NOTE: This disposition is nonprecedential.

United States Court of Appeals for the Federal Circuit

HUAWEI TECHNOLOGIES CO., LTD.,
Appellant

v.

ANDREI IANCU, UNDER SECRETARY OF COMMERCE FOR INTELLECTUAL PROPERTY AND DIRECTOR OF THE UNITED STATES PATENT AND TRADEMARK OFFICE,
Intervenor

2019-1493

Appeal from the United States Patent and Trademark Office, Patent Trial and Appeal Board in No. IPR2017-01472.

Decided: May 14, 2020

CONSTANTINE L. TRELA, JR., Sidley Austin LLP, Chicago, IL, for appellant. Also represented by DOUGLAS I. LEWIS, NATHANIEL C. LOVE; MICHAEL J. BETTINGER, CURT HOLBREICH, San Francisco, CA; RYAN C. MORRIS, Washington, DC.

JOSEPH MATAL, Office of the Solicitor, United States

Patent and Trademark Office, Alexandria, VA, for intervenor. Also represented by THOMAS W. KRAUSE, MAUREEN DONOVAN QUELER.

Before MOORE, O'MALLEY, and TARANTO, *Circuit Judges*.

TARANTO, *Circuit Judge*.

Huawei Technologies Co., Ltd. owns U.S. Patent No. 8,369,278, which describes and claims methods and apparatuses for defining the meaning of certain radio control signals sent between two devices. Samsung Electronics Co., Ltd., which is no longer a party to this case, successfully sought from the Patent and Trademark Office (PTO) an inter partes review of claims 1, 2, and 6–9 of the '278 patent under 35 U.S.C. §§ 311–319. The Patent Trial and Appeal Board ultimately determined that the challenged claims are unpatentable for obviousness. *Samsung Electronics Co. v. Huawei Technologies Co.*, No. IPR2017-01472, 2018 WL 6519541 (P.T.A.B. Dec. 10, 2018). On Huawei's appeal, we affirm.

I

A

The '278 patent, titled "Method and Apparatus for Sending Control Signaling," notes that in radio communication systems, two devices must exchange certain control information in order to permit successful data transmissions and that such control information is sent in a control signal. '278 patent, col. 1, lines 25–35. The '278 patent describes, as illustrative, the prior art Hybrid Automatic Repeat reQuest (HARQ) process for transmitting control signals when data packets are being sent. *Id.*, col. 1, lines 36–38. "The control signaling may include time frequency resource, modulation mode, payload size, HARQ process number, Redundancy Version (RV), and New Data Indicator (NDI)." *Id.*, col. 1, lines 49–52.

In one configuration of the HARQ process described in the '278 patent, a base station transmits a control signal and data packet to a terminal. *Id.*, col. 1, lines 40–41. If the terminal successfully receives the data packet, it transmits a positive acknowledgment (ACK) message to the base station. *Id.*, col. 1, lines 58–63. If the terminal does not successfully receive the data packet, it transmits a negative acknowledgement (NACK) message to the base station, and "the base station retransmits the control signaling and the packet which is not received by the terminal correctly." *Id.*, col. 1, line 65, through col. 2, line 3. The initial control signal sent by the base station contains the payload size (the amount of data being sent) and the RV, the latter typically set to a default value. *Id.*, col. 2, lines 12–19. In *re*transmissions, the RV is incremented, while the payload size remains the same. *Id.*, col. 2, lines 19–28. Where the RV in an initial transmission is a default value already known by the terminal, the initial control signal sent to the terminal need not actually indicate that default RV value. *Id.*, col. 3, lines 13–16. And because the payload size does not change upon retransmission, once the terminal successfully receives the payload-size figure in the initial transmission's control signal—while failing to receive the data packet, which must be sent again—the payload size need not be included in any retransmission's control signal. *Id.*, col. 3, lines 16–20.

Therefore, the '278 patent notes, transmitting the RV in the initial control signal and transmitting the payload size in retransmissions wastes transmission resources. *Id.*, col. 3, lines 20–27. The '278 patent seeks to eliminate such waste by transmitting the payload size and RV in a common data field of the control signal. *Id.*, col. 4, lines 23–29. Distinct ranges of this single field are reserved for indicating the payload size and RV, thus allowing the terminal to determine from the value of the single field whether the field conveys the payload size or RV. *Id.*, col. 4, lines 49–54.

In one embodiment disclosed in the '278 patent, the common field is six bits, which can represent 64 (*i.e.*, 2^6) different values. *Id.*, col. 5, lines 9–17. If the four lowest values of the common field indicate values of RV—*i.e.*, 000000 through 000011 indicate RV1 through RV4—then the remaining 60 values—*i.e.*, 000100 through 111111—can indicate different payload sizes. *Id.*

The '278 patent includes two independent claims, both at issue in this appeal, one claiming a method, the other an apparatus. The parties agree that claim 1 is representative for purposes of deciding the issues on appeal:

> 1. A method of signaling, comprising:
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> receiving, by a terminal, control signaling comprising a field, wherein the field includes N bits that are either 1 or 0, and a state of the field is indicated by all the N bits of the field; wherein N is a positive integer greater than 1; wherein the field is dynamically indicative of one of a payload size or a Redundancy Version (RV) through the state of the field, wherein the payload size is indicated through a first state of the field when the first state is within a first predetermined range and the RV is indicated through a second state of the field when the second state is within a second predetermined range distinct from the first predetermined range; and
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> sending, by the terminal, a packet according to the received control signaling to a base station (BS).

