

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MICROSOFT CORPORATION,
Petitioner,

v.

INTERDIGITAL PATENT HOLDINGS, INC.,
Patent Owner.

IPR2024-00538
U.S. Patent No. 9,173,054
Issued: October 27, 2015
Application No. 14/251,383
Filed: April 11, 2014

Title: DATA TRANSFER BETWEEN WIRELESS DEVICES

DECLARATION OF PETER RYSAVY

MICROSOFT CORP.
EXHIBIT 1203

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I, Peter Rysavy, do hereby declare as follows:

I. INTRODUCTION AND ENGAGEMENT

1. I have been retained as an independent expert on behalf of Microsoft Corporation in connection with the above-captioned Petition for *Inter Partes* Review (“IPR”) to provide my analyses and opinions on certain technical issues related to U.S. Patent No. 9,173,054 (hereinafter “the ’054 Patent”).

2. I am being compensated at my usual and customary rate for the time I spent in connection with this IPR. My compensation is not affected by the outcome of this IPR.

3. Specifically, I have been asked to provide my opinions regarding whether claims 1, 3-10, 12, 14-15, 21, 23, 25-32, 34, 36-37, 43, 46-47, and 49-50 (each a “Challenged Claim” and collectively the “Challenged Claims”) of the ’054 Patent would have been obvious to a person having ordinary skill in the art (“POSITA”) as of April 11, 2014. It is my opinion that each Challenged Claim would have been obvious to a POSITA after reviewing the prior art discussed herein.

II. BACKGROUND AND QUALIFICATIONS

4. I am an expert in the fields of wireless networking and communications. More specifically, I have expertise in Bluetooth, Wi-Fi, and mobile systems. In formulating my opinions, I have relied upon my training, knowledge, and experience in the relevant art. A copy of my curriculum vitae is appended to this declaration as

Appendix A and provides a description of my professional experience, including my academic and employment history, publications, conference participation, awards and honors, and more. The following is a brief summary of my relevant qualifications and professional experience.

5. I graduated with BSEE and MSEE degrees from Stanford University in 1979, with my master's degree emphasizing communications technologies.

6. From 1988 to 1993, I was vice president of engineering and technology at Traveling Software (later renamed LapLink), at which projects included LapLink, LapLink Wireless, and connectivity solutions for a wide variety of computing platforms, including handheld laptops and handheld devices. During this period, I was responsible for evaluating wireless communications technologies for use with the LapLink file transfer and synchronization product families. I also managed the development of a short-range wireless modem called LapLink Wireless that replaced a serial-data cable connection between computers.

7. Prior to Traveling Software, I spent seven years at Fluke Corporation, where I worked on data-acquisition products and touchscreen technology. My work in touchscreens included analyzing technologies used for touchscreens and developing new touchscreen technology.

8. I am now the president of the consulting firm Rysavy Research LLC and have worked as a consultant in the field of networking systems and wireless

technology since 1993. As a consultant I specialize in wireless systems, including the wireline networking systems that support them. My work includes working with networking protocols at all layers of the protocol stack, including the TCP/IP family of protocols. One of my clients in 1994 was McCaw Cellular (which later became AT&T Wireless), the leading U.S. cellular company at the time. I did multiple projects for McCaw Cellular, helping me develop my expertise in networking technologies.

9. Beginning in 1994, I began teaching public courses, including courses that I taught at Portland State University, the University of California at Los Angeles, at conferences, and through my own organization. These courses included content about cellular networks, Wi-Fi and other wireless local area networks, Bluetooth, paging, and mobile-application architectures.

10. Past projects have included reports on the evolution of networking technologies, evaluation of wireless technologies, analysis of mobile applications, strategic consultations, system design, articles, courses and webcasts, network performance measurement, test reports, and involvement in multiple patent litigation cases. My past and current clients include more than one hundred organizations.

11. I have written more than one hundred and ninety articles, reports, and papers, and have taught more than forty public courses and webcasts, on networking

technologies and mobile systems. I have also performed technical evaluations of many networking technologies.

12. From 2000 to 2016, as part of my consulting practice, I was the executive director of the Portable Computer and Communications Association (PCCA), which was formally incorporated in May of 1993, then operated as the Wireless Technology Association. The PCCA's mission was to promote the interoperability of wireless-data systems, and its initial work was to develop specifications for interfaces between computers and wireless modems.

13. I have extensive experience with standards and specifications in the wireless industry, including analyzing standards and specifications documents associated with dozens of projects, and being the executive director of the Portable Computer and Communications Association (PCCA) for sixteen years, an organization that developed wireless interoperability specifications, one of which became adopted by the TIA/EIA as the TIA/EIA-678 standard.

14. In the more than twenty-five years of my consulting career, I have studied or worked with nearly every major wireless technology related to cellular networks and wireless local-area networks, as well as the wireline networks associated with them.

III. **MATERIALS CONSIDERED AND INFORMATION RELIED UPON REGARDING '054 PATENT**

15. In preparing this declaration, I have reviewed the following materials bearing Exhibit Nos. that I understand are being referenced in the IPR to which my declaration accompanies:

LIST OF EXHIBITS

No.	Description
1201	U.S. Patent No. 9,173,054 (“ the '054 patent ”)
1204	U.S. Patent Application Publication No. 2011/0083111 to Forutanpour et al. (“ Forutanpour ”)
1205	U.S. Patent Application Pub. No. 2008/0166967 to Christopher D. McKillop (“ McKillop ”)
1206	International Patent Application Pub. No. WO 2005/1072895 to Peter Hoddie (“ Hoddie ”)
1207	U.S. Patent Application Pub. No. 2007/0191028 to Hinckley et al. (“ Hinckley ”)
1208	Sidhu et al., <i>Emerging Wireless Standards – WiFi, ZigBee and WiMAX</i> , International Journal of Electronics and Communication Engineering Vol. 1 No. 1 (2007)
1209	Harry Newton, Newton’s Telecom Dictionary, 20 th Updated and Expanded Edition (excerpted) (2004)
1210	U.S. Patent Application Pub. No. 2009/0034498 to Banerjea et al. (“ Banerjea ”)
1212	U.S. Patent Application Pub. No. 2007/0135046 to Kapur et al. (“ Kapur ”)
1213	U.S. Patent Application Pub. No. 2009/0215398 to Adler et al. (“ Adler ”)

No.	Description
1214	Bluetooth Specification Version 1.1, Vol. 2, “Profiles” (Feb. 22, 2001)
1215	Megowan et al., Infrared Data Association® (IrDA®) Object Exchange Protocol OBEX™ Version 1.3 (Jan. 3, 2003).
1216	Postel et al., RFC 959, File Transfer Protocol (FTP) (Oct. 1985)
1217	K. Sollins, RFC 1350, The TFTP Protocol (Revision 2) (Jul. 1992)
1218	Frodigh et al., <i>Wireless ad hoc Networking - The Art of Networking Without a Network</i> , Ericsson Review No. 4 (2000)
1219	U.S. Patent Application Pub. No. 2007/0146347 to Louis B. Rosenberg (“ Rosenberg ”)
1220	Cheverst et al., <i>Exploring Bluetooth Based Mobile Phone Interaction with the Hermes Photo Display</i> , Proceedings of the 7 th International Conference on Human Computer Interaction with Mobile Devices and Services (Sept. 2005)
1221	User’s Guide for Nokia N72 (2006)
1222	U.S. Patent No. 7,356,347 to David Kammer (“ Kammer ”)
1223	Phil Karn, <i>MACA - A New Channel Access Method for Packet Radio</i> , The Proceedings of the 9th ARRL Computer Networking Conference (1990)
1224	Chatzimisios et al., <i>Optimisation of RTS/CTS Handshake in IEEE 802.11 Wireless LANs for Maximum Performance</i> , IEEE Communications Society Globecom 2004 Workshops (2004)
1225	Nokia 9500 Communicator User Guide (2004-2005)
1226	User’s Guide for Nokia N95 (2007)
1227	U.S. Patent Application Pub. No. 2005/0113079 to Hui Guo (“ Guo ”)
1228	U.K. Patent Application Pub. No. GB 2,439,364 to Turner et al. (“ Turner ”)

No.	Description
1229	U.S. Patent Application Pub. No. 2004/0242216 to Demetrios Boutsikakis (“ Boutsikakis ”)
1230	U.S. Patent No. 7,043,548 to Stephane Bouet (“ Bouet ”)
1231	Brad A. Myers, <i>The Importance of Percent-Done Progress Indicators for Computer-Human Interfaces</i> , Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (Apr. 1985)
1232	U.S. Patent Application Pub. No. 2009/0140986 to Karkkainen et al. (“ Karkkainen ”)
1233	U.S. Patent Application Pub. No. 2007/0124503 to Ramos et al. (“ Ramos ”)
1234	U.S. Patent No. 8,059,111 to Phil Harrison (“ Harrison ”)
1235	U.S. Patent Application Pub. No. 2006/0026521 to Hotelling et al. (“ Hotelling ’521 ”)
1236	Westerman et al., <i>Multi-Touch: A New Tactile 2-D Gesture Interface For Human-Computer Interaction</i> , Proceedings of the Human Factor and Ergonomic Society 45th Annual Meeting, at 632-636 (2001)
1237	Jun Rekimoto, <i>Pick-and-Drop: A Direct Manipulation Technique for Multiple Computer Environments</i> , Proceedings of the 10th Annual ACM Symposium on User Interface Software and Technology (1997)
1238	U.S. Patent Application Pub. No. 2008/0009309 to Hwang-hyeon Gha (“ Gha ”)
1239	Pravin Bhagwat, <i>Bluetooth: Technology for Short-Range Wireless Apps</i> (Jun. 2001)
1242	U.S. Patent Application Pub. No. 2003/0134629 to Ollis et al. (“ Ollis ”)
1244	U.S. Patent Application Pub. No. 2006/0097991 to Hotelling et al., (“ Hotelling ’991 ”)

No.	Description
1245	U.S. Patent Application Pub. No. 2008/0168384 to Platzer et al. (“ Platzer ”)
1246	U.S. Patent No. 7,479,949 to Jobs et al., (“ Jobs ”)
1247	U.S. Patent Application Pub. No. 2008/0143685 to Lee et al. (“ Lee ”)
1253	Bluetooth Specification Version 1.1, Vol. 1, “Core” (Feb. 22, 2001)
1254	European Patent Application Pub. No. 1,489,783 to Anders Angela (“ Angelhag ”)
1255	U.S. Patent Application Pub. No. 2005/0289195 to Lehtola et al. (“ Lehtola ”)
1257	Information Disclosure Statement for Lehtola filed June 23, 2004
1260	User Guide for Nokia N91 (2006)
1261	User Guide for Nokia N75 (2006)
1262	User Guide for Nokia 9300 (2005)
1265	David Pogue, iPhone The Missing Manual (1st ed. Aug. 2007)
1266	U.S. Provisional Patent Application No. 61/140,126 to Carlton et al. (“ the ’126 provisional ”)
1267	U.S. Patent Application Pub. No. 2007/0011335 to Burns et al. (“ Burns ”)
1268	Yardena Arar, <i>Bluetooth to Work with Wi-Fi</i> , NetworkWorld (Feb. 12, 2008)
1274	U.S. Patent Application Pub. No. 2005/0281237 to Heinonen et al. (“ Heinonen ”)
1275	Full Claims Listing (1, 3-10, 12, 14-15, 21, 23, 25-32, 34, 36-37, 43, 46-47, 49-50)
1276	U.S. Patent No. 7,102,640 to Aholainen et al. (“ Aholainen ”)

No.	Description
1277	Bluetooth Technology To Harness The Speed Of 802.11, Feb 11, 2008
1278	Megowan et al., Infrared Data Association® (IrDA®) Object Exchange Protocol OBEX™ Version 1.5 (Aug. 14, 2009).
1279	U.S. Patent No. 7,333,514 to Anehem et al. (“ Anehem ”)
1281	U.S. Patent Application No. 13/493,650 to Carlton et al. (“ 650 application ” or “ grandparent application ”)
1282	U.S. Patent Application No. 12/644,948 to Carlton et al. (“ 948 application ” or “ great-grandparent application ”)
1285	U.S. Patent Application No. 13/390,743 to Carlton et al. (“ 743 application ” or “ parent application ”)

IV. UNDERSTANDING OF PATENT LAW

16. I am not an attorney. For the purposes of this declaration, I have been informed about certain aspects of the law that are relevant to my opinions. My understanding of the law was provided to me by the Petitioner's attorneys.

17. I understand that when considering the scope of the claims of a patent that the patent claim terms should generally be given the ordinary meaning that the terms would have to a person of ordinary skill in the art in question after reading the patent as of the earliest claimed priority date. As discussed below, it is my opinion that the challenged claims are not entitled to the earliest priority date asserted by the '054 patent. However, in my opinion, the meaning of the claim terms would not have materially differed to a person of ordinary skill in the art ("POSITA") whether the claims were evaluated at the time of the earliest claimed priority date (2008) or at the time the application that led to the '054 patent was filed (2014).

18. I understand that the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the term appears, but in the context of the entire patent, including the specification. I further understand that the principal considerations regarding the scope and meaning of the claims are the plain language of the claim (including the surrounding claim language and context), the patent specification, and the prosecution history. I understand that while a claim is to be read in light of the specification, one must generally avoid

importing limitations into the claim from the specification. I am also informed that the prosecution history can often inform the meaning of the claim by demonstrating how the inventor understood the invention and whether the inventor limited the invention in the course of prosecution, making the claim scope narrower than it would otherwise be. I applied these understandings when considering the scope and meaning of the claims of the '054 patent.

19. I understand that a prior art reference anticipates an asserted claim, and thus renders the claim unpatentable, if all elements of the claim are disclosed in that prior art reference, either explicitly or inherently (i.e., necessarily present or implied).

20. I further understand that a claim is unpatentable if it would have been obvious. Obviousness of a claim requires that the claim would have been obvious from the perspective of a POSITA at the time the alleged invention was made. I understand that a claim could have been obvious from a single prior art reference or from a combination of two or more prior art references. I understand that an obviousness analysis requires an understanding of the scope and content of the prior art, any differences between the alleged invention and the prior art, and the level of ordinary skill in evaluating the pertinent art.

21. I further understand that a claim would have been obvious if it unites old elements with no change to their respective functions, or merely substitutes one

element for another known in the field, and that combination yields predictable results. While it may be helpful to identify a reason for this combination, I understand that there is no strict requirement of finding an express teaching, suggestion, or motivation to combine within the references. 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 POSITA can implement a predictable variation, obviousness likely bars its patentability. For the same reason, if a technique has been used to improve one device and a POSITA would recognize that it would improve similar devices in the same way, using the technique would have been obvious. I understand that a claim would have been 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 further understand that certain factors may support or rebut the obviousness of a claim. I understand that such secondary considerations include, among other things, commercial success of the patented invention, skepticism of those having ordinary skill in the art at the time of invention, unexpected results of the invention, any long-felt but unsolved need in the art that was satisfied by the alleged invention, the failure of others to make the alleged invention, praise of the alleged invention by those having ordinary skill in the art, and copying of the alleged invention by others in the field. I understand that there must be a nexus—a

connection—between any such secondary considerations and the alleged invention. I also understand that contemporaneous and independent invention by others is a secondary consideration tending to show obviousness.

23. I am not aware of any allegations by the named inventors of the '054 patent or any assignee of the '054 patent that any secondary considerations tend to rebut the obviousness of any Challenged Claim of the '054 patent.

24. I understand that in considering obviousness, it is important not to determine obviousness using the benefit of hindsight derived from the descriptions found in the patent being considered.

25. I understand that other challenges to the patentability of a patent, including patent ineligibility, enablement, written description, and definiteness or clarity of claim language, cannot be raised in IPR proceedings before the Board. However, I also understand that if Patent Owner wishes to rely on the filing date of earlier ancestor applications, those ancestor applications must provide a description that clearly allows persons of ordinary skill in the art to recognize that the inventor invented what is claimed, such that the disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date.

26. I further understand that a patent claim is not entitled to claim priority to an ancestor application unless the ancestor application contains an adequate

written description of the claimed invention. I further understand that, to meet the written description requirement, it is not enough that the claims would have been obvious in view of the disclosure. I also understand that the written description requirement requires that the disclosure of the claimed subject matter must be: (1) express or necessarily present, (2) complete, and (3) unambiguous.

27. I understand that Petitioner has the burden of proving unpatentability by a preponderance of evidence, which means that the claims are more likely than not unpatentable. I further understand that a patent claim is not entitled to claim priority to an ancestor application unless the ancestor application contains an adequate written description of the claimed invention.

