kotzin with Peirce. 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***. Ex. 1018, ¶ [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. Ex. 1018, ¶ [0042], Fig. 7.

96. 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. Ex. 1018, Abstract; Ex. 1044, 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.

5. Independent Claim 12

- a. [12.1] "*a first connection via a first device to a first network having a first bandwidth including an allocated first portion of the first bandwidth;*"

97. Hundreds of devices can be connected to a given network. As I explained above, bandwidth is a primary property of network. When devices are using a network at the same time, bandwidth must be distributed among these devices. Accordingly, a POSITA would understand and find it obvious that any data network, including a WAN, has an overall bandwidth, and that a device on that network will be allocated a portion of that bandwidth. Ex. 1018, ¶ [0039]. Kotzin teaches that "the method includes identifying to the wide area network which local area network units . . . will participate in sharing of the resources," including "the maximum bandwidth that was provided by each of the proximal wireless units" as available for sharing. *Id.* 1018, ¶ [0039]. Kotzin adds that each participating unit communicates with the WAN "to receive *the portion of the bandwidth* of the communication that is destined for the wireless apparatus 106a." *Id.*, ¶ [0040]. Per Kotzin's disclosure, a portion of the bandwidth can be *allocated* to units in a way

that “one megabit per second can be sent to the wireless apparatus 106b, two megabits per second can be sent to wireless apparatus 106c,” and so on. *Id.*, ¶ [0039]. Moreover, “the wireless apparatus 106a itself may . . . participate in receive a portion of the message destined for it,” a portion of bandwidth is, in that case, also *allocated* to unit 1. *Id.* ¶ [0039]. After the units communicate the bandwidth, the WAN transmits “to each of the participating wireless units,” including in the embodiment noted above, unit 1, “subsets of the total information destined for the wireless apparatus 106a,” which are transmitted over the bandwidth *allocated* to each participating unit, including unit 1 (for example, “one megabit per second” for unit 2, “two megabits per second” for unit 3, and so on). *Id.* ¶¶ [0039]-[0040].

X. SECONDARY CONSIDERATIONS

98. 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 '343 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

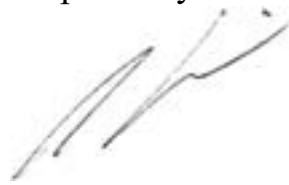
99. For all the reasons discussed above, it is my opinion that each and every claim of the '343 Patent is invalid.

Declaration of Bill Lin in Support of Petition for *Inter Partes* Review of U.S.
Patent No. 11,582,343

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

Dated: July 31, 2025

Respectfully submitted,

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

Bill Lin