'278 patent, col. 11, line 60, through col. 12, line 11.

B

In May 2017, Samsung petitioned for an inter partes review of claims 1, 2, and 6–9 of the patent. Samsung

argued that the claims are unpatentable on three grounds: *first*, claims 1, 2, and 6–9 are unpatentable for obviousness over a combination of U.S. Patent No. 7,813,379 (Kim '379), U.S. Patent Application Publication No. 2003/0123470 (Kim '470), and a 3rd Generation Partnership Project (3GPP) technical specification (TS 24.008); *second*, claims, 1, 6, 7, and 9 are unpatentable for obviousness over a combination of a 3GPP working group document (R1-02-0051) and TS 24.008; and *third*, claims 2 and 8 are unpatentable for obviousness over a combination of R1-02-0051 and TS 24.008 in further view of Kim '379.

The Board instituted a review of all challenged claims on all asserted grounds of unpatentability. In its final written decision, the Board determined that all the challenged claims are unpatentable for obviousness on all asserted grounds. *Samsung*, 2018 WL 6519541, at *10–20.

Huawei timely appealed. Samsung withdrew from the appeal, and the Director of the PTO intervened to defend the Board's decision pursuant to 35 U.S.C. § 143. We have jurisdiction under 28 U.S.C. § 1295(a)(4)(A).

II

On appeal, Huawei contends that the Board erred in its reading of the prior art. Further, Huawei argues that the Board erred in finding that a relevant skilled artisan would have been motivated to modify and combine the prior art references with a reasonable expectation of success. Lastly, Huawei argues that the Board abused its discretion by departing from the grounds for unpatentability asserted in Samsung's petition and by failing to provide support for its determination adequate to enable our review.

We review the Board's determination of obviousness de novo and its underlying factual findings for substantial-evidence support. *Personal Web Technologies, LLC v. Apple, Inc.*, 848 F.3d 987, 991 (Fed. Cir. 2017). Among the factual

determinations in an obviousness analysis are "findings as to the scope and content of the prior art . . . [and] the presence or absence of a motivation to combine or modify with a reasonable expectation of success." *Ariosa Diagnostics v. Verinata Health, Inc.*, 805 F.3d 1359, 1364 (Fed. Cir. 2015). "Substantial evidence review asks 'whether a reasonable fact finder could have arrived at the agency's decision' and requires examination of the 'record as a whole, taking into account evidence that both justifies and detracts from an agency's decision.'" *Intelligent Bio-Systems, Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1366 (Fed. Cir. 2016) (quoting *In re Gartside*, 203 F.3d 1305, 1312 (Fed. Cir. 2000)). We review the Board's procedural decisions for an abuse of discretion. *Ericsson Inc. v. Intellectual Ventures I LLC*, 901 F.3d 1374, 1379 (Fed. Cir. 2018).

The Board's decision presents more than one basis for unpatentability of the claims at issue. We hold that claim 1, and therefore each of the challenged claims, would have been obvious over TS 24.008's "message type" field in combination with Kim '379 and Kim '470, and we reject Huawei's arguments for setting aside the Board's decision so concluding. That holding suffices to affirm, without further analysis.

A

As to the content of the prior art, it is undisputed that none of the prior-art references by itself teaches all limitations of claim 1. Kim '470 discloses a six-bit common field that conveys either (a) transport block set size and transport channel identity (TBSS+TrCH ID) or (b) RV. The parties agree that TBSS+TrCH ID is equivalent to payload size. Kim '470, however, does not disclose using distinct ranges in the common field to indicate which parameter is conveyed. Rather, the terminal taught in Kim uses another field—the new data indicator (NDI)—to identify which parameter (*e.g.*, payload size or RV) is conveyed in the common field. J.A. 2096 ("It is determined from the

NDI preceding the common field whether the common field contains the TrCH ID & TBSS or the RV.").

Samsung argued, however, that TS 24.008 discloses at least one signaling field that uses distinct ranges to indicate which of a plurality of parameters (having different meanings) is being conveyed by the value of that single field. For example, in a given protocol, TS 24.008 discloses using bits five and six of the "message type" field to indicate whether the message is one of four "registration messages," one of eight "security messages," one of eight "connection management messages," or one of three "miscellaneous messages." J.A. 2419. The Board agreed with Samsung's characterization of TS 24.008. *Samsung*, 2018 WL 6519541, at *14–15.

Substantial evidence supports the Board's finding that the "message type" field in TS 24.008 teaches the technique used in the obviousness combination. The decimal