28. The analysis in this declaration is in accordance with the above-stated legal principles.

V. LEVEL OF SKILL IN THE ART, AND STATE OF THE ART

29. For purposes of this declaration, I understand the time of the invention to be April 11, 2014, which is the filing date of the application that led to the '054 patent (application no. 14/251,383). For purposes of my analysis herein, there would be no material difference in the definition of a POSITA if taken at any point in the time period from this date back to December 2008.

30. I understand that several factors are relevant to determining the level of ordinary skill in the art at the time of the claimed invention. I understand that those

factors include: (1) the educational level of the inventor(s); (2) the type of problems encountered in the art; (3) prior art solutions to those problems; (4) the rapidity with which innovations are made; (5) sophistication of the technology; and (6) the educational level of active workers in the field.

31. Having reviewed and considered the '054 patent, its prosecution history, the state of the art at the time of the invention, including the level of skill of the persons with whom I worked, and the above-listed factors, it is my opinion that the person of ordinary skill in the art for purposes of the '054 patent in April 2014 (“POSITA”) would have held a bachelor’s degree in computer science, electrical engineering, computer engineering, or a closely related field, and one to three years of experience working with wirelessly connected mobile devices that used common wireless communications protocols such as Bluetooth and 802.11 / Wi-Fi. More education, e.g., a Master’s or Ph.D., would compensate for less work experience and vice versa. The overview of the state of the art provided below (*infra* Section VII) reflects some of the information within a POSITA’s knowledge. For example, the POSITA had working knowledge of the Bluetooth and IEEE 802.11 (Wi-Fi) specifications, and followed the development of those specifications as well as publications describing the evolution and use of those specifications.

32. I have used this level of ordinary skill in the art in forming my opinions as set forth in this declaration. My opinions are from the perspective of this level of

ordinary skill in the art. I met or exceeded this level of skill in the art between December 2008 and April 2014.

VI. CLAIM CONSTRUCTION

33. I understand that, in IPR, claim terms should be given the ordinary meaning that the terms would have to a person of ordinary skill in the art on the earliest effective filing date, in view of the specification and file history.

34. For this declaration, I apply the plain and ordinary meaning of all claim terms. I reserve the right to offer my opinions on any constructions or construction issues presented by Patent Owner InterDigital Patent Holdings, Inc.

VII. STATE OF THE ART

A. Bluetooth And Wi-Fi Were Ubiquitous

35. Bluetooth and Wi-Fi were well-known wireless communication protocols that were commonly used in prior art devices ranging from smartphones to laptop computers. EX1205, [0003]; EX1265, 12, 68-70, 106-111; *see also* EX1254, [0008]; EX1267, [0006]; EX1276, 1:11-22; EX1274, [0002-6]. By as early as May 2007, “[f]or example, a laptop computer such as the MacBookPro” was “configured to communicate wirelessly in accordance with both the Wi-Fi and the Bluetooth standards.” EX1205, [0003]. Similarly, by at least August 2007, “[t]he iPhone ha[d] more antennas than an ant colony: one for the cellular network, one for Wi-Fi hot spots, and a third for Bluetooth.” EX1265, 68; *see also* EX1267, [0006]

(by July 2006, “[m]any devices that include[d] Bluetooth also support[ed] other wireless technologies including 802.11a, 802.11b, 802.11g, WiMAX and Ultra Wide Band (UWB) radios”). The Bluetooth and Wi-Fi protocols were so common, they were defined in dictionaries. EX1209, 26 (by 2004, “802.11b,” “also called Wi-Fi,” was “the most common wireless local area network”), 119 (“Bluetooth” is a “wireless protocol that is used to communicate from one device to another” and “version 1.1 allows a Bluetooth device to communicate with up to 8 devices”).

36. **The Bluetooth specification** provides the information that developers need to develop Bluetooth-compatible products. *See, e.g.*, EX1214, EX1253, EX1215. Thus, when I taught the Bluetooth protocol in courses (*supra* par. 9), I would regularly reference the documents associated with this specification. The Bluetooth specification comprises two volumes: the core (EX1253) and the profile (EX1214). The Bluetooth protocol incorporates aspects of the OBEX protocol (such as the OBEX PUT operation for pushing files), described in the OBEX specification (EX1215). *Infra* par. 53. The v1.1 Bluetooth specification (EXS 1014 and 0153) and the v1.3 OBEX specification (EX1215) describe core and basic Bluetooth functionality that persists to this day. In general, the Bluetooth specification over the years has been backward compatible so that devices previously programmed based on older versions of the specification can communicate with devices programmed or updated based on newer versions. As such, the POSITA in 2014 would have been

familiar with the functionality described by these specifications. The portions of the Bluetooth and OBEX specifications relied on in this IPR did not change materially, if at all, between 2001 and 2009. For example, OBEX v1.5 from 2009 contains the exact same disclosure on the PUT exchange for the claimed request and acceptance messages. EX1278, 100-101. Thus, for the purposes relied on in this declaration, these Bluetooth and OBEX specifications (EX1214-15 and EX1253) reflect a POSITA's working knowledge of the pertinent aspects of the Bluetooth and OBEX protocols. Similarly, **for Wi-Fi, IEEE 802.11 is the specification** that provides the information that developers need to develop Wi-Fi-compatible products. As someone who taught courses on IEEE 802.11 (*supra* par. 9), I can confirm that IEEE 802.11 included the four-way RTS-CTS handshake discussed in EXS 1018, 1023-1024 and that these exhibits reflect a POSITA's working knowledge of IEEE 802.11 in the 2014 timeframe. Ericsson Review, the publisher of EX1218, is a well-known publisher. In fact, I have personally reviewed and utilized numerous articles published by Ericsson Review dating back to 2001. Multiple patent references also cite this Frodigh paper (EX1218): U.S. Patent Nos. 6,954,443, 7,333,514 (EX1279), and 7,415,268. EX1279, 2:17-24 ("Aspects of BLUETOOTH™ systems are disclosed in ... M. Frodigh et al., "Wireless ad hoc Networking—The Art of Networking without a Network", *Ericsson Review* no. 4, pp. 248-263 (2000), both of which are currently available on the World Wide Web").

37. The Bluetooth protocol supported short-range personal area networks (PANs), and by at least 2001, included: (1) inquiry and discovery processes (part of Bluetooth's generic access profile) for discovering nearby devices, and (2) a service discovery protocol (SDP) for discovering the capabilities of (i.e., the services supported by) nearby devices. EX1239, 96-103; EX1253, 331-391; EX1214, 13-97; EX1209, 119; EX1222, 1:42-2:13, 11:2-4; EX1274, [0006]; *see also* EX1212, [0022]; EX1267, Abstract, [0004], [0009], [0019], [0021], [0040], FIG. 2; EX1210, [0026]; EX1205, [0013-17], [0038], [0041-45], claims 1-2, FIG. 4; EX1206, 9:17-10:9.

B. Bluetooth For Discovery, Wi-Fi For Data Transfers

38. It was well known to discover nearby devices using Bluetooth, or another low-power communication protocol, to save power and then, when transferring files, using Wi-Fi, or another higher-speed protocol, to expedite the transfer, thus providing a high-speed, power-efficient file transfer process.

39. This Bluetooth-to-Wi-Fi switching functionality was publicly discussed as being incorporated into at least one wireless standard—Bluetooth 3.0—at least ten months before the '054 patent's earliest alleged priority date. EX1268, 1-2; EX1277, 1 (In February 2008, Bluetooth SIG was implementing “the wireless technology equivalent of ‘low hanging fruit’” by “taking classic Bluetooth connections” and “allowing [them] to jump on top of the already present 802.11

radio, when necessary, to send bulky entertainment data, faster.”). This 2008 article is consistent with my own experience in 2008, as I recall industry articles and press releases that discussed the Bluetooth Special Interest Group (“SIG”) announcement of plans to link Bluetooth with Wi-Fi to make it easier for users to transfer images and large data files such as music and video. Similar technology is reflected in at least six prior art publications.

40. Hoddie (published November 2005), for example, discloses “search[ing] for other devices ... using Bluetooth” and if “the size of the file would make it more appropriate to send ... across a Wi-Fi connection (because of the improved bandwidth of the Wi-Fi connection compared to a Bluetooth connection),” the devices “agree on setting up a Wi-Fi connection,” and the sending device “sends the file to the [receiving device] across the Wi-Fi connection.” EX1206, 3:30-4:22; *see also id.*, 3:16-6:11, 9:9-14:9, claims 2, 4, FIGS 3-4.

41. McKillop (filed May 2007) similarly discloses that its system and methods “can provide highly power efficient wireless communications by utilizing a low power, limited range protocol, such as Bluetooth, in order to find and establish a high speed communications path. Once the high speed communications path is found, such as a Wi-Fi network, the systems and methods can switch from the slower communications protocol to the high speed protocol until the particular event is

over.” EX1205, [0013]; *see also id.*, Abstract, [0002], [0006-7], [0014-18], [0034], [0038], [0042-47], claims 2-4, FIGS. 2, 4.

42. Burns (published January 2007) discloses using “Bluetooth to provide the network management functions such as device discovery, service discovery, security negotiation and connection establishment,” and then to “establish a secondary data channel,” such as Wi-Fi, for “data communication.” EX1267, [0040-41]; *see also id.*, [0009-10], [0012], [0047], [0051].

43. Banerjea (filed July 2008) discloses that “a Bluetooth connection (BT connection) 110 may be established between the mobile communication devices,” and then “[m]ultimedia data may be transmitted over the WiFi connection.” EX1210, [0026-27]; *see also id.*, Abstract, [0008-10], [0037-47].

44. Adler (filed February 2008) discloses “establishing a first connection between a first device and a second device with a first networking standard,” such as Bluetooth, and then “transferring data between the first and second devices using [a] second networking standard,” such as Wi-Fi. EX1213, [0006-8]; *see also id.*, Abstract, [0038-56], claim 5.

45. Kapur (published June 2007) discloses that “[a]fter the Bluetooth® device 1002 discovers the Bluetooth® device 1004, the Bluetooth® protocol stack within the Bluetooth® device 1002 may configure the high-speed data connection

1008,” which includes an 802.11 (Wi-Fi) connection. EX1212, [0065-66]; *see also id.*, [0022], [0029].

C. Prompting Recipients To Accept Or Deny A File Transfer

46. Numerous references teach allowing a user of a receiving device to reject unwanted and/or unsolicited content by prompting the user (e.g., via a displayed prompt on the receiving device’s screen) to either accept or reject an incoming data transfer.

47. Hinckley, for example, discloses “displaying on the receiving device an indication that information is to be received” (EX1207, claim 3), and if the user rejects the information, “blocking the receipt of the indicated information” (EX1207, claim 4). For example, “a user sees a thumbnail preview of the image ... that another user is transmitting, and can choose whether or not to accept it (Yes/No). By selecting NO, the receiving user is stopping the transfer of information from the sending device.” EX1207, [0061]; *see also id.*, [0035], [0038], [0058-62], FIG. 3.

48. Guo similarly discloses the receiving mobile phone’s “processor 10 causes GUI 12 to prompt the user to accept the data file 16.” EX1227, [0017].

49. Turner shows that, by at least 2006, Bluetooth prompted users to accept or deny a transfer: “if a connection does result in some type of file transfer, users can be prompted as to whether they wish to accept such a transfer.” EX1228, 2:9-

11; *see also id.*, 2:7-8 (further explaining how users can “prevent unwanted connections to a device and a subsequent infection by malware”).

50. Numerous user guides confirm that Nokia phones presented prompts to users asking them if they “want[ed] to accept the Bluetooth message” and would show the incoming message only if the user accepted. EX1262, 87; EX1225, 86; EX1221, 77; *see also* EX1226, 21; EX1260, 89; EX1261, 110.

51. The prior art Cheverst reference shows one such exemplary prompt.



Figure 6. Typical mobile phone display prompting the user to receive her selected image

EX1220, 49 (FIG. 6).

D. Request To Send And Acceptance To Transfer

52. Many then-existing protocols employed pre-transfer request and acceptance messages to set up / negotiate the transfer, ensure the sending device is authorized to transfer the file, and/or ensure the receiving device is ready for the

transfer. EX1214, 23, 316-393; EX1253, 425, 428-441; EX1215, 10, 14, 16, 22-43, 73-74; EX1216, 18, 44; EX1217, 4-5; EX1218, 261-262. Specifically, these prior art references disclose sending, to a target device, a message requesting to transfer a file, and receiving, from the target device, an acceptance to transfer the file. *Id.*

53. Bluetooth version 1.1, as specified in the Bluetooth v1.1 specification (published in 2001), used the Object Exchange Protocol (OBEX) PUT operation to transfer a file, which involved sending a “request” to transfer a named file to a target device and then sending the file only after receiving a “[r]esponse” of “CONTINUE” from the target device. EX1215, 73-74; *see also id.*, 8, 10, 13-16, 22-24, 29-31, 50-51, 62; EX1214, 23, 316-330, 339-361, 368-390; EX1253, 425, 428-441; EX1255, [0006]; EX1257.

9.2.4 Example Put Exchange

An application wishes to PUT a 2000 byte file named “Test File Object” with the time stamp 0x41a50016 (Jan 9, 1992, 11:02:00 UTC). The OBEX packet size is 512 bytes.

	Opcode or Response plus Headers	Final bit	Header Data	Header Length	Running Total of Data Exchanged
Pre-Transfer Request and Response Messages	Request →		PUT		
			Name Length Time	37	
			“Test File Object”	19	
			“2000”		
			“19920109T110200Z”		
	Response ←	✓	CONTINUE		
			no headers		
Transfer	Request →		PUT		
			Body		
			“start of file data..”	509	506 bytes

EX1215, 74 (red annotations added).

54. Further, well-known ad-hoc Wi-Fi protocols (used for direct, device-to-device communications and defined by the distributed coordination function

(DCF) mode of IEEE 802.11) used similar request and acceptance messages—a four-way handshake known as RTS-CTS—to ensure data was successfully transferred and not interrupted by other devices on the network. EX1218, 261-262; *see also* EX1223, 1; EX1224, 270. Specifically, in RTS-CTS, “[a] terminal ... that wants to send data” does so by completing a “[f]our-way handshake—the sending node sends a request-to-send (RTS) packet to the receiving terminal. If the receiver accepts the request, it replies with a clear-to-send (CTS) packet. If no collisions have occurred, the sender then begins transmitting its data.” EX1218, 262.

55. Indeed, by at least the 1980s, such pre-transfer request and acceptance messages were common in file transfer protocols. The specification of the File Transfer Protocol (FTP) (published in 1985), for example, specifies that the user device sends a “transfer request command” and that when the connection is established with the server device, “the server-PI sends a confirming reply to the user-PI.” EX1216, 18. Similarly, the specification for the Trivial File Transfer Protocol (TFTP) (published in 1992), specifies that “a transfer is established by sending a request ... and receiving a positive reply.” EX1217, 4.

E. Touchscreens

56. The '054 patent itself admits that touchscreens were known and were known to provide a simplified user experience. EX1201, 1:30-33 (“As the sophistication of user interfaces supporting data transfers has developed (for

example, the emergence of touch screen and multi-touch technology), the user experience has been simplified considerably.”), 3:27-30, 8:15-38.

57. Indeed, multi-touch touchscreens were first developed decades earlier and had become widespread (e.g., such as in the iPhone) by the '054 patent's earliest alleged priority date (December 23, 2008) because they were versatile and easy to use. EX1236, 632, 633 (“In 1984, Lee at the University of Toronto first implemented a capacitive sensor array capable of tracking multiple touches simultaneously.”), 634-635; EX1245, [0064], [0127], [0133], [0141], claims 7, 14, 19, 24; EX1244, [0004]; EX1235, [0004], [0007-10]; EX1246, 2:16-20, 12:33-39 (“multi-touch sensitive tablets [were] described in” several patents to Westerman); EX1265, 18-19, 92, 116, 144, 176-177.

