United States Court of Appeals for the Federal Circuit

IXI IP, LLC,
Appellant

v.

SAMSUNG ELECTRONICS CO., LTD., SAMSUNG ELECTRONICS AMERICA, INC., APPLE INC.,
Appellees

2017-1665

Decided: September 10, 2018

GOUTAM PATNAIK, Pepper Hamilton LLP, Washington, DC, argued for appellant. Also represented by BRADLEY THOMAS LENNIE; WILLIAM D. BELANGER, Boston, MA.

MICHAEL J. MCKEON, Fish & Richardson, PC, Washington, DC, argued for appellees. Also represented by CRAIG E. COUNTRYMAN, OLIVER RICHARDS, San Diego, CA.

Before O'MALLEY, MAYER, and REYNA, *Circuit Judges.*

REYNA, *Circuit Judge.*

Samsung Electronics Co., Ltd., Samsung Electronics America, Inc., and Apple Inc. filed a petition to institute an *inter partes* review of certain claims of U.S. Patent No. 7,039,033. The Patent Trial and Appeal Board instituted review that resulted in a final written decision that the reviewed claims are invalid. Patent owner IXI IP, LLC appeals the final written decision. We find that the Patent Trial and Appeal Board's decision is supported by substantial evidence. We affirm.

I.   THE '033 PATENT

Appellant IXI IP, LLC ("IXI") owns U.S. Patent No. 7,039,033 ("the '033 patent"), titled "System, Device And Computer Readable Medium For Providing A Managed Wireless Network Using Short-Range Radio Signals." The '033 patent is directed to "a system that accesses information from a wide area network ('WAN'), such as the Internet, and local wireless devices in response to short-range radio signals." '033 patent col. 4 ll. 8–11. The system includes a wireless gateway device (i.e., a cellphone), which is coupled to a cellular network, which in turn connects to the Internet through a carrier backbone. *Id.* col. 4 ll. 36–39, 49–54, Fig. 1. The cellphone also forms part of a personal area network ("PAN"), which is a local network made up of the cellphone and one or more terminal devices, such as a laptop computer, a personal digital assistant (PDA), or a printer. *Id.* col. 4 ll. 17–25. The system disclosed in the '033 patent allows the terminal devices of the PAN to access the cellular network through the cellphone. *Id.* Abstract. Thus, the '033 patent discloses a system that contains both a PAN and a WAN, connected via the cellphone. *Id.* col. 4 ll. 8–19.

Software architecture for the cellphone may include network management software including, *inter alia,* a PAN application server. *Id.* col. 5 l. 61–col. 6 l. 5, col. 6 ll. 36–42, col. 6 ll. 58–63, Figs. 4, 5a. In turn, the PAN

application server includes a service repository software component, which allows applications that run on the cellphone or the terminal devices to discover what services are offered by the PAN, and to determine the characteristics of the available services. *Id*. col. 10 ll. 1–9, col. 12 ll. 9–14, Fig. 7; *see also id*. col. 12, ll. 33–67 (enumerating the many functions of the service repository software component).

Appellant and Appellees agree that independent claim 1 is representative of all challenged claims. Claim 1 recites:

> 1. A system for providing access to the Internet, comprising:

>> a first wireless device, in a short distance wireless network, having a software component to access information from the Internet by communicating with a cellular network in response to a first short-range radio signal, wherein the first wireless device communicates with the cellular network and receives the first short-range radio signal; and,

>> a second wireless device, in the short distance wireless network, to provide the first short-range radio signal,

>> wherein the software component includes a network address translator software component to translate between a first Internet Protocol ("IP") address provided to the first wireless device from the cellular network and a second address for the second wireless device provided by the first wireless device,

>> wherein the software component includes a service repository software component to

>   identify a service provided by the second
>   wireless device.

Id. col. 15 ll. 40–59.

II. PRIOR ART

Samsung Electronics Co., Ltd., Samsung Electronics America, Inc., and Apple Inc. (collectively, "Samsung") filed a petition to institute an *inter partes* review ("IPR") of certain claims of the '033 patent on the basis of the following prior art references: PCT Publication No. WO 01/76154 to Marchand ("Marchand"); K. Arnold et al., The Jini™ Specification, Addison-Wesley ("JINI Spec."); U.S. Patent No. 6,560,642 to Nurmann ("Nurmann"); U.S. Patent No. 6,771,635 to Vilander, filed Mar. 27, 2000, issued Aug. 3, 2004 ("Vilander"); Handley et al., Request For Comments 2543 SIP: Session Initiation Protocol, The Internet Society ("RFC 2543"); and U.S. Patent No. 6,836,474 to Larsson ("Larsson").

Relevant to this appeal, Marchand, titled "Ad-hoc Network and Gateway," discloses "an ad-hoc network and a gateway that provides an interface between external wireless IP networks and devices in the ad-hoc network." Marchand, p. 1 ll. 5–7. The ad-hoc network, also called "Bluetooth Piconet," is a PAN that includes a gateway device (i.e., a cellphone) and other terminal devices such as a laptop computer or a printer. *See id*. p. 3, ll. 22–30. The devices on the ad-hoc network can communicate via Bluetooth radio link. *Id*. Abstract, p. 7 ll. 9–11. The cellphone acts "as a gateway between the ad-hoc network and a 3G wireless IP network [] such as the General Packet Radio Service (GPRS) network." *Id*. p. 7 ll. 12–14.

The ad-hoc network utilizes Bluetooth, IP, and JINI[1] technologies to enable its terminal devices to access the cellular network through the cellphone. *Id*. p. 7 ll. 7–9. For IP address translation, IP packets from the GPRS are received at the cellphone through its public IP address, and are then forwarded to the private IP address of the terminal device on the ad-hoc network. *Id*. p. 7 ll. 14–16. Address translation in the opposite direction is handled similarly. *Id*. p. 7 ll. 16–17. "JINI (Java) technology is utilized to publish and share services between the devices" in the ad-hoc network, and this technology "provid[es] the capability for an application [] to discover, join, and download services [] from a JINI LUS ["Lookup Service"]." *Id*. p. 6 ll. 3–4, 21–22. "The LUS contains a list of available services provided by other devices on the network." *Id*. p. 3 ll. 11–12. Devices in the ad-hoc network "announce not only value-added services, but also their attributes and capabilities to the network," whereupon these services are published through the LUS. *Id*. p. 3 ll. 12–15, p. 10 ll. 17–18. The LUS also provides interfaces for services that are available to the devices in the ad-hoc network. *Id*. p. 3 ll. 13–14, p. 8 ll. 12–15.

For example, Figure 4 of Marchand depicts "a simplified functional block diagram of a connection between two devices such as the laptop computer [] and the [cell]phone [] utilizing the ad-hoc network." *Id*. p. 7 ll. 26–28. The cellphone publishes in the Bluetooth Piconet the call control services that it offers "[u]tilizing the JINI Lookup Service (LUS)." *Id*. p. 8 ll. 11–12.

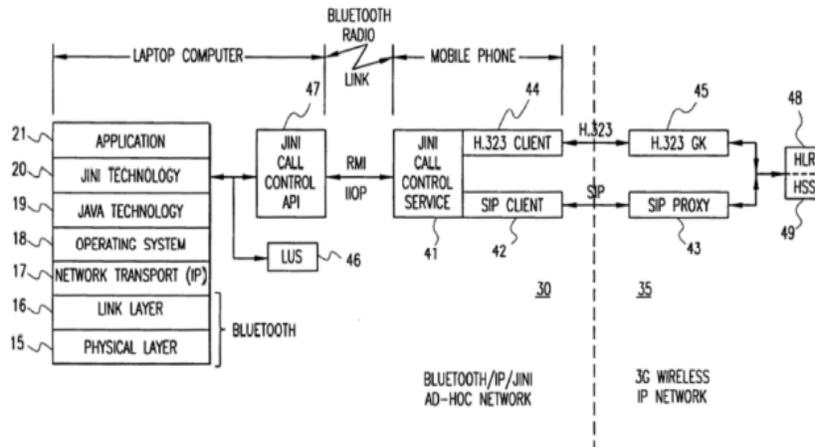[1]   JINI is a specific architecture "designed for deploying and using services in a network." J.A. 523.