58. Moreover, the use of taps, swipes, and other gestures on a multi-touch touchscreen to perform various functions, such as to select content and/or intended recipients, among other functions (e.g., pinch to zoom, swipe to scroll), was well known in the art, as reflected in, for example, the iPhone. EX1265, 17-19 (describing tap, flick, and other gestures), 63 (“Tap the person you want to text.”), 91-98 (select photo to send); EX1246, 19:45-46 (“the gesture corresponding to selection is a tap”), 25:30-31 (select a contact “by a tap”), 33:24-26, 34:8-11, 34:33-41 (pinch to zoom), 36:2-6 (tap to select recipient), 36:17-18 (tap to select contact), 56:28-37 (tap to select recipient); EX1235, Abstract, [0008] (“in touch pads, selections may be made

when one or more tap are detected”), [0066-72], [0084-105]; EX1245, [0011], [0060] (pinch to zoom), [0065], [0078-83], [0097-108]; EX1233, [0067], [0083], [0085], [0091], [0093], [0111] (“tapping on a single photo to select it); EX1234, 5:64-65 (“[a] particular file may be selected, e.g., by touching it”); EX1236, 636; EX1237, 32; EX1204, [0019-20], [0032-35], [0037], [0064], FIGS. 1, 3; EX1219, Abstract, [0004-6], [0015-31], claims 1-2, 4, FIGS. 4A, 4B; EX1232, Abstract, [0005-12], [0020], [0024-25], [0028], [0036-49].

VIII. THE GRANDPARENT APPLICATION (EX1281) DOES NOT SUPPORT THE CHALLENGED CLAIM

A. The '054 Patent

59. I understand that the '054 patent issued October 27, 2015, and alleges priority to non-provisional applications filed June 28, 2013 (EX1285, “parent application”), which issued as U.S. Pat. No. 8,737,933 (the “'933 patent”); June 11, 2012 (EX1281, “grandparent application”), which issued as U.S. Pat. No. 8,478,207 (the “'207 patent”); and December 22, 2009 (EX1282), which issued as U.S. Pat. No. 8,200,265 (the “'265 patent”); and to provisional application No. 61/140,126 (“the '126 provisional”) (EX1266), filed December 23, 2008.

60. The '054 patent, outside the claims, focuses on the use of gestures to transfer data to a nearby device. It acknowledges that well-known functionality “allow[ed] the transfer of data (such as files or digital media) between devices in ... wireless environments” and alleges that the file transfer process “may still be a

cumbersome, multi-step task.” EX1201, 1:22-38. The ’054 patent purports to provide a “simplified and more intuitive approach to data transfer between devices” (*id.*, 1:42-43) by providing “a simple three step hand (or finger) motion to enable the data transfer” (*id.*, 8:16-17), whereby the user taps the file they want to send, pushes the file towards the intended recipient, and then releases (i.e., a swipe motion). *Id.*, 8:17-57, 9:33-46, FIGS. 6-9.

B. The Parent ’933 Patent Prosecution History

61. I understand that the parent application, which led to the parent ’933 patent, was filed June 28, 2013. I further understand that on November 19, 2013, Applicant cancelled all original claims in response to a double patenting rejection and added new claims that—for the first time in the patent family’s history— included using Bluetooth for device detection and WiFi¹ for data transfer. EX1272, 73-74, 89-102. The Examiner allowed the new claims without ever rejecting them or addressing any prior art references. *Id.*, 108-113.

¹ The ’933 and ’054 patents, and Forutanpour (EX1204), use the term “WiFi” without a hyphen, whereas the correct industry spelling is “Wi-Fi.” The two are often used interchangeably (e.g., EX1208), and herein I use them interchangeably.

C. The Grandparent Application (EX1281)

62. I have reviewed the grandparent application (EX1281), and it is my opinion that the grandparent application does not disclose the methods and devices claimed by the challenged claims.² This is at least because the grandparent application does not describe a method that uses Bluetooth to detect nearby devices and WiFi to transfer a media element to one of the detected devices, as found in claim 1 (or, as in claim 23 and its dependent claims, circuitry configured to carry out such a method).³ There is no description of how the devices utilize WiFi in any method, and the grandparent application does not even hint at a method that uses Bluetooth and WiFi in separate operations, as later claimed.

63. Independent claim 1 is representative and recites a method that involves first using Bluetooth to detect nearby WTRUs and then using Wi-Fi to transfer a

² I have also reviewed the parent application (EX1285), which has no material differences from the grandparent application (EX1281)—the two appear to have the same description, abstract, claims, and figures. Thus, for the same reasons explained below for the grandparent application, the parent application also fails to disclose the methods and devices claimed by the challenged claims.

³ I have not analyzed and do not opine on other possible deficiencies of the grandparent or parent applications.

selected media element to one of the detected WTRUs. Claim 23 recites a “wireless transmit/receive unit (WTRU)” with circuitry configured to carry out this method.

'054 Patent, claim 1 (excerpted)	'054 Patent, Claim 23 (excerpted)
1. A method performed by a wireless transmit/receive unit (WTRU), the method comprising: ... detecting, by the WTRU over bluetooth, another WTRU; processing, by the WTRU, another input from the touch display to select the another WTRU; ... and transferring, by the WTRU to the selected another WTRU over WiFi, the selected media.	23. A wireless transmit/receive unit (WTRU) comprising: ... circuitry configured to detect, by the WTRU over bluetooth, another WTRU; the circuitry further configured to process another input from the touch display to select the another WTRU; ... and circuitry configured to transfer, by the WTRU to the selected another WTRU over WiFi, the selected media.

64. The grandparent application, however, does not describe a single method (or circuitry configured to carry out the same steps of the method) that uses one protocol for device detection and another protocol for data transmission, much less the specific claim 1/23 method using Bluetooth and WiFi.

65. At most, the grandparent application discloses WTRUs that have the capability to communicate using Bluetooth and Wi-Fi, along with a laundry list of other possible communications technologies. For example, it describes the WTRU as including a “communication peripheral” that is either a Bluetooth *or* a WiFi

device: “communication peripheral 107 may be implemented as a wireless personal area network (WPAN) device, for example Bluetooth® ... or WiFi® in ad-hoc mode.” EX1281, [0017]. The same paragraph later notes that the communication peripheral may include “any combination or all of” Bluetooth, WiFi®, 3GPP, and 2G/3G technologies. *See, e.g.*, EX1281, [0017]. The provisional application, purportedly incorporated into the grandparent, similarly states that “[t]he communications peripherals of the WTRUs may implements [sic] technologies such as Wireless Personal Area Network (WPAN) (IEEE 802.15), Bluetooth, Wireless Universal Serial Bus (W-USB), or WiFi/WLAN (IEEE 802.11x) in ad-hoc mode.” EX1266, [0021]; *see also id.*, [0019] (“A WTRU may include one or [sic] modems, capable of communicating using technologies including 2G and 3G cellular technologies, Bluetooth, and WiFi/Wireless Local Area Network (WLAN) technologies.”). And claim 33 of the provisional application recites that the “WTRU supports at least one of” a long list of possible technologies. EX1266, 18-19. These passing mentions of Bluetooth and WiFi capability give no indication of using the two together as different parts of the same method, much less the particular method of usage later claimed by the ’054 patent.

66. The grandparent application’s only other discussion of WiFi appears in a passage on providing environment information to the device’s processor. EX1281, [0024]. After explaining that the device processor receives “environment

information stored at the lower layers by the communication peripheral 107” (*id.*, [0023]), the application states:

The lower level information is provided to the application processor 105 according to the communication technology being used. For example, the information available to the application processor 205 may vary based on an implementation using a Third Generation Partnership Project (3GPP) technology, an Institute of Electronic and Electrical Engineers (IEEE) standard such as WiFi, or some other communication technology.

EX1281, [0024] (excerpted). Nothing in this disclosure suggests using one communication technology for device detection and a different communication technology for file transfer, let alone Bluetooth and WiFi specifically. Indeed, it suggests the opposite by describing “the communication technology being used” in the singular and then providing a disjunctive list of singular example technologies for “an implementation.” This would be understood to mean that a given system used a single technology for both detection and file transfer. *Id.*

67. The grandparent application makes no other mention of WiFi or 802.11—not in the title, abstract, drawings, background, summary, or claims.

68. Moreover, in explaining the transmission of “a data communication,” the grandparent application provides no explanation of what communication technology is used or that somehow the technology switches or is selected at the

time of transmission or differs from the technology used for detection. *E.g.*, [0023] (“[A] data communication from the WTRU 101 may be transmitted to the identified target WTRU 101c,t.”). In further discussing file transmission, the grandparent application describes “break[ing] the file into blocks,” but never describes use or selection of a particular communication technology or that there is a process for determining the communications technology, much less switching between different communication technologies for different operations. *E.g.*, [0032] (“The application processor 105 in the sending WTRU 101 may control the manner in which the data is transferred to the target WTRU 101c,t, for example, by breaking the data into blocks corresponding to the manner in which the visual depiction of the data should appear at the target WTRU 101c,t.”); *see also* EX1266, [0029] (similar passage in provisional).

69. Indeed, the grandparent application is altogether silent on which protocol or technology to use for the transfer, leading a POSITA to understand that the same protocol used for device detection is also used for the transfer. *See, e.g.*, EX1281, [0027-28], [0032], [0036-39]. For example, the grandparent application does not say which protocol to use for the transfer, gives no indication that the WTRU makes a decision as to which protocol to use for data transmission, and does not provide any indication that the protocol used for data transmission is different than the protocol used for device detection. Thus, the grandparent application at best

discloses WTRUs with the ability to communicate using Bluetooth and Wi-Fi, among numerous other possible communication technologies. EX1281, [0017], [0024], [0027, [0043]. It never describes a process or method that uses one of these technologies (Bluetooth) for device detection and then switches to the other (Wi-Fi) for data transfer. Computing devices can be programmed to perform any number of methods. This description of the mere ability to use numerous communication technologies *does not indicate* a method using just two of these technologies, each for a particular operation, in the particular manner claimed by the '054 patent.

70. The grandparent application thus does not describe any method using different communication protocols to perform different functions, much less the specific claimed method of using Bluetooth to detect nearby devices and Wi-Fi to transfer data to one of the detected devices. The grandparent application provides no suggestion that this was as part of the supposed invention later claimed by the '054 patent. Thus, nothing in the grandparent application reasonably conveys to those skilled in the art that the inventors had possession of using Bluetooth to detect nearby devices and WiFi to transfer a selected media element to one of the detected devices.

**IX. GROUNDS 1-2: CLAIMS 1, 3-10, 12, 14-15, 21, 23, 25-32, 34, 36-37, 43, 46-47, AND 49-50
ARE ANTICIPATED BY AND/OR OBVIOUS OVER FORUTANPOUR**

71. Forutanpour anticipates claims 1, 4-9, 12, 14-15, 21, 23, 26-31, 34, 36-37, 43, 46-47, and 49-50 (Ground 1). To the extent the Board finds that Forutanpour

does not anticipate one or more of these claims, Forutanpour still renders them obvious, and additionally renders obvious claims 3, 10, 25, and 32 (Ground 2).

A. Forutanpour (EX1204)

72. For purposes of my analysis of the grounds, I have assumed that Forutanpour is prior art to the challenged claims. Forutanpour is analogous art to the '054 patent because they are both within the same field of endeavor: data transfer between wireless devices. *E.g.*, EX1201, Title; EX1204, Title, Abstract, [0004-11], claim 1.

73. Forutanpour discloses touchscreen-containing mobile devices that wirelessly share media elements (e.g., pictures) with one another using multiple wireless protocols. *E.g.*, EX1204, [0004], [0069-89], [0152], claim 3. To send a file, the user first accesses a file they wish to send, triggering their device to detect and establish wireless links with neighboring devices using a first communication protocol (e.g., Bluetooth). EX1204, [0070-72], [0086], [0128]. The user then taps the media element (e.g., picture) they wish to share, and swipes it towards the intended recipient. *E.g.*, EX1204, [0064], [0071], [0090], [0098-105], [0125], [0134-138], FIGS. 9-18.

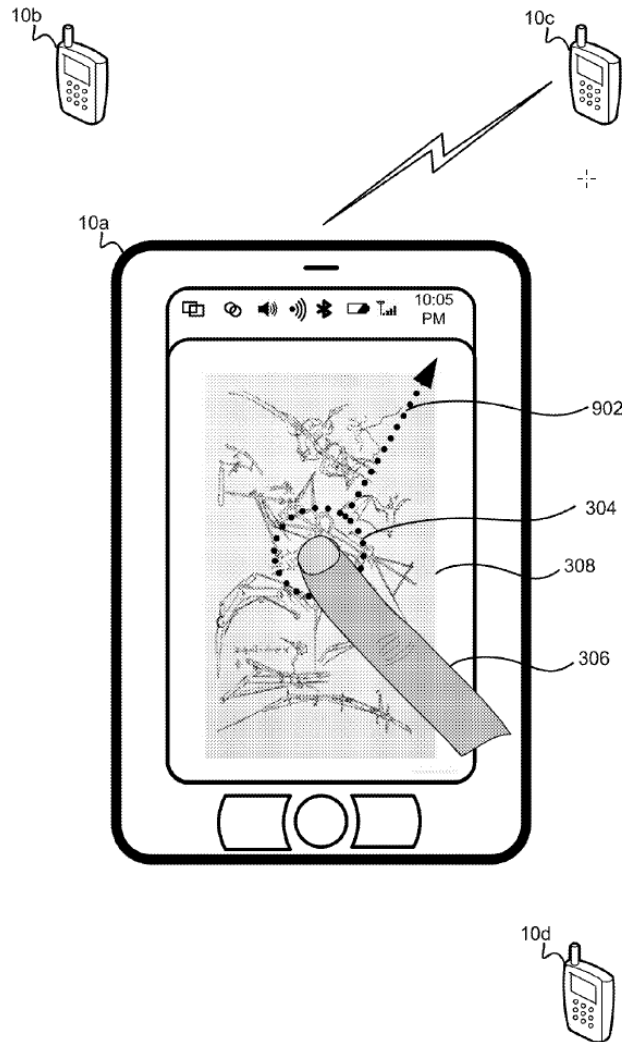


FIG. 9

EX1204, FIG. 9.

74. The user's mobile device detects this touchscreen input and transfers the user-selected media element to the intended recipient device using a "wireless technology different from the wireless technology used to establish the wireless link" (e.g., a protocol providing a direct Wi-Fi communication link). EX1204, [0004], claim 3; *see also id.*, [0005], [0072], [0081-0084], [0128-129], [0143].

75. The sending device, however, does not send the file until it receives authorization from the receiving device. This authorization process involves the exchange of at least two messages: a request message and an acceptance message. EX1204, [0005], [0070], [0080-81], [0086], [0143], [0145], FIG. 42. Specifically, the sending device “send[s] a query, message 24, to the targeted computing device [] requesting permission to transmit the file.” EX1204, [0086]. In response to receiving the request from the sending device, the receiving device “generate[s] a prompt that alerts the device’s user of the pending file transfer request.” EX1204, [0080]; *see also id.*, [0110], [0144], FIG. 30.

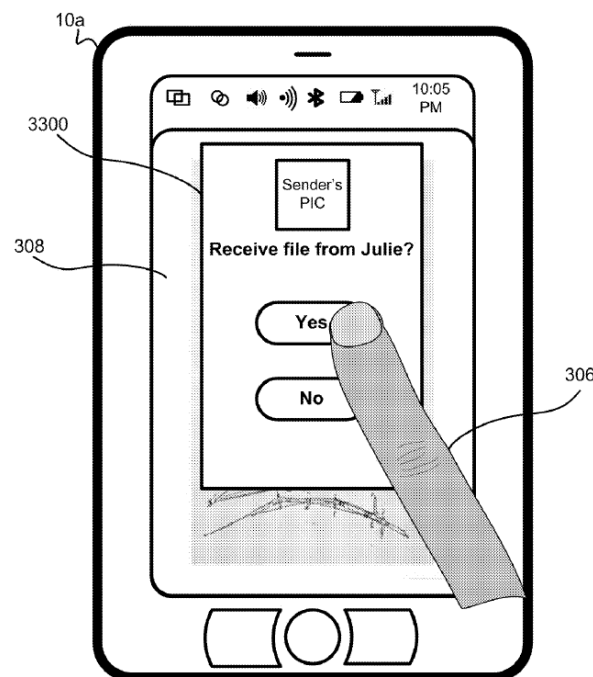


FIG. 30

EX1204, FIG. 30.

76. If the receiving user accepts the file transfer, the receiving device sends an acceptance message to the sending device that includes “access data” that “identif[ies] a preferred communication method and communication network to be used for transmitting the file,” including a “direct communication link such as ... [a] WiFi direct communication link.” EX1204, [0081]; *see also id.*, [0005], [0007], [0083-84], [0114], [0128], [0143-144].

77. Once the sending device receives the acceptance message from the sending device, it sends the user-selected media element to the receiving device using the preferred communication method identified in the receiving device’s acceptance message. EX1204, [0005], [0081-84], [0086-87], [0098], [0143-144].