FIG. 4

III. PTAB PROCEEDING

Samsung filed a petition to institute an IPR of claims 1, 4–7, 12, 14, 15, 22, 23, 25, 28, 34, 39, 40, 42, and 46 of the '033 patent. *Samsung Elecs. Co. v. IXI IP, LLC*, IPR2015–1444, Paper No. 27, at 1 (P.T.A.B. Dec. 21, 2016) ("Final Written Decision"). The Patent Trial and Appeal Board ("the Board") instituted review on all challenged claims. *Id*. at 2.

The Board determined that Samsung established by a preponderance of the evidence that Marchand, Vilander, and Nurmann teach every limitation of claim 1. *Id*. at 16. The Board found that Marchand teaches a "first wireless device, in a short distance wireless network, having a software component to access information from the Internet by communicating with a cellular network in response to a first short-range radio signal," as recited in claim 1. *Id*. at 13, 16, 19–20. The Board mapped the terminal devices in Marchand's ad-hoc network, such as the laptop computer and printer, to the "second wireless device" recited in claim 1. *Id*. at 14, 16–20. The Board found that the IP packets sent among devices in Marchand's ad-hoc network over a short-range radio link (e.g., Bluetooth

Piconet) correspond to the "first short-range radio signal" as recited in claim 1. *Id*.

The Board further determined that Marchand discloses a network address translator to translate between a first IP address and a second IP address based on Marchand's description of translating and forwarding between public and private IP addresses. *Id*. Citing Vilander's implementation of a device on the cellular network to allocate the public IP address to the cellphone, the Board found that a person of ordinary skill in the art ("POSITA") would have modified Marchand in view of Vilander such that the public IP address of the cellphone was provided by the cellular network. *Id*. The Board also found that a POSITA would have modified Marchand in view of Nurmann such that the cellphone provides the private IP addresses to the terminal devices on the local area network. *Id*. at 14, 16, 19–20.

The Board also found that Marchand's disclosure of the JINI LUS met the limitation of the recited "service repository software component [that] identif[ies] a service provided by the second wireless device" of claim 1. *Id*. at 15–20. The Board considered and rejected IXI's argument that Marchand does not teach a JINI LUS located on the cellphone after weighing expert testimony from both parties. *Id*. at 16–20. The Board determined that "Marchand would have informed an ordinarily skilled artisan that the 'service repository software component' may be disposed in the 'first wireless device [i.e., the cellphone].'" *Id*. at 20.

Thus, the Board concluded that claim 1 would have been obvious over the combination of Marchand, Vilander, and Nurmann under 35 U.S.C. § 103(a). *Id*. at 23–24. The Board also found the remaining challenged claims invalid as obvious. *Id*. at 42.

IV. DISCUSSION

A.

A claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a POSITA to which said subject matter pertains.[2] *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). Obviousness is a question of law with underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) objective evidence of nonobviousness. *Graham v. John Deere Co. of Kan. City*, 383 U.S. 1, 17–18 (1966). We review the Board's legal conclusions without deference and its factual findings for substantial evidence. *Kennametal, Inc. v. Ingersoll Cutting Tool Co.*, 780 F.3d 1376, 1381 (Fed. Cir. 2015). Additionally, issues relating to a motivation to combine prior art references and a reasonable expectation of success are both questions of fact. *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1366 (Fed. Cir. 2016).

Substantial evidence is "such relevant evidence as a reasonable mind might accept as adequate to support a conclusion." *Universal Camera Corp. v. NLRB*, 340 U.S. 474, 477 (1951) (quoting *Consol. Edison Co. v. NLRB*, 305 U.S. 197, 229 (1938)); *see also In re Gartside*, 203 F.3d 1305, 1312 (Fed. Cir. 2000). "Where two different conclu-

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[2]   The Leahy-Smith America Invents Act, Pub. L. No. 112-29, § 3(c), 125 Stat. 284, 287 (2011) ("AIA"), amended 35 U.S.C. § 103. Because the '033 patent has an effective filing date before the effective date of the applicable AIA amendments, we refer to the pre-AIA version of § 103 throughout this opinion.

sions may be warranted based on the evidence of record, the Board's decision to favor one conclusion over the other is the type of decision that must be sustained by this court as supported by substantial evidence." *In re Bayer Aktiengesellschaft*, 488 F.3d 960, 970 (Fed. Cir. 2007) (citing *In re Jolley*, 308 F.3d 1317, 1329 (Fed. Cir. 2002)).