**B. Detailed Claim Mapping For Claims
1, 3-10, 12, 14-15, 21, 23, 25-32, 34, 36-37, 43, 46-47, And 49-50**

1. Claim 1

78. Forutanpour anticipates claim 1 because it discloses every element of claim 1. To the extent the Board finds Forutanpour does not disclose one or more elements of claim 1, Forutanpour still renders every claim element obvious.

a) Element 1.1

[1.1] A method performed by a wireless transmit/receive unit (WTRU), the method comprising:

79. Forutanpour anticipates this claim element or at least renders it obvious because Forutanpour discloses “computing devices” (WTRUs), e.g., a “mobile

device,” programmed to perform the claimed method. *E.g.*, EX1204, [0009] (describing a “mobile device” configured “to perform operations of the various aspect methods described in Forutanpour”), [0070] (“FIG. 1 illustrates a process flow diagram of a method 100 for implementing file sharing functionality in response to intuitive user gestures according to the various aspects.”), [0071-84], [0150-156], FIG. 1, claims 1-2, 9-12, 19-20, 24, 27-29. Each computing device includes a “processor,” such as processor 191 shown in FIG. 47, that processes inputs from a “touchscreen display” and that wirelessly communicates with other computing devices using “one or more wireless transceivers.” EX1204, [0070-84], [0150]; *see also id.*, [0151], FIGS. 2A-2B, 47. The computing devices’ processors are “configured with processor-executable instructions” to cause the devices to perform the claimed method steps. EX1204, [0009]; *see also id.*, [0150-156].

b) Element 1.2

[1.2] processing, by the WTRU from a touch display, an input to select media in an application;

80. Forutanpour anticipates this claim element or at least renders it obvious. EX1204, [0003], [0069-71], [0090]. For example, Forutanpour discloses that a user “can select a file by, for example, touching it on a touchscreen display” to “activate the file sharing functionality.” EX1204, [0070-71]; *see also id.*, [0069]. The processor of Forutanpour’s computing device processes this touchscreen input (i.e.,

a tap) at least because it “determines the file to be shared” based on this input. EX1204, [0070]; *see also id.*, [0090], FIG. 3.

81. Forutanpour discloses its file being a media element, e.g., “documents, pictures or videos.” EX1204, [0003]; EX1201, 14-5 (claim 3, reciting that the claimed media element “is any one of a photograph, video, or a document”).

82. Forutanpour also discloses that the user selects the media in an application at least because “an application” “provide[s] the file sharing functionality.” EX1204, [0123]; *see also id.*, [0070], [0090], [0153-154], FIG. 31. For example, the application “provides a user interface for file sharing, detects and interprets user gestures,” such as “a particular touch gesture” on a touchscreen, and “determines the file to be shared and the destination” based on the user’s touchscreen input. EX1204, [0070]; *see also id.*, [0071-83]. For example, the user interface provided by the application “may present a menu, list, or thumbnail display of files from which the user can select a file by, for example, touching it on a touchscreen display.” EX1204, [0071]. Thus, Forutanpour discloses an application that presents media elements to a user and that processes from a touch (an input) on a touchscreen to select one of the presented media elements. *Id.*

83. Moreover, it would have been obvious to implement Forutanpour’s mobile devices to present the media elements to the user in an application (e.g., in a photo/video application) because it was well known to do so to allow a user to

retrieve, view, and perform actions on (e.g., edit, send, etc.) media content. EX1265, 94-95 (showing that in 2007 the iPhone contained a dedicated Photos application that allowed users to send pictures). Moreover, it was well known, in general, to use applications in computing devices because they allow users to perform useful tasks (e.g., to send and/or edit pictures). EX1209, 69 (an “application” is a “software program that carries out some useful task” such as “word processors.”).

84. Thus, it would have been obvious to a POSITA when implementing wireless devices in accordance with Forutanpour’s teachings to have programmed the devices to process, from a touch display, an input to select media in an application.

c) Element 1.3

[1.3] detecting, by the WTRU over bluetooth, another WTRU;

85. Forutanpour anticipates this claim element or at least renders it obvious. EX1204, [0068], [0072], [0086], [0096], [0128], FIGS. 8, 35. For example, Forutanpour discloses that its computing device uses “Bluetooth®” to “discover nearby computing devices,” e.g., in response to the user selecting a file for transfer. EX1204, [0072]. Forutanpour confirms that it was “well known” to use the Bluetooth communication protocol “for automatic device discovery” because it “enable[s] a computing device to locate other nearby computing devices.” *Id.*; *see also id.*, [0068], [0086], [0096], [0128], FIGS. 1, 8, 35.

d) Element 1.4

[1.4] processing, by the WTRU, another input from the touch display to select the another WTRU;

86. Forutanpour anticipates this claim element or at least renders it obvious. EX1204, [0061], [0068], [0075-77], [0098], [0107-108], FIG. 9. For example, after detecting the nearby devices, the processor of Forutanpour's computing device "determine[s]" that "a user wishes to share the selected file with another computing device by detecting a file transfer gesture" and "identif[ies] the intended recipient of the file" based on the "direction, distance, speed, etc." of the gesture (e.g., flick). EX1204, [0075-77]; *see also id.*, [0061], [0068], [0098], [0107] ("identify the targeted computing device [] based on the location of the finger [] touch release"), [0108] ("determine the target computing device" based on a user "touching the picture of the device owner using a finger"), FIG. 9. Thus, Forutanpour's computing device processes another touchscreen input, such as a flick gesture, to select one of the detected devices because it determines the intended recipient based on this another touchscreen input (e.g., the intended recipient is the one that is in the direction of the flick).

e) Elements 1.5-1.6

[1.5] sending, by the WTRU to the selected another WTRU, a message to transfer the selected media;
[1.6] receiving, by the WTRU, an acceptance to transfer the selected media; and

87. Forutanpour anticipates this claim element or at least renders it obvious. EX1204, [0079-82], [0086], [0143], [0145], FIG. 42. For example, Forutanpour discloses that “the transmitting computing device 10 may send a file transmission query to the targeted computing device before transmitting a file. The computing device may receive an authorization response from the targeted computing device.” EX1204, [0143]; *see also id.*, [0081-82], [0086], [0145]. Additionally, the receiving device may require the receiving user’s authorization sending the acceptance message to the sending device. “On the receiver side, ... the device processor may generate a prompt that alerts the device’s user of the pending file transfer request and, optionally, the identity of the user sending the file and file name or type.” EX1204, [0080]. The “intended recipient user may then press a key or virtual key on the GUI to either accept or decline transfer of the file.” *Id.*

88. Thus, Forutanpour discloses sending, by the sending “computing device” (WTRU), a “query” (message) to transfer the selected media element to the “targeted computing device” (selected WTRU), and receiving, by the “computing device” (WTRU), an “authorization response” (acceptance) to transfer the selected media element to the “targeted computing device” (selected WTRU).

f) Element 1.7

[1.7] transferring, by the WTRU to the selected another WTRU over WiFi, the selected media.

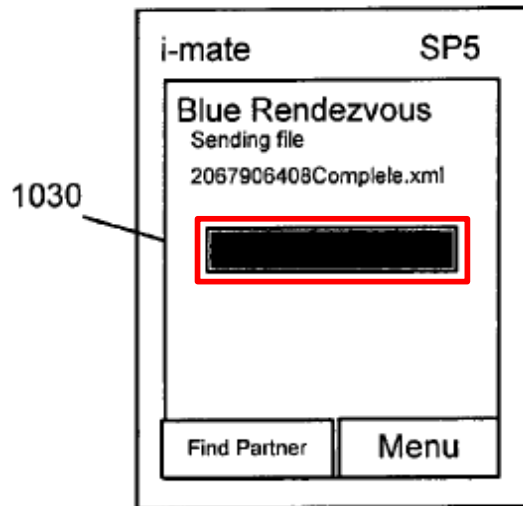
89. Forutanpour anticipates this claim element or at least renders it obvious. EX1204, [0004-5], [0081-84], [0143-144], claim 3. For example, Forutanpour expressly discloses identifying a “WiFi direct communication link” as the “communication network to be used for transmitting the file” (EX1204, [0081]), and then “transmit[ting] the selected file to the targeted device using” that network (EX1204, [0082]). *See also id.*, [0083-84] (“[M]essages may similarly be transmitted via another type of wireless communication network, such as a WiFi, WiMax or MiFi network.”), [0143-144]. Forutanpour also discloses using different wireless protocols for device detection and file transmission, thus expressly contemplating use of, e.g., Bluetooth for device detection and WiFi for file / data transfer. EX1204, [0004] ([T]ransmitting the file sharing message to the targeted computing device ... using a wireless technology different from the wireless technology used to establish the wireless link.”); *see also id.*, [0005], claim 3.

2. Claim 3

3. The method of claim 1 further comprising: displaying, by the WTRU, a progress of the transfer to the selected another WTRU.

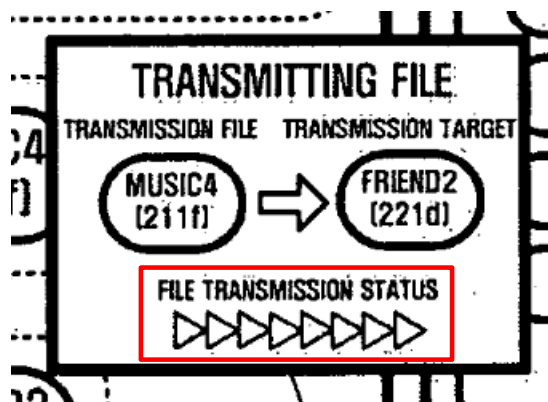
90. Forutanpour renders claim 2 obvious in view of the state of the art. It was well known to display the progress of a data transfer to inform the user of the status of the transfer.

91. Hinckley, for example, discloses that “[w]hen the user presses a soft key associated with the Send icon 1022, a progress bar gives feedback on the transfer.” EX1207, [0058].



EX1207, FIG. 10 (excerpted) (red annotations added).

92. As another example, Lee discloses displaying a “file transmission status,” “thereby giving [] feedback to the user.” EX1247, FIG. 11C, [0130].



EX1247, FIG. 11C (excerpted) (red annotations added).

93. As another example, Boutsikakis discloses “provid[ing] an indication to the user that the transmission is in progress” and “an indication when transmission has been completed.” EX1229, [0013].

94. Moreover, the use of progress bars generally, and their benefits, were well known more than 20 years before the '054 patent's alleged priority date. EX1231 (published in 1985), 11-12 (“Progress indicators give the user enough information at a quick glance to estimate how much of the task has been completed and when the task will be finished.”), 16-17; EX1230, 1:60-2:47.

95. Thus, a POSITA would have been motivated to program the Forutanpour devices to display the progress of the transfer to indicate the time remaining for the transfer so that, for example, users know when they may close the transfer application and put away their devices, or say, “goodbye,” and move to another location. A POSITA would have had a reasonable expectation of success in implementing this functionality in the Forutanpour devices because it would have required only elementary computer code that was well within the programming skill of a POSITA, as evidenced by the widespread use of such functionality in the art.

3. Claim 4

4. The method of claim 1, wherein the media is any one of a photograph, video, or a document.

96. Forutanpour anticipates this claim or at least renders it obvious because Forutanpour expressly discloses that its “files” (media element) include “documents, pictures or videos.” EX1204, [0003]; *see also id.*, [0066], FIGS. 3-7, 9-12, 14, 21A-24. Forutanpour also illustrates that the media element includes a “drawing” (EX1204, [0090]) in at least FIGS. 3-7, 9-12, 14, and 21A-24.

4. Claim 5

5. The method of claim 1, wherein the input or the another input is a tap.

97. Forutanpour anticipates this claim or at least renders it obvious because Forutanpour discloses that the touchscreen input is a “touch” (tap). EX1204, [0090]; *see also id.*, [0064], [0071], [0125]. For example, “the user can select a file by, for example, touching it on a touchscreen display” (EX1204, [0071]), as illustrated in at least FIGS. 3.

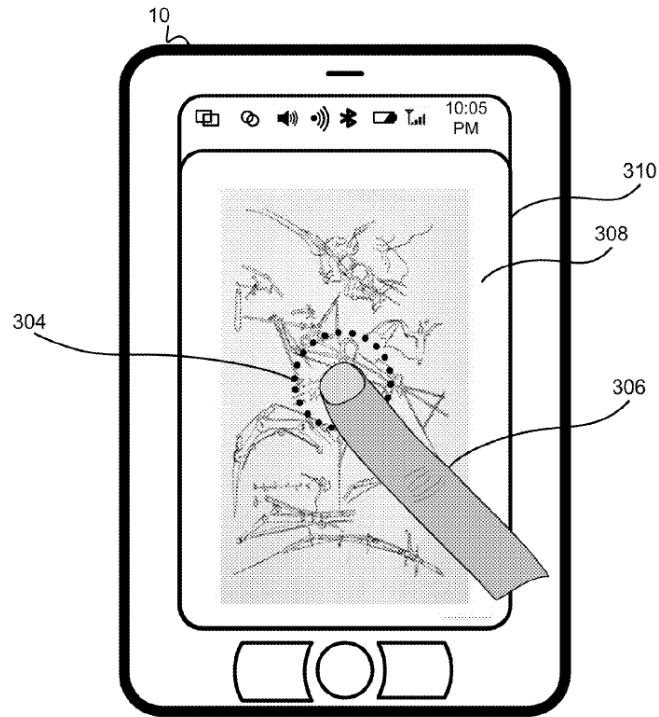


FIG. 3

EX1204, FIG. 3

98. The claim is further obvious because the '054 patent itself admits that it was known to convert touchscreen “user actions” and inputs, including a “tap 6A,” “to electromechanical signals through mechanisms known in the art.” EX1201, 8:15-38.

5. Claim 6

6. The method of claim 1, wherein the message to transfer is a request.

99. Forutanpour anticipates this claim or at least renders it obvious because Forutanpour discloses that the message to transfer is a “request.” EX1204, [0005], [0079-0080], [0086], [0144], claim 9, FIG. 1.

6. Claim 7

7. The method of claim 1, wherein the transferring by the WTRU over WiFi uses a WiFi link.

100. Forutanpour anticipates this claim or at least renders it obvious because Forutanpour discloses that the WiFi communication is a “WiFi direct communication link.” EX1204, [0081]; *see also id.*, [0004], claim 2.

7. Claim 8

8. The method of claim 1, wherein the transferring by the WTRU is provided by a communication peripheral.

101. Forutanpour anticipates this claim or at least renders it obvious because Forutanpour discloses that the WiFi and Bluetooth communications are provided by one or more “transceivers” coupled to a “processor.” EX1204, [0150-151], *see also id.*, [0009], [0063], [0072], [0128], claim 29.

8. Claim 9

9. The method of claim 1 further comprising using bluetooth to detect one of a plurality of WTRUs in proximity to the WTRU.

102. Forutanpour anticipates this claim or at least renders it obvious because Forutanpour discloses detecting “nearby” devices (i.e., devices in proximity) using the “automatic device discovery” provided by “the Bluetooth® communication protocol,” “[a]s is well known.” EX1204, [0072]; *see also id.*, [0068], [0086], [0096], [0128]; *id.*, FIGS. 1, 8, 35. It would have been further obvious to detect the nearby wireless devices using Bluetooth discovery, such as the Bluetooth device discovery provided by Bluetooth’s generic access profile, because this is how Bluetooth works, as described by the Bluetooth specification. EX1214, 38-43.

9. Claim 10

10. The method of claim 9, wherein the detection of the plurality of WTRUs utilizes a service discovery protocol.

103. Forutanpour renders this claim obvious because Forutanpour discloses using Bluetooth “to discover the presence of like-equipped computing devices.” EX1204, [0072]. POSITAs knew, as detailed in the Bluetooth specification, that Bluetooth’s service discovery protocol (SDP) provides this kind of discovery (of like-equipped devices) because SDP discovers the services offered by detected devices (and thus whether they are like-equipped). EX1214, 69-98; EX1253, 331-391; *see also*, EX1274, [0003], [0006], [0013-15]; EX1239, 96-102. The ’054 patent itself admits as much. *See, e.g.*, EX1201, 5:38-46 (“a service discovery protocol

(SDP) such as currently available in protocols such as Bluetooth®” may be invoked “to discover all of the TapAPP enabled WTRUs operating in a particular location”).

104. Thus, a POSITA would have found it obvious to utilize Bluetooth’s SDP to discover the presence of other like-equipped devices, as taught by Forutanpour.

10. Claim 12

12. The method of claim 1 further comprising: determining, by the WTRU, that the selected another WTRU is compatible to receive the selected media.

105. Forutanpour anticipates this claim or at least renders it obvious a POSITA would have understood that Forutanpour’s teachings to discover “like-equipped” (compatible) computing devices involved determining that the selected mobile device (WTRU) is compatible to transfer the selected media element. EX1204, [0072]. At the very least this would have been obvious. In the context of Forutanpour, a POSITA would have understood that “like-equipped” refers to devices having similar communication capabilities and thus “compatible” with one another for that purpose. In the context of Forutanpour, a POSITA would have understood that “like-equipped” refers to devices having similar communication capabilities and thus are “compatible” with one another for that purpose. Further, when setting up the transfer, the transmitting device “negotiate[s] a mutually acceptable communication network to use for the file transfer.” EX1204, [0081]. A

POSITA would have understood and/or at least have found it obvious that to negotiate a mutually acceptable communication network, the transmitting device would have to determine that the receiving device is compatible to receive the selected media element over that communication network.

106. This claim would have been further obvious in view of the state of the art because it was common practice to perform the claimed compatibility check to make sure the receiving device can accept the transfer. EX1229, [0011]; EX1242, [0007]; EX1238, Abstract, [0028]; EX1267, [0046]; EX1206, 12:30-13:4.

11. Claim 14

14. The method of claim 1 further comprising: determining, by the WTRU, environment information that lists a plurality of WTRUs in proximity to the WTRU.

107. Forutanpour anticipates this claim or at least renders it obvious because Forutanpour discloses gathering “contact information” and/or “the locations” of nearby computing devices and displaying “the profile picture[s]” of the other computing devices’ owners and/or the “locations of nearby computing devices with graphical indicators (e.g., dots).” EX1204, [0073-74], [0108]; *see also id.*, [0096], [0106], [0108-111], [0123], [0131-133], claim 13, FIG. 18. This location information is gathered using, e.g., GPS receivers, and the contact information is gathered, e.g., during device discovery. EX1204, [0073], [0108]. A POSITA would have understood Forutanpour’s determining and display of contact information and

location information of nearby devices to be environment information that lists the mobile devices (WTRUs) in proximity to the user device.

108. Moreover, a POSITA would have found it obvious that Forutanpour's Bluetooth discovery process involves determining environment information that lists the plurality of nearby wireless devices because Bluetooth's discovery process identifies nearby devices based on wireless signals received from these devices. EX1204, [0072], [0086], [0128]; EX1214, 13, 38-43. The Bluetooth specification itself discloses that the initial device discovery provided by Bluetooth's generic access profile lists the discovered Bluetooth devices. EX1214, 42-43.

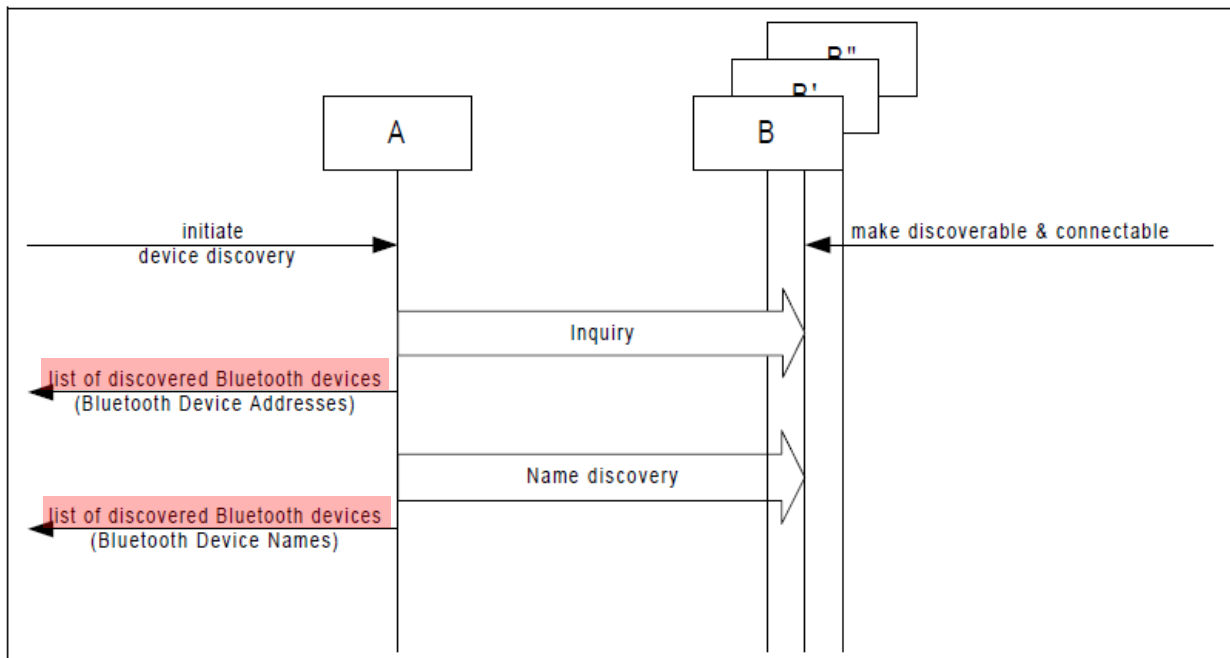


Figure 6.5: Device discovery procedure.

EX1214, 43 (Figure 6.5) (red annotations added).

12. Claim 15

15. The method of claim 1, wherein the WTRU processes the input or the another input based on information from the touch display.

109. Forutanpour anticipates this claim or at least renders it obvious because Forutanpour discloses that each mobile computing device's touchscreen is coupled to each device's processor (EX1204, [0150], FIG. 47) and that each mobile “detect[s] and recognize[s] a file transfer gesture” (EX1204, [0075] (processes the touchscreen input) based upon “information received through presses of the keys 402 and/or touchscreen 308 [which] may be communicated to the operating system 3404 [] via drivers” (EX1204, [0123]) (information from a touchscreen). *See also id.*, [0098], [0125], [0127].

13. Claim 21

[21.1] The method of claim 1 further comprising:
 [21.2] receiving, by the WTRU from a different WTRU, a request to transfer other media;
 [21.3] receiving, in response to accepting the request by the WTRU, the other media; and
 [21.4] displaying, by the WTRU, the other media substantially completely to a user of the WTRU.

110. Forutanpour anticipates these claims or at least renders them obvious. Forutanpour discloses that when receiving content, the targeted computing device (selected WTRU) “receive[s] a message from the transmitting computing device [] requesting permission to transmit files to it,” and after “send[ing] an authorization

response” to the transmitting computing device, the targeted computing device “receive[s] the file from the transmitting computing device.” EX1204, [0144]. After receiving the file, the targeted computing device “display[s] the file.” EX1204, [0114]. Thus, the targeted computing device (selected WTRU) performs each of the claim 22-recited actions.

111. A POSITA would have understood or at least found it obvious, however, that the other computing devices in Forutanpour’s network of devices also perform the claim 22-recited steps when receiving content at least because a POSITA would have understood or at least found it obvious that they are similarly equipped with the same file-sharing functionality. Forutanpour refers to the devices collectively: “computing devices 10a-10c,” ([0083-84]) “computing devices 10” (EX1204, [0095], [0108-110], [0115], [0123], [0128]) and gives no indication that the wireless computing devices are programmed to have disparate wireless functionality. Moreover, implementing Forutanpour’s system any other way (e.g., such that only some devices can send and receive transfer requests while others can only send transfer requests) would be nonsensical because it would unnecessarily limit the devices’ capabilities. Thus, a POSITA would have understood or at least have found it obvious that the computing device that sends content and performs the claim 1-recited steps (the WTRU) also performs the claim 22-recited steps when receiving content responsive to a transfer request from another device.

112. A POSITA would have found the specific use scenario (where a first device sends content to a second device and receives content from a third device) to be at least obvious in Forutanpour's system at least because Forutanpour discloses "sharing files among computing devices," not just sending content from one device to a second device. EX1204, [0004]. It further shows an exemplary system with three different computing devices (FIG. 2A) that a POSITA would have understood to be programmed to share files with each other according to Forutanpour's method. Thus, a POSITA would have understood or at least have found it obvious that in Forutanpour's network of multiple devices, a third device would send a transfer request to the first device and perform the claimed method.

14. Claims 46-47

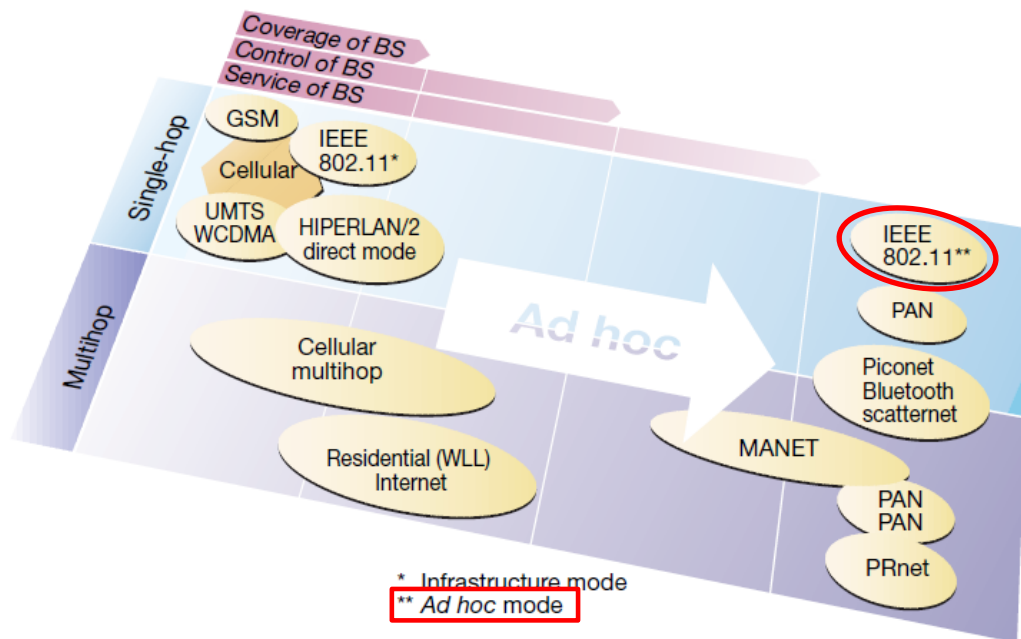
46. The method of claim 7, wherein the WiFi link utilizes peer-to-peer communication.

47. The method of claim 46, wherein the peer-to-peer communication operates in WiFi ad-hoc mode.

113. Forutanpour anticipates these claims or at least renders them obvious at least because Forutanpour discloses sharing files through direct, "device-to-device" wireless communication links (EX1204, Abstract, [0083], [0086-87]), such as a "WiFi direct communication link" (EX1204, [0081]). A POSITA would have understood that this "WiFi direct communication link" utilizes peer-to-peer communication that operates in WiFi ad-hoc mode because it was well known this

is how WiFi direct communication links are provided. EX1206, 4:16-17, 13:29, 19:10-12 (claim 15); *see also id.*, 4:5-22, 8:7-13, 13:3-33; EX1218, 250, 261-262. Hoddie, for example, discloses providing direct, device-to-device Wi-Fi connections by setting up an “ad hoc” Wi-Fi network using “a service set identifier (SSID) and encryption settings.” EX1206, 4:16-19. Frodigh confirms that by at least 2000, “IEEE 802.11 *ad hoc* mode” provided “[f]ully decentralized radio, access, and routing technologies” that supported “direct communication between wireless clients.” EX1218, 250, 261.

Figure 2
Various wireless networks mapped to two independent aspects of *ad hoc* networking: the level of centralized control (horizontal), and the use of radio multihopping (vertical).



EX1218, 250 (Figure 2) (red annotations added). Given all this, at the very least it would have been obvious to use peer-to-peer communications in WiFi ad-hoc mode.

15. Claims 23, 25-32, 34, 36-37, 43, 49-50

114. Claims 23, 25-32, 34, 36-37, 43, 49-50 are substantively identical to claims 1, 3-10, 12, 14-15, 21, and 46-47, respectively, but recite performing the claimed actions with configured circuitry. *See* EX1275. For example, in addition to the processor discussed above with respect to claim 1 and its dependents, Forutanpour discloses that its computing devices include other circuitry, such as transceivers configured to perform, or aid in performing, the wireless detection, transfer, sending, receiving, and compatibility determination discussed above with respect to the corresponding method claims. *E.g.*, EX1204, [0063]; [0072]; [0150-52]; claims 19-20, 22, 27-29, 31. I note that the '054 patent does not use the word “circuitry” outside the claims. A POSITA would have understood that the processor and transceiver described in Forutanpour include circuitry programmed to carry out the described methods. To the extent the claims require a display, Forutanpour also discloses a display configured to display the various displayed information. *E.g., id.*, [00123] (“The file sharing functionality application 3408 may communicate with users through the device display 310.”); *see also id.*, [0009]; [0071]; [0074]; [0150]; claims 19, 30-34; FIG. 31.

115. Because Forutanpour discloses performing its disclosed actions with circuitry, including processors and transceivers, these claims are anticipated by or at least obvious over Forutanpour for the reasons provided above in Sections IX.B.1-

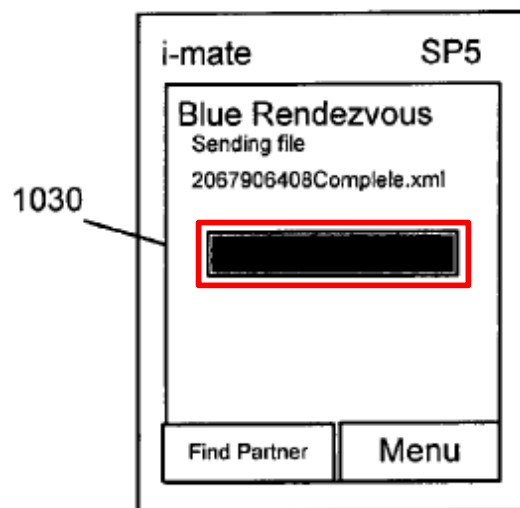
14. EX1204, [0009], [0070], [0078-80], [101], [0104], [0128], [0150-156], FIG. 47.

**X. GROUND 3: CLAIMS 3 AND 25 ARE
OBVIOUS OVER FORUTANPOUR AND HINCKLEY**

116. To the extent Patent Owner argues that it was not in the POSITA's knowledge to display the transfer progress (claims 3, 25), Ground 3 expressly relies on Hinckley (discussed as a background reference in Grounds 1-2) to confirm the obviousness of this feature.

117. For purposes of my analysis of the grounds, I have assumed that Hinckley is prior art to the challenged claims. Hinckley is analogous art to the '054 patent because they are both within the same field of endeavor: data transfer between wireless devices. EX1201, Title; EX1207, Abstract, [0010-12].

118. As explained above for Grounds 1-2, Hinckley discloses displaying a "progress bar" that "gives feedback on the transfer" to the user. EX1207, [0058].



EX1207, FIG. 10 (excerpted) (red annotations added).

119. A POSITA would have been motivated to program the Forutanpour devices to display the progress of the transfer, as taught by Hinckley, so that the user could “estimate how much of the task has been completed and when the task will be finished,” as was well known in the art. EX1231, 11-12, 16-17. A POSITA would have had a reasonable expectation of success in implementing this functionality in the Forutanpour devices because it would have required only elementary computer code that was well within the programming skill of a POSITA, as evidenced by the widespread use of such functionality in the art.

**XI. GROUND 4: CLAIMS 12 AND 34 ARE
OBVIOUS OVER FORUTANPOUR AND HODDIE**

120. To the extent Patent Owner argues that it was not in the POSITA’s knowledge to determine that the selected WTRU is compatible to transfer the selected media element (claims 12, 34), Ground 4 expressly relies on Hoddie (cited above as a background reference in Grounds 1-2) to confirm the obviousness of this feature.

121. For purposes of my analysis of the grounds, I have assumed that Hoddie is prior art to the challenged claims. Hoddie is analogous art to the ’054 patent because they are both within the same field of endeavor: data transfer between wireless devices. EX1201, Title; EX1206, Abstract, 1:24-6:11, claim 1.

122. Hoddie discloses detecting nearby wireless devices using Bluetooth and then determining whether the device is compatible to receive a media element over

a different, higher bandwidth interface (e.g., Wi-Fi) to expedite the transfer. EX1206, 3:2-4:26, 7:16-33, 9:9-11:7, 12:10-13:33. “The devices determine compatible interfaces” and either “agree upon a compatible interface” or “end the communication” (e.g., if the receiving device is not compatible to receive the file over Wi-Fi). *Id.*, 12:24-13:13.