B.

IXI asserts that claim 1 is representative and that its arguments "with respect to claim 1 are applicable to all claims subject to this appeal." Appellant Br. 8. The parties also stipulate that the single issue on appeal is whether a POSITA would read Marchand as implicitly describing an implementation in which the JINI LUS, which identifies services provided on the network, is located on the gateway device, i.e., the cellphone. Appellant Reply Br. 1; Appellee Br. 1.

Samsung acknowledges that "Marchand does not expressly state that [the] JINI LUS is located on [a] mobile phone." Final Written Decision, at 15. Nonetheless, Samsung contends, and the Board agreed, that a POSITA would read Marchand to understand that JINI LUS may be located on the cellphone. *Id*. at 18–20. We conclude that substantial evidence supports the Board's finding.

First, Marchand discloses that the cellphone provides other devices on the network with the necessary software to enable those devices to use the phone's call control service. Marchand explains that the cellphone can act as a call-control server for client devices in the ad-hoc network to allow these devices to, for example, place telephone calls. *See* Marchand, p. 6 l. 27—p. 7 l. 2. "Utilizing the JINI Look-Up Service (LUS)," the cellphone "'publish[es]' . . . the call control services that it offers." *Id*. p. 8 ll. 11—12. The cellphone also "includes an interface/Application Programming Interface (API)," which is software that "enables" other network devices to use the phone's services, and "this API is *downloaded to the*

Bluetooth device involved in an external wireless call in order to have the device behave as a slave device toward the mobile phone[,] which is the master." *Id.* p. 6 ll. 27—31 (emphasis added). According to the JINI Spec., Marchand's JINI call control API qualifies as a JINI proxy object. *See* J.A. 532 (explaining that, in one example, "the proxy object is a driver for the printer that is downloaded on demand"). Based on these disclosures, the Board's determination that a POSITA "would have considered Marchand's call control API to be a JINI proxy object" is reasonable and supported by substantial evidence. Final Written Decision, at 19; *see also* J.A. 240–41.

Second, the Board correctly determined that JINI proxy objects, such as the cellphone's JINI call control API, "are stored in a LUS for use when a client wants access to a service." Final Written Decision, at 19. Samsung's expert stated that a POSITA would read Marchand as "describing an implementation in which the JINI LUS is located on the mobile phone gateway." *Id.* (quoting J.A. 240 ¶ 38). In particular, Samsung's expert explained that a POSITA would understand that the API software downloaded from the cellphone "corresponds to a service object stored in a JINI LUS." J.A. 240 ¶ 38. Samsung's expert further explained that "[a]s described in the JINI Spec., for a given service, the LUS stores a proxy object for the service," and "[w]hen a client wants to access that service, the client downloads the proxy object from the LUS." *Id.*

The JINI Spec. corroborates the testimony from Samsung's expert, showing that a client who wants to use a service (e.g., a printing service) downloads the software to use the service (the proxy object) from the LUS. Thus, it is reasonable for a POSITA to interpret Marchand to disclose an implementation where the LUS is included on the cellphone because Marchand discloses that the API—which corresponds to a JINI proxy object—is downloaded from the cellphone, and, according to the JINI

Spec., JINI proxy objects are downloaded from a LUS. *Final Written Decision*, at 16. Substantial evidence therefore supports the Board's finding that a POSITA would read Marchand to understand that the JINI API is stored in the LUS in the cellphone. *Id.* at 19.

The Board also determined that Marchand implicitly discloses that its cellphone has a LUS because, in Marchand's system, all of the network devices publish their services when the cellphone connects to the local ad-hoc network and the cellular network. *Id.* at 16. Marchand explicitly states that this is how its system works: when the devices are close enough for the "[cell]phone [to] connect[] to the Bluetooth Piconet as well as to the wireless network," then "all of the devices on the Piconet publish the services they can provide to the other devices through the JINI LUS." Marchand, p. 10 ll. 13—18. If the cellphone does not contain a LUS, there would be no need for other network devices to publish (or republish) their services to the LUS when the cellphone connects. *Final Written Decision*, at 16. Thus, as Samsung's expert explained and the Board agreed, "this disclosure would also lead a POSITA to conclude that Marchand teaches that the JINI LUS is located on the [cell]phone." J.A. 240–41 ¶ 39.

IXI argues that Marchand expressly discloses that the LUS is on the laptop. IXI's arguments rely heavily on Marchand's Figure 4, reproduced above, which appears to disclose a LUS within the laptop computer. IXI contends that "Marchand's only express disclosure of the LUS's location squarely shows the LUS in the laptop computer." Appellant Br. 36.

The Board considered and explicitly rejected this argument after examining Marchand and considering expert testimony from both IXI and Samsung. *Final Written Decision*, at 18 ("We do not agree Marchand's disclosure should be read so narrowly . . . ."). The Board

noted that "Marchand's Figure 4 is merely exemplary and [] nothing in Marchand limits or precludes the inclusion of a LUS in the gateway mobile phone." *Id*. at 20. We agree.

Marchand describes Figure 4 as "a simplified functional block diagram of a connection between a laptop computer and a mobile phone utilizing the ad-hoc network of FIG. 3." Marchand, p. 5 ll. 29–30, p. 7 ll. 26–28. Marchand does not provide that Figure 4 is the only way that the two devices—the cellphone and the laptop—can be connected, nor does Marchand exclude other implementations. *See* Final Written Decision, at 20. For example, Figure 4's implementation does not preclude the cellphone from having a LUS. As the Board found, a POSITA "would have known, at least, that it was possible to have multiple LUSs in a network." *Id*. The Board relies on the JINI Spec., which states that:

> Each Jini system is built around *one or more* lookup services. The lookup service is where services advertise their availability so that you can find them. There may be *one or more* lookup services running in a network.

J.A. 530 (emphases altered). As a result, the Board's conclusions that (1) Marchand discloses other implementations that were separate from what is shown in Figure 4, and (2) Marchand does not prohibit a configuration where a LUS is located on both the laptop and the cellphone are reasonable and supported by substantial evidence.

IXI also argues that locating the LUS on the cellphone would have rendered the system inoperable. According to IXI, Marchand's ad-hoc network is a Bluetooth network, which only allows the LUS to be on the master device; "Marchand discloses that the LUS is located on the laptop, the laptop is the master" of the ad-hoc network. Appellant Br. 46. IXI argues that because the cellphone

is the master device of a subnetwork consisting of the cellphone and devices requesting the cellphone's call control services, it "cannot be the master device in the broader Bluetooth" ad-hoc network because a Bluetooth device can only act as a master in a single network. *Id.* 47–48. The Board correctly rejected this argument. The Board found that Marchand discloses that the cellphone is the master device of the broader ad-hoc network:

> If multiple LUSs are possible, and if a LUS must be disposed on a master device, as IXI contends, then Marchand's teaching that a gateway mobile phone is a master supports Petitioner's contention that Marchand suggests disposing a LUS in the gateway mobile phone.

Final Written Decision, at 20 (citations omitted). We agree. Marchand expressly discloses that:

> The present invention establishes three new interfaces or Application Programming Interfaces (APIs) between the slave device placing the call and *the master mobile phone . . . .* This interface enables any of the Bluetooth devices on the Piconet to behave as a slave device toward *the mobile phone which is the master*.

Marchand, p. 7 l. 28–p. 8 l. 3 (emphases added). Marchand does not disclose any subnetwork of the ad-hoc network that contains the cellphone and terminal devices (e.g., laptop, printer). Thus, the Board's determination that a POSITA reading Marchand would understand that the cellphone is the master of the ad-hoc network and contains the LUS is reasonable and supported by substantial evidence.

V. CONCLUSION

We have considered IXI's other arguments, but find them unpersuasive. We affirm the Board's decision that

the challenged claims of the '033 patent are invalid as obvious under 35 U.S.C. § 103(a).

AFFIRMED

Costs

No costs.