123. A POSITA would have been motivated to implement the Forutanpour wireless computing device to determine whether the receiving device is compatible to receive the selected media over Wi-Fi, as taught by Hoddie, to ensure the receiving device can actually receive the media element, especially since it was well known in the art to check device compatibility before initiating a transfer to ensure the transfer is successful. EX1205, [0014-15], [0045]; EX1206, 12:15-13:33; EX1229, [0011]; EX1242, [0007]; EX1238, Abstract, [0010-11], [0013-29], [0046], [0063-64], [0070-74], [0079-80], claim 13-18, FIG. 2; EX1267, [0046]. A POSITA would have had a reasonable expectation of success in implementing this functionality because it would have required only elementary computer code that was well within the programming skill of a POSITA, as evidenced by the numerous prior art references that disclose this compatibility check. *Id.*

**XII. GROUND 5: CLAIMS 10 AND 32 ARE
OBVIOUS OVER FORUTANPOUR AND HEINONEN**

124. To the extent Patent Owner argues that it was not in the POSITA's knowledge to provide Bluetooth discovery using a service discovery protocol (claims 10, 32), Ground 5 expressly relies on Heinonen (discussed as a background reference in Grounds 1-2) to confirm the obviousness of this feature.

125. For purposes of my analysis of the grounds, I have assumed that Heinonen is prior art to the challenged claims. Heinonen is analogous art to the '054 patent because they are both within the same field of endeavor: data transfer between wireless devices. EX1201, Title; EX1274, Title, Abstract, [0001].

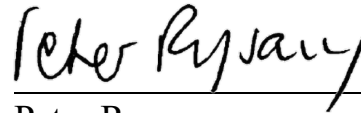
126. Heinonen confirms that Bluetooth discovery is provided, at least in part, using a service discovery protocol (SDP). EX1274, [0003], [0006], [0013-15]. For example, Heinonen's background states that "Bluetooth devices are designed to find other Bluetooth devices ... and to discover what services they offer, using a service discovery protocol (SDP)." EX1274, [0003].

127. Thus, as explained above for grounds 1-2 (Section IX.B.9), SDP is used to determine whether a detected device is "like-equipped" because it discovers the services that the other device supports. Given Forutanpour's instruction to discover like-equipped devices using Bluetooth (EX1204, [0072]), a POSITA would have been motivated with a reasonable expectation of success to use SDP to discover these like-equipped devices at least because this is how it was ubiquitously done in

the art, as confirmed by Heinonen and others. EX1274, [0003], [0006], [0013-15]; EX1214, 69-98; EX1253, 331-391; EX1239, 96101-102.

I, Peter Rysavy, do hereby declare and state, that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Dated: February 8, 2024

A handwritten signature in black ink, reading "Peter Rysavy", written over a horizontal line.

Peter Rysavy

APPENDIX A

Peter Rysavy – Curriculum Vitae

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**Peter Rysavy is an expert in data networking,
wireless technology, and mobile computing**

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1. Education

BSEE, MSEE Electrical Engineering, Stanford University, 1979.

2. Work Experience

Rysavy Research. 1993 to Present: President

Peter Rysavy is president of Rysavy Research LLC, a consulting firm that has specialized in data networking, wireless technology, and mobile computing since 1993. Projects have included testifying in multiple venues, evaluation of data network capabilities, reports on wireless technology evolution, network performance measurement, test reports, spectrum analysis for broadband services, strategic consultations, system design, articles, courses, and webcasts.

Peter Rysavy has expertise in all aspects of data networking, internet technologies, TCP/IP, fiber, DOCSIS, voice communications, IP Multimedia Subsystem (IMS), IEEE 802.11 (Wi-Fi), wireless hotspots, mesh networks, metro and municipal Wi-Fi, paging technology, 2G, 3G, 4G, 5G (Release 15, Release 16, Release 17, Release 18), IMT-Advanced, IMT-2020, Global System for Mobile Communications (GSM), General Packet Radio Service (GPRS), Enhanced Data Rates for GSM Evolution (EDGE), Universal Mobile Telecommunications System (UMTS), Code Division Multiple Access (CDMA), Wideband CDMA (WCDMA), High Speed Downlink Packet Access (HSDPA), High Speed Uplink Packet Access (HSUPA), High Speed Packet Access (HSPA), HSPA+, Long Term Evolution (LTE), LTE-Advanced, LTE-Advanced Pro, LTE-Licensed Assisted Access (LAA), LTE-U, 5G, CDMA2000, CDMA2000 1XRTT, Evolved Data Optimized (EV-DO), Bluetooth, WiMAX, IEEE 802.16 (IEEE 802.16e, IEEE 802.16m), wireless security, smartphones, smartphone operating systems, Mobile IP, Evolved Packet System (EPS), Evolved Packet Core (EPC), machine-to-machine communications (M2M), Internet of Things (IoT), remote monitoring and control systems, location-based services, e-mail, wireless e-mail, browsers, mobile browsers, media gateways, orthogonal frequency division multiplexing (OFDM),

orthogonal frequency division multiple access (OFDMA), voice over IP (VoIP), mobile video, wireless spectrum, spectrum sharing, spectral efficiency, capacity analysis, and mobile computing architectures.

Patent Litigation

Peter Rysavy has worked in numerous cases, both as testifying and consulting expert. He has trial experience, reports, and depositions. See section 4 for details.

Analysis

Rysavy Research analyzes wireless technologies for capability, compatibility, interoperability, and intellectual-property considerations.

Training

Rysavy Research conducts wireless-technology training, both publicly and privately.

Testing and Reports

Rysavy Research tests, evaluates, and reports on all major wireless technologies.

Application Development and Deployment

Rysavy Research works with companies to define architectures, select vendors, perform pilots, and to deploy wireless systems and applications.

Clients from 1993 to present include:

5G Americas, ADT, AlphaSights, AltaVista, Anchorage Partners, Antenna Software, Apple, Arris, AT&T, AT&T Wireless, Aventail, Black Lowe & Graham, Bluetooth SIG, Broadbeam, Canopy Spectrum, Cingular Wireless, City of Seattle, CMP Media, Compression Laboratories, Coinstar, Converse Network Systems, Cravath Swaine & Moore, Cricket Wireless, Crosslink Capital, Customer Focused Strategies, Datacomm Research, CTIA – The Wireless Association, Data Communications Magazine, Datacomm Research, Delco Electronics, Epicenter, Epicron, Ericsson, Fish and Richardson, Fitbit, Fluke, Foley Lardner, Fossil, GE, Gerson Lehrman Group, Gibson Dunn, Good, Google, GSMA, GuidePoint, Haynes & Boones, Hillman Company, Hobnob, Holland & Knight, Huawei, Hughes Network Systems, IMS Expert Services, Informa, Information Week, Intel, IT World, iWindsurf, Juniper Networks, Kecker & Van Nest, King & Spalding, Kirkland & Ellis, Klarquist Sparkman, Mayer Brown, MCCI, McGuire Woods, Medtronic Physio-Control, Microsoft, Mobile Computing Promotion Consortium (MCPC), Mobile Future, Moffatt Thomas, Motorola, NetMotion Wireless, Network Magazine, Network Computing Magazine, New York State Wireless Association, Nokia, Norcom Networks, Novatel Wireless, OmniSky, Pacific Commware, Park & Associates, Perkins Coie, Portable Computer and Communications Association (PCCA), Portland State University, Powell and Gilbert, Research in Motion (RIM), Park and Associates, Quality in Motion, RKM Holdings, Rogers Communications, RPX, Ruckus Wireless, Sanyo, SkyGo, Sprint, Stratos Product Development Group, Superconductor Technologies, Symbian, T-Mobile, TCI, Teklicon, Tektronix, Teledyne Electronic Technologies, Third Bridge, Traveling Software

(LapLink), United Business Media, University of British Columbia, UCLA, US Department of Defense, Verizon Wireless, Wells Fargo, White & Case, Whitworth Analytics, WiMAX Forum, Wireless Data Forum, Wireless Technology Association, WRQ, Xerox Palo Alto Research Center, and Xircom.

Wireless Technology Association. 2000 to 2016: Executive Director.

Managed all the logistics of a non-profit industry organization that that evaluated wireless technologies, investigated mobile communications architectures, and promoted wireless-data interoperability. Organized and moderated more than fifty industry workshops.

Traveling Software (LapLink), Bothell, WA, USA. 1992 to 1993: Vice President of Technology.

Researched and evaluated key technologies. Developed Traveling Software's wireless communications strategy for local area and wide area connections. Helped define overall product and technology directions. Prototyped new technologies. Collaborated with technology partners. Developed license agreements for sale and purchase of technology. Participated in strategic sales efforts. Frequently traveled around the US and Asia. Spoke at conferences. Attended and monitored standards efforts. Managed patent applications and patent issues.

Traveling Software (LapLink), Bothell, WA, USA. 1988 to 1992: Vice President, Research and Development.

Developed Traveling Software's Research and Development department. Recruited over thirty professionals, including managers, design engineers, quality assurance engineers and technical writers. Under my management, we implemented: documented design and quality assurance procedures; a version control system; complete archiving with off-site storage; regular performance appraisals; a bonus plan; and well defined career paths. This R&D organization successfully brought in house all strategic technology and also released numerous successful software products for the retail PC market, including LapLink, LapLink Mac, DOS Connect for the HP 95LX, Organizer Link for the Sharp Wizard, and PC Link for the Casio BOSS.

Fluke Corporation, Everett, WA, USA. 1979 to 1981 and 1983 to 1988: Program Manager, Project Manager, Design Engineer.

As program manager, managed marketing group to determine target markets, sales channels, positioning and promotion in support of Fluke's operator interface business. As project manager, managed development of an entire family of communications-oriented touch terminals. Fluke introduced the first member, the 1020 Touch Control Screen in May, 1986. Directed software (C code for 68000 family processor), digital hardware (surface mount, semi-custom IC's, computer aided engineering), package design (injection molded plastic parts, steel chassis), and manuals (in English, French, German and Japanese.) Coordinated many groups: design, manufacturing, purchasing, component engineering, and marketing. As design engineer from 1979 to 1981, designed hardware and firmware for various systems, including: RS-232 communications; IEEE-488 communications; RS-485 multi-drop communications; thermal printer interface; cartridge drive interface; vacuum display driver and keypad driver.

Other Work Experience:

Time Office Computers, Australia, 1981 to 1983: Ethernet networking, random-access memory, power supply hardware development.

Stanford University, USA, 1976-1979: software consulting services for university/industry collaborations.

Additional information:

Available at <https://rysavy.com/>.

3. Patents

Peter Rysavy is the co-inventor of US4929935A, Apparatus for aligning raster scanned image to touch panel, filed May 2, 1986.

Peter Rysavy is the co-inventor of US4941845 A, Data transfer cable, filed June 7, 1989.

4. Testifying and Consulting Experience in Litigation

Summary

Fifty engagements in cases as a testifying expert.

Forty-eight engagements in patent cases as a testifying expert.

Court testimony as testifying expert in patent-litigation trial for Apple.

Ten patent-related depositions as testifying expert.

One breach-of-contract litigation deposition as testifying expert.

Thirty-three expert declarations for Inter Partes Review covering twenty patents.

Seven expert reports on non-infringement covering fifteen patents.

Eight expert reports on invalidity covering ten patents.

Four declarations related to claim construction.

Sixteen patent cases as consulting expert.

Three expert reports on non-patent matters.

Training in testifying and patents, 2020. (*Seak: How to be an Effective Expert Witness. How to Excel and Succeed as an Expert Witness in Patent Cases: Special Techniques.*)

Current Patent Cases as Testifying Expert

Two cases. Details available upon request.

Prior Patent Cases as Testifying Expert (most recent on top)

Testifying expert for LG Electronics. Claim construction, U.S. Patent 9,854,545. Declaration filed June 23, 2023. Deposed July 12, 2023.

Testifying expert for Alarm.com. Inter Partes Review. U.S. Patent No. 9,349,262. *Case No. IPR2022-00728.* Firm: Cravath, Swaine & Moore. Declaration filed March 18, 2022.

Testifying expert for Alarm.com. Inter Partes Review. U.S. Patent No. 7,956,739. *Case No. IPR2022-00714.* Firm: Cravath, Swaine & Moore. Declaration filed March 15, 2022.

Testifying expert for T-Mobile. Inter Partes Review. U.S. Patent No. 9,918,196. Firm: *Case No. IPR2022-00669.* Firm: McGuire Woods. Declaration filed March 4, 2022.

Testifying expert for ADT. Inter Partes Review. U.S. Patent No. 9,349,262. *Case No. IPR2022-00612.* Firm: Cravath, Swaine & Moore. Declaration filed February 7, 2022.

Testifying expert for Amazon. Inter Partes Review. U.S. Patent 10,791,442. *Case No. IPR2022-00260.* Firm: Perkins Coie. Declaration filed December 10, 2021.

Testifying expert for Fossil. Non-infringement, U.S. Patent Nos. 8,738,794; 8,892,752; and 9,749,847. *Case No. 4:17-CV-05933-YGR.* Firm: Fish & Richardson. Expert report on non-infringement October 29, 2021.

Testifying expert for ADT. Inter Partes Review. U.S. Patent No. 7,956,739. *Case no. IPR2021-01374.* Firm: Cravath, Swaine & Moore. Declaration filed August 6, 2021. Deposed April 26, 2022.

Testifying expert for Huawei. Inter Partes Review. U.S. Patent 6,704,304. *Case no. IPR2021-01012.* Firm: Fish & Richardson. Declaration filed May 26, 2021.

Testifying expert for Huawei. Inter Partes Review. U.S. Patent 7,460,658. *Case no. IPR2021-00691.* Firm: Fish & Richardson. Declaration filed April 6, 2021.

Testifying expert for T-Mobile. Claim construction. U.S. Patent 6,922,728. *Case No. 2:20-cv-281-JRG.* Firm: Gibson Dunn. Declaration filed March 15, 2021. Deposed March 31, 2021.

Testifying expert for Huawei. Inter Partes Review. U.S. Patent 8,429,480. *Case no. IPR2021-00229.* Firm: Fish & Richardson. Declaration filed November 30, 2020.

Testifying expert for Huawei. Inter Partes Review. U.S. Patent 7,515,546. *Case no. IPR2021-00225.* Firm: Fish & Richardson. Declaration filed November 30, 2020.

Testifying expert for Huawei. Inter Partes Review. U.S. Patent 7,508,755. *Case no. PR2021-00224.* Firm: Fish & Richardson. Declaration filed November 30, 2020.

Testifying expert for Ericsson. Inter Partes Review. U.S. Patent No. 7,016,676. *Case no. IPR2020-00376.* Firm: Haynes and Boone, LLP. Declaration of December 22, 2019.

Testifying expert for Microsoft. Inter Partes Review. U.S. Patent No. 6,664,891. *Case no. IPR2019-01188.* Firm: Klarquist Sparkman. Declaration filed June 11, 2019. Second declaration filed May 25, 2020. Patent Trial and Appeal Board ruled challenged claims unpatentable, November 4, 2020.

Testifying expert for Microsoft. Inter Partes Review. U.S. Patent No. 7,016,676. *Case no. IPR2019-01116.* Firm: Klarquist Sparkman. Declaration filed May 29, 2019. Second declaration filed May 19, 2020. Patent Trial and Appeal Board ruled challenged claims unpatentable, October 26, 2020.

Testifying expert for Microsoft. Inter Partes Review. U.S. Patent No. 6,993,049. *Case no. IPR2019-01026*. Firm: Klarquist Sparkman. Declaration filed May 6, 2019. Second declaration filed May 19, 2020.

Testifying expert for RPX. Inter Partes Review. U.S. Patent 7,245,917. *Cases no. IPR2018-01387, IPR2018-01388*. Firm: Klarquist Sparkman. Declaration filed July 13, 2018. Declaration for opposition to motion to amend filed August 8, 2019.

Testifying expert for Verizon. Non-infringement, U.S. Patent No. 9,642,024. *Traxcell v. Verizon. Case no. 2:17-cv-00721-RWS-RSP*. Firm: Holland & Knight. Expert report on non-infringement July 17, 2019. Deposed August 9, 2019. Motion for summary judgement granted September 18, 2019.

Testifying expert for Fossil. Non-infringement and invalidity, U.S. Patent No. 6,490,443. *Freemy v. Fossil, case no. 2:18-cv-00049*. Firm: Fish & Richardson. Expert report on non-infringement, May 13, 2019. Expert report on invalidity April 22, 2019. Deposed May 21, 2019. Parties settled.

Testifying expert for Fossil. Inter Partes Review. U.S. Patent 6,490,443. *Case no. IPR2019-00755*. Firm: Fish & Richardson. Declaration filed April 1, 2019.

Testifying expert for Microsoft. Inter Partes Review. U.S. Patent 9,531,657. *Case no. IPR2017-01411*. Firm: Klarquist Sparkman. Declaration filed May 8, 2017. On November 28, 2018, the Patent Trial and Appeal Board ruled all claims to be unpatentable.

Testifying expert for Arris. Non-infringement and invalidity (one patent), U.S. Patent No. RE45,126. *Sony v. Arris, ITC No. 337-TA-1049*. Firm: Fish & Richardson. Expert report on non-infringement, October 13, 2017. Expert report on invalidity September 27, 2017. Case settled in December 2017.

Testifying expert for Microsoft. Inter Partes Review. U.S. Patent 8,848,892. *Case no. IPR2017-01052*. Firm: Klarquist Sparkman. Declaration filed March 9, 2017. Deposed November 30, 2017. On September 19, 2018, the Patent Trial and Appeal Board ruled all claims to be unpatentable.

Testifying expert for Apple. Non-infringement and invalidity. U.S. Patent 6,321,092. *Unwired Planet v. Apple, Case No. 13-cv-04134*. Firm: Gibson Dunn. Expert reports on non-infringement and invalidity, March 7, 2017.

Testifying expert for Google, Inter Partes Review.

U.S. Patent 5,809,428. *Case nos. IPR2017-00529, IPR2017-00530, and IPR2017-00559*. Three declarations filed December 30, 2016. Firm: Fish & Richardson. Parties settled as of May 2017 and IPR proceedings terminated.

U.S. Patent 5,754,946. *Case nos. IPR2017-00536 and IPR2017-00537*. Two declarations filed December 29, 2016. Firm: Fish & Richardson. Parties settled as of May 2017 and IPR proceedings terminated.

U.S. Patent 5,894,506. *Case nos. IPR2017-00532, IPR2017-00533, IPR2017-00534, and IPR2017-00535*. Four declarations filed December 28, 2016. Firm: Fish & Richardson. Parties settled as of May 2017 and IPR proceedings terminated.

Testifying expert for T-Mobile, non-infringement. U.S. Patent Nos. RE41,490, RE43,306, 5,790,793, 7,450,957, and 8,078,200. *Intellectual Ventures v. T-Mobile US*, case no. 1:13-cv-01632-LPS. Firm: Gibson Dunn. Expert report May 26, 2016. Deposed September 20, 2016. Parties settled.

Testifying expert for RPX, Inter Partes Review.

U.S. Patents 8,135,342 and 8,879,987. *Case nos. IPR2016-01052, IPR2016-01053, and IPR2016-01054*. Declaration filed May 17, 2016. Firm: Klarquist Sparkman. January 2017, all IPRs were instituted on a majority of the claims in the petitions, and patent owner ultimately canceled all instituted claims.

U.S. Patents 8,135,342 and 8,879,987. *Case nos. IPR2016-00985 and IPR2016-00989*. Declaration filed April 30, 2016. Firm: Klarquist Sparkman. January 2017, both IPRs were instituted on a majority of the claims in the petitions, and patent owner ultimately canceled all instituted claims.

Testifying expert for Microsoft, invalidity and non-infringement. U.S. Patents 6,346,047 and 6,684,062. *Eleven Engineering Inc. et al. v. Microsoft Corporation et al.*, Case No. 09-903-LPS (D. Del.). Firm: Fish & Richardson. Plaintiff conceded to non-infringement based on claim construction July 2016 prior to report submission.

Testifying expert for LG Electronics, non-infringement. U.S. Patent 8,055,820. *Cellular Communication Equipment LLC v. LG Electronics, Inc., et al.*, Case no. 6:13-cv-00508 (EDTX). Firm: Mayer Brown. Case settled July 2016 prior to report submission.

Testifying expert for Amazon, Barnes & Noble, MediaTek, Nokia, Samsung, Texas Instruments, invalidity. U.S. Patent No. 5,487,069. *CSIRO v. MediaTek et al.*, Case No. 6:12-cv-578-LED-KNM. Firms: Covington & Burling, O'Melveny & Myers, Quinn Emanuel Urquhart & Sullivan, White & Case. Report on invalidity December 19, 2014. Deposed March 6, 2015. Case settled July 2015.

Testifying expert for Apple, non-infringement (three patents) and invalidity (two patents). U.S. Patent Nos. 6,317,831, 6,647,260, and 6,532,446. *Unwired Planet v. Apple*, case No. 13-cv-04134. Firm: Gibson Dunn. Expert report on non-infringement January 12, 2015. Expert report on invalidity December 3, 2014; rebuttal-reply report on invalidity January 26, 2015. Deposed February 13, 2015. Case settled in April 2017.

Testifying expert for Apple, invalidity. U.S. Patent Nos. 7,555,267, 7,570,954, and 7,792,492. *GPNE v. Apple*, case no. 12-CV-02885-LHK. Firm: Fish & Richardson. Report on invalidity January 4, 2014. Deposed February 20, 2014. Testified in court October 17 and October 20, 2014. Jury verdict of non-infringement on all three patents.

Testifying expert for HTC, invalidity (one patent), in *Nokia v. HTC, ITC Investigation No. 337-TA-847*. Firm: White & Case. Report 2013. Patent withdrawn from dispute.

Other Patent-Litigation Testimony

Claim-construction declaration for Microsoft in *Eleven Engineering Inc. et al. v. Microsoft Corporation et al.*, No. 09-903-LPS (D. Del.), January 28, 2016. Case details above.

Claim-construction declaration for Apple in *Unwired Planet v. Apple*, April 7, 2014. Case details above.

Declaration "*In re Patent Application of Han-Jin JOH, 11/266,114.*" Docket No. P2481US00, April 18, 2012. Firm: H.C. Park & Associates, PLC.

Declarations for Front Row Technologies in *Inter Partes Reexam. 95/001,565*, April 4, 2011; *95/001,568*, March 7, 2011; *95/001,566*, March 4, 2011. Firm: Black, Lowe & Graham PLLC.

Non-Patent Litigation Testimony

Testifying expert for Instant Checkmate, Robert Fischer and Stephanie Lukis individually and on behalf of all others similarly situated v. Instant Checkmate LLC, Civil action 1:19-cv-04892 (N.D. Ill.). Firm: Jenner & Block. Report September 17, 2021.

Testifying expert for Sprint, Truckstop.net vs. Sprint Communications, Case No. CV-04-561-S-BLW. Firm: Moffatt Thomas. Report March 31, 2006, supplemental report September 28, 2006. Deposed May 3, 2007. Worked on case 2005 to 2010.

Consulting Expert History

Twenty cases.

Law firms include: Axinn, Veltrop & Harkrider; Finnegan, Henderson, Farabow, Garrett & Dunner; Foley & Lardner; HC Park & Associates; Holland & Knight, Keker & Van Nest; King & Spalding; Kirkland & Ellis; Klarquist Sparkman; Mayer Brown, Maynard, Coper & Gale; Powell Gilbert; Simpson Thacher & Bartlett.

Clients include: Amazon, Apple, Huawei, Lenovo, Motorola, Nokia, Pantech, Research in Motion (RIM), Samsung, Sanyo, SkyTel (Verizon), Starent, Thales, and T-Mobile.

5. Public Speaking

Peter Rysavy has spoken at more than 60 public events, such as conferences, as a keynote presenter, moderator, and panelist. See <https://rysavy.com/speaking/> for details.

6. Published Articles and Reports

The 200 articles, reports, and white papers by Peter Rysavy, listed from most recent to oldest, include the following:

1. Declaration, submitted to the FCC, analyzing in technical detail why today's internet fits the legal definition of an information service as opposed to a telecommunications service. December 2023.
2. "5G Mid-Band Spectrum: The Benefits of Full Power, Wide Channels, and Exclusive Licensing," December 2022. Report published by CTIA.
3. "Lessons Learned from the CBRS Spectrum Experiment," April 2022. Article for Fierce Wireless.
4. "3G Shutdowns Should Not Be Delayed," February 2022. Article for Fierce Wireless.
5. "Rational Decisions Needed on C-band and Altimeters," November 2021. Article for Fierce Wireless.

6. "The Folly of Attempting to Future-proof Broadband," June 2021. Article for Light Reading.
7. "No Magic Spectrum Sharing Solutions," April 2021. Article for Fierce Wireless.
8. "5G Mid-Band Spectrum Deployment," February 2021. Rysavy Research Report.
9. "DoD's proposed 5G spectrum sharing fraught with problems," October 2020. Article for Fierce Wireless.
10. "Global 5G: Rise of a Transformational Technology," September 2020. Report published by 5G Americas.
11. "Latest Tech Aims to Solve Riddle for Rural Broadband," August 2020. Article for Fierce Wireless.
12. "6 GHz Should Be Allocated for Both Licensed and Unlicensed Applications," March 2020. Article for Light Reading.
13. "Virtualization Will Transform the Wireless Industry," December 2019. Article for Fierce Wireless.
14. "Global 5G: Implications of a Transformational Technology," September 2019. Report published by 5G Americas.
15. "How Title II Net Neutrality Undermines 5G," June 2019. Report published by Rysavy Research.
16. "How the 'Save the Internet' Act Breaks 5G," May 2019. Article for Bloomberg Law.
17. "Bad Idea of Nationalized 5G Network Put to Rest," April 2019. Article for Fierce Wireless.
18. "Untangling C-band for a New Broadband Future," January 2019. Article for Fierce Wireless.
19. "Broadband Disruption: How 5G Will Reshape the Competitive Landscape—Second Edition," November 2018. Report published by Datacomm Research.
20. "LTE to 5G: The Global Impact of Wireless Innovation," August 2018. Report published by 5G Americas.
21. "Mid-Band Spectrum for 5G Needed Now," August 2018. Article published by Fierce Wireless.
22. "Small Cells – Suddenly Essential," March 2018. Article published by RCR Wireless.
23. "How 5G Will Solve Rural Broadband," January 2018. Article published by Fierce Wireless.
24. "The Power of Wireless Broadband," November 2017. Report published by Rysavy Research.
25. "Broadband Disruption: How 5G Will Reshape the Competitive Landscape," August 2017. Report published by Datacomm Research.
26. "Why 5G Will Be a Game Changer," August 2017. Article published by Fierce Wireless.

27. "LTE to 5G: Cellular and Broadband Innovation," August 2017. Report published by 5G Americas.
28. Declaration of Peter Rysavy. Exhibit to CTIA Comments to Federal Communications Commission, WC Docket No. 17-108, Restoring Internet Freedom. 2017.
29. "How "Title II" Net Neutrality Undermines 5G," April 2017. Report published by Rysavy Research.
30. "Accelerating Innovation in Unlicensed Spectrum," November 2016. Article published by Fierce Wireless.
31. "IoT & 5G: Wait or Move?" October 2016. Report published by Informa.
32. "Mobile Broadband Transformation," August 2016. Report published by 5G Americas.
33. "Threading the Spectrum Needle - Can LTE and Wi-Fi Coexist?" February 2016. Article published by Fierce Wireless.
34. "5G - Promises and Pitfalls," November 2015. Article published by RCR Wireless News.
35. "LTE and 5G Innovation: Igniting Mobile Broadband," August 2015. Report published by 4G Americas.
36. "Latest FCC Auction Shatters Spectrum Myths," January 2015. Article published by Gigaom.
37. "LTE Congestion Management - Enabling Innovation and Improving the Consumer Experience," January 2015. Report published by Mobile Future.
38. "Mobile Broadband Networks Should Not Be Hampered by Net Neutrality Constraints," September 2014. Article published by Fierce Wireless.
39. "How Wireless is Different - Considerations for the Open Internet Rulemaking," September 2014. Report for Mobile Future.
40. "Beyond LTE: Enabling the Mobile Broadband Explosion," August 2014. Report published by 4G Americas.
41. "Will LTE in Unlicensed Spectrum Unlock a Vast Store of Mobile Broadband Capacity?" June 2014. Article published by MIMO World.
42. "How will 5G compare to fiber, cable or DSL?" May 2014. Article published by Fierce Wireless.
43. "It's Time for a Rational Perspective on Wi-Fi," April 2014. Article published by Gigaom.
44. "Complexities of Spectrum Sharing - How to Move Forward," April 2014. Report published by Mobile Future.
45. "Canadian 700 MHz Auction: Analysis of Results." April 2014. Analysis of auction that concluded February 2014 in Canada.
46. "Challenges and Considerations in Defining Spectrum Efficiency," March 2014. Article for Proceedings of the IEEE.

47. "The High and Wide Future of Radio," March 2014. Column for Fierce Wireless.
48. "Uncertain Government Spectrum Policies Have Far-Reaching Consequences," November, 2013. Article for Bloomberg BNA Insights.
49. "Who Owns the Internet of Things?", September 2013. Column for Fierce Wireless co-authored with Chris Rezendes.
50. "Mobile Broadband Explosion - The 3GPP Wireless Evolution," August 2013. Report for 4G Americas.
51. "Learn How Technology Will Turn Less Desirable Airwaves into 'Beachfront' Spectrum," June 2013. Article for Gigaom.
52. "Efficiency of Spectrum Use," May 2013. Article for Fierce Wireless.
53. "2013 Mobile Commerce Survey," May 2013. Report for Information Week.
54. "Trends in Enterprise Cellular Network Data Usage," March 2013. Market research and report done in conjunction with NetMotion Wireless."
55. "White Spaces Networks Are Not "Super" Nor Even Wi-Fi," March 2013. Article for Gigaom.
56. "Mobile Commerce: State of the Market," February 2013. Coauthored report for Information Week.
57. "Vehicles and Mobility Are Converging but Fragmentation, Lack of Standards May Hinder Progress," February 2013. Column for Fierce Wireless.
58. "4G: Carriers, IT Pros Square Off," December 2012. Report for Information Week.
59. "Spectrum – All Options Essential, Including Incentive Auctions," December 2012. Blog for HighTech Forum.
60. "Spectrum Sharing with LTE is Conceivable But Not Trivial," November 2012. Column for Fierce Wireless.
61. "4G World: The Need For More Spectrum," October 2012. Column for Information Week.
62. "Spectrum Sharing Opens a Potential Attack Route," October 2012. Article for Gigaom.
63. "No Silver Bullets for FCC, NTIA Spectrum Challenge," September 2012. Article for Bloomberg BNA.
64. "Mobile Broadband Explosion – The 3GPP Wireless Evolution," September 2012. Report for 4G Americas.
65. "Spectrum Sharing – The Promise and The Reality," July 2012. Report for Mobile Future.
66. "Mobile Network Design and Deployment: How Incumbent Operators Plan for Technology Upgrades and Related Spectrum Needs," June 2012. Rysavy Research report.

67. "LTE: Huge Technology, Huge Challenges," March 2012. Report for Information Week.
68. "Wireless Spectrum Doomsday Looms," January, 2012. Column for InformationWeek.
69. "Unleashing the Wireless Power of Long-Term Evolution: Spectrum, and Lots of It," December 2011. Article for Bureau of National Affairs (BNA).
70. "Convergence of 3G/4G and Wi-Fi, October 2011. Report for InformationWeek.
71. "Comments on Citi 'Wireless Supply and Demand'," October 2011. Analysis and report.
72. "Mobile Broadband Explosion. 3GPP Broadband Evolution to IMT-Advanced (4G)," September 2011. Detailed report for 4G Americas.
73. "Public Safety Spectrum," July 2011. Analysis and report.
74. "Efficient Use of Spectrum," May, 2011. Report sponsored by CTIA, filed with the FCC.
75. "The Spectrum Imperative: Mobile Broadband Spectrum and its Impacts for U.S. Consumers and the Economy. An Engineering Analysis," March 2011. Report sponsored by Mobile Future.
76. "Application Mobilization: A Rapidly Changing Landscape," January 2011. Report published by Information Week.
77. "Smartphone Efficiency Report," January 2011. Rysavy Research report.
78. "Innovation Enabled by Mobile Wireless Network Management," Report sponsored by Mobile Future, filed with the FCC October, 2010.
79. "Strategic Use of Wi-Fi in Mobile Broadband Networks," October 2010, Rysavy Research white paper.
80. "Transition to 4G – 3GPP Broadband Evolution to IMT-Advanced," September 2010. Rysavy Research report for 4G Americas.
81. "Spectrum Shortfall Consequences," April 2010. Analysis written for CTIA and filed with the FCC.
82. "Beyond Smartphones," February, 2010. Article published by Information Week.
83. "Mobile Broadband Capacity Constraints And the Need for Optimization," February 2010. Rysavy Research report.
84. "The 2.6 GHz Spectrum Band - Unique Opportunity to Realize Global Mobile Broadband," December 2009. Report published by GSMA with Peter Rysavy providing the technology analysis on how best to manage the 2.6 GHz band.
85. "Net Neutrality Regulatory Proposals: Operational and Engineering Implications for Wireless Networks and the Consumers They Serve." Report sponsored by Mobile Future, filed with the FCC January, 2010.
86. "The Mobile Web Imperative," December 2010. Article published by Information Week.

87. "Air Pressure: Why IT Must Sort Out App Mobilization Challenges," October, 2009. Analytics report published by Information Week.
88. "Spectrum Crisis?" October, 2009. Article published by Information Week.
89. "HSPA to LTE-Advanced. 3GPP Broadband Evolution to IMT-Advanced (4G)" September 2009. Detailed report published by 3G Americas.
90. "3G Safeguards: Incomplete, Getting Better," May 2009. Article published by Information Week.
91. "Mobile Broadband Spectrum Demand," December 2008. Report commissioned by CTIA, released at CTIA Wireless March, 2009.
92. "Femtocells Suit Up For Work," January 2009. Article published by Information Week.
93. "Wireless E-Mail Efficiency Assessment," January 2009. Test report.
94. "HSPA Gets Uploads Almost Up To Download Speeds," September 2008. Article published by Information Week.
95. "EDGE, HSPA and LTE - Broadband Innovation," September 2008. White paper, published by 3G Americas.
96. "Code of the Road," August 2008. Article published by Information Week.
97. "Global Mobile," May 2008. Article published by Information Week.
98. "GPS Performance," March 2008. Test report.
99. "Mobile Application Development Quick Start Guide," March 2008. White paper, published by AT&T.
100. "Harnessing Mobile Middleware", December 2008. White paper published by AT&T.
101. "Security Requirements for Wireless Networking," December 2007. White paper.
102. "Mobile Application Development Best Practices," September 2007. Peter Rysavy co-wrote this white paper, published by AT&T.
103. "EDGE, HSPA, LTE: The Mobile Broadband Advantage", September 2007, White Paper for 3G Americas
104. "Handheld Computing Evolution", June 13, 2007, Network Computing Mobile Observer
105. "Reach Me if You Can", article on wireless application deployment, May 2007, Network Computing Magazine
106. "Global Mobile", May 23, 2007, Network Computing Mobile Observer
107. "Wireless Networks, Wired Bottlenecks", May 2, 2007, Network Computing Mobile Observer
108. "Breaking the Gray Flannel Ceiling", article on mobile IM, April 2007, Network Computing Magazine

109. "QoS and VoIP With 3G: Not an Easy Marriage", Apr 11, 2007, Network Computing Mobile Observer
110. "Mobile Linux Puzzle - Coming Together." March 2007, Network Computing Magazine.
111. "Learning from Bluetooth", Mar 21, 2007, Network Computing Mobile Observer
112. "Disconnect!", Feb 28, 2007, Network Computing Mobile Observer
113. "EV-DO Rev A: Upping the Ante", Feb 7, 2007, Network Computing Mobile Observer
114. "IEEE 802.11n for the Enterprise—Not a Trivial Upgrade", Jan 17, 2007, Network Computing Mobile Observer
115. "Google Embraces Mobile", Dec 20, 2006, Network Computing Mobile Observer
116. "Using VPNs with Wireless Networks", Nov 29, 2006, Network Computing Mobile Observer
117. "Evolved EDGE and the Future of TDMA", Oct 18, 2006, Network Computing Mobile Observer
118. "Wireless E-Mail Efficiency Assessment." Oct 13, 2006. White paper that presents the results of a detailed engineering assessment to compare network efficiency of RIM Blackberry versus Microsoft Direct Push.
119. "Mobile Broadband: EDGE, HSPA & LTE", Sep 2006. White paper published by 3G Americas.
120. "Mobile Computing Policy and De-Perimeterization", Sep 27, 2006, Network Computing Mobile Observer
121. "Trials and Tribulations in Assessing Wireless Network Performance", Sep 6, 2006, Network Computing Mobile Observer
122. "Time to Decide", article on wireless networking, Aug 31, 2006, Network Computing Cover Story
123. "Sprint Nextel, WiMAX and the Mobile Broadband Conundrum", Aug 16, 2006, Network Computing Mobile Observer
124. "Wide-Area Wireless—The Next Five Years", Jul 26, 2006, Network Computing Mobile Observer
125. "Anatomy of a Well-Designed Wireless Application", Jul 5, 2006, Network Computing Mobile Observer
126. "Wireless Network Assessment, EVDO and WiFi Hotspots." A detailed test report on the relative performance of CDMA2000 EVDO and WiFi hotspots. March 21, 2006.
127. "Using Your Cell Phone as a Modem", Jun 14, 2006, Network Computing Mobile Observer

128. "Convergence Update: IMS and UMA", May 24, 2006, Network Computing Mobile Observer
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134. "The Smartphone Conundrum", Jan 18, 2006, Network Computing Mobile Observer
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137. "Confusion About 4G", Nov 9, 2005, column, Network Computing Mobile Observer
138. "Strong Capabilities, Difficult Decisions", Oct 27, 2005, article, Network Computing Magazine
139. "Hard Numbers and Experts' Insights on Migration to Evolved 3G and 4G Wireless Technology", Oct, 2005, updated public report, published by Datacomm Research
140. "Wireless Data Pricing--One Hundred Times Less Expensive and Still Not Satisfied", Oct 19, 2005, column, Network Computing Mobile Observer
141. "Secure Mobile Access Using SSL VPNs", Oct 2005, white paper, published by Aventail
142. "Embedded Wireless WAN", Sep 28, 2005, column, Network Computing Mobile Observer
143. "Redefining the Endpoint--Wireless Broadband Routers", Sep 7, 2005, column, Network Computing Mobile Observer
144. "Data Capabilities: GPRS to HSDPA and Beyond", Sep 2005, white paper, published by 3G Americas
145. "High Speed Downlink Packet Access (HSDPA)", Aug 17, 2005, column, Network Computing Mobile Observer
146. "The Uneven Uptake of Wireless Data", Jul 21, 2005, column, Network Computing Mobile Observer

147. "Where is WiMAX?", Jul 6, 2005, column, Network Computing Mobile Observer
148. "Mobile Broadband and the Multi-Network Path to 4G", Jul 2005, article, WiMAX Business and Technology Strategies
149. "Freed Up or Tied Down", Jul 21, 2005, article, Network Computing Magazine
150. "Wireless E-Mail for the Masses, Jun 15, 2005, column, Network Computing Mobile Observer
151. "Parallel Mobile Universes", May 25, 2005, column, Network Computing Mobile Observer
152. "Beyond the Airlink- IP Multimedia Subsystem", May 4, 2005, column, Network Computing Mobile Observer
153. "Secure Wireless Networking Using SSL VPNs", May 2005, white paper, published by Aventail
154. "3 Sides to 3G", Apr 13, 2005, column, Network Computing Mobile Observer
155. "Hard Numbers and Experts' Insights on Migration to Evolved 3G and 4G Wireless Technology", Feb, 2005, public report, published by Datacomm Research
156. "Forever Evolving", Oct 14, 2004, article, Network Computing Magazine
157. "Data Capabilities: GPRS to HSDPA", Sep 2004, white paper, published by 3G Americas
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159. "Policing the Airwaves", May 7, 2004, article, Secure Enterprise Magazine
160. "Device Drivers (Smartphones and Wireless PDAs)", Apr 15, 2004, article, Network Computing Magazine
161. "Making the Smart Choice (Smartphone and Wireless PDA Platform Review)", Apr 15, 2004, article, Network Computing Magazine
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164. "Data Capabilities for GSM Evolution to UMTS", Nov 19, 2002, white paper, published by 3G Americas.
165. "Wireless Nirvana", Oct 21, 2002, article, Network Computing Magazine
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167. "Networking Standards and Wireless Networks", 2002, white paper, published by NetMotion Wireless

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170. "MMDS Struggles to Find a Foothold", Oct 29, 2001, article, Network Computing Magazine
171. "Can MWIF Unify Cellular Protocols?", May 2001, column, M-Business Magazine
172. "M-Wallets: Not Ready Yet", Apr 2001, column, M-Business Magazine
173. "AT&T's GSM Move Could Ignite U.S. Market", Mar 2001, column, M-Business Magazine, March 2001
174. "Lessons From I-Mode", Feb 2001, column, M-Business Magazine
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179. "WAP: Untangling the Wireless Standard", Nov 2000, article, Network Computing Magazine
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181. "Wireless Wonders (HiperLAN and Bluetooth) Coming Your Way", May 2000, article, Network Magazine.
182. "Managing Mobile Code", Aug 23, 1999, online manual, Network Computing Magazine.
183. "The Evolution of Cellular Data: On the Road to 3G", 1999, article published by Intel "On The Road To PCS", February 15, 1996, article, Network Computing Magazine.
184. "Wireless IP - A Case Study", Apr 30, 1999, article, PCS Data Today online journal
185. "Broadband Wireless: Now Playing in Select Locations", Oct 7, 1999, article, Data Communications Magazine
186. "Satellite Services: Don't Join the Space Race", Sep 21, 1999, column, Data Communications Magazine
187. "Making the Case for Fixed Wireless Technology", Jul 1999, column, Data Communications Magazine

188. "Wireless IP: Ready to Lift Off?", Mar 1999, column, Data Communications Magazine.
189. "Planning and Implementing Wireless LANS", 1999, online manual, Network Computing Magazine.
190. "Wireless Broadband and Other Fixed-Wireless Systems", 1998, online manual, Network Computing Magazine.
191. "General Packet Radio Service (GPRS)", September 30, 1998, GSM Data Today online journal.
192. "Wide-Area Wireless Computing", 1997, online manual, Network Computing Magazine.
193. "Internet-To-Go, Now With Mobile IP", November 1, 1997, article, Network Computing Magazine.
194. "Making The Call With Two-Way Paging", January 15, 1997, article, Network Computing Magazine.
195. "Cellular Data Communications Made Easy", July 1, 1997, article, Network Computing Magazine.
196. "Wireless Data Made To Order", March 15, 1996, article, Network Computing Magazine.
197. "TCP/IP: The Best Protocol for Remote Computing", public white paper, WRQ. 1996.
198. "Message Middleware In A Wireless Environment", April 15, 1996, article, Network Computing Magazine.
199. "On The Road To PCS", Feb 15, 1996, article, Network Computing Magazine
200. "The ABCs of PCS," Nov 7, 1994, article, Network World.

7. Wireless Courses

The following lists the public courses that Rysavy Research has taught. These are listed in the order of most recent to oldest. Rysavy Research has also privately taught on wireless technology at AT&T, Bluetooth SIG, Cingular Wireless, Cricket Communications, Intel, Medtronic, Microsoft, NetMotion Wireless, RIM, Tektronix, Teledyne, T-Mobile, and the U.S. Department of Defense.

1. Interop Conference, Las Vegas, May 2013. "Wireless Everywhere: LTE and Beyond," 1 hour course.
2. Bellevue, WA, April 2013. "4G: Deep Technology Insights," full-day course.
3. Interop Conference, Las Vegas, May 2012. "LTE Update," one-hour course.
4. Bellevue, WA, April 2012. "Mobile Broadband Explosion," full-day course.
5. Redmond, WA, December 2010. "Mobile Broadband - Technology Evolution and Strategic Considerations," full-day course.

6. Portland, OR, November 2010. "Mobile Broadband - Technology Evolution and Strategic Considerations," full-day course.
7. AT&T Developer Program, March 2010, "Guidelines for Delivering Streaming Services on AT&T's Wireless Network," one-hour webcast.
8. Bellevue, WA, Oct 2009. "Mobile Broadband - Entering the 4G Decade," 1.5-hour session at IEEE Wireless Workshop.
9. Bellevue, WA, Apr 2009. Portland, OR, May 2009. "Mobile Broadband Innovation - 3G to 4G Evolution and Impacts," full-day course.
10. 3G Americas, Dec 2008, "EDGE, HSPA, LTE - Broadband Innovation," one-hour webcast.
11. AT&T Developer Program, August 2008, "Broadband Innovation - Applications for New Broadband Networks," one-hour webcast.
12. AT&T Developer Program, June 2008, "Emerging Mobile Application Architectures," one-hour webcast.
13. AT&T Developer Program, March 2008, "Understanding Mobile Application Development Environments: Open Platforms, Tools, Capabilities, Developer Strategies," one-hour webcast.
14. AT&T Developer Program, Dec 2007, "Harnessing Mobile Middleware - Architectures, Functions and Integration," one-hour webcast.
15. AT&T Developer Program, Sep 2007, "Best Practices for Mobile Application Development - Strategies, Considerations, and Techniques for Optimal Development," one-hour webcast.
16. AT&T Developer Program, Apr 2007, "How Enterprises Can Get Ready for IP Multimedia Subsystem (IMS): IMS Strategies and Application Development Approaches," one-hour webcast.
17. Bellevue, WA, May 2006, "Evolution of Mobile Broadband", full-day course.
18. Portland State University, Apr 2006, "Wireless Technology Advances: Wi-Fi, 3G, WiMAX, Mobile Broadband", full-day course.
19. Portland State University, Sep 2005, "3G, Evolved 3G, 4G and WiMAX", full-day course.
20. Bellevue, WA, April 2005, "Wireless Technology Advances", full-day course.
21. CTIA Wireless Data University, Mar 2005, "Wi-Fi and WiMAX in Detail", half-day course.
22. Portland State University, Jan 2005, "Wi-Fi Technology - Evolution and Integration", full-day course.
23. CTIA Wireless Data University, Oct 2004, Wi-Fi - Technology, Evolution, Adoption and Hotspots, Added Section: WiMAX", half-day course.
24. Portland State University, Jun 2004, "3G, WiMAX and other Wide-Area Broadband Wireless Networks", full-day course.

25. CTIA Wireless Data University, Mar 2004, "Wi-Fi - Technology, Evolution, Adoption and Hotspots", half-day course.
26. Portland State University, Nov 2003, "Wi-Fi - Evolution, Adoption and Hotspots", full-day course.
27. CTIA Wireless Data University, Oct 2003, "Wi-Fi Technology - Evolution, Adoption and Hotspots", half-day course.
28. IEEE Wireless LAN Conference, 2002, "Wireless LAN Business and Marketing Issues", one-hour presentation.
29. Portland State University, 2002, "WLANs, 3G Cellular and Beyond", two-day course.
30. Portland State University, 2001, "Next Generation Cellular Data", full-day course.
31. CMP Web 2001, "The Wireless Web in Detail", full-day course.
32. IEEE Chapter Evening Presentation, 2001, "Wireless Networking Advances - Setting Reasonable Expectations", two-hour presentation.
33. UCLA, 2001, "Wireless Data Systems", full-day course.
34. CMP Web 2000, "Wireless Data Networks", full-day course.
35. UCLA, 2000, "Wireless Data Systems", two-day course.
36. UCLA, 1999, "New Third Generation Cellular, Digital PCS and Broadband Mobile Data - What Will Dominate?", four-day course co-taught with C. R. Baugh Ph.D.
37. Portable Design Conference, 1999, "Wireless Data Integration", full-day course.
38. Northcon, 1998, "Wireless Data Networking Advances", full-day course.
39. UCLA, 1998, "Technologies for Wireless Competitive Markets: Cellular, PCS and Wireless Data", four-day course co-taught with C. R. Baugh Ph.D.
40. UCLA, 1997, "Cellular, PCS and Wireless Data Technology", four-day course co-taught with C. R. Baugh Ph.D.
41. UCLA, 1996, "Wireless Voice And Data Communications (Personal Communications Services, Digital Cellular, and Wireless Data)", four-day course co-taught with C. R. Baugh Ph.D.
42. UCLA, 1995, "Wireless Voice and Data Communications (Personal Communications Services, Digital Cellular, and Wireless Data)", four-day course co-taught with C. R. Baugh Ph.D.
43. UCLA, 1994, "Wireless Voice and Data Communications (Personal Communications Services, Digital Cellular, and Wireless Data)", four-day course co-taught with C. R. Baugh Ph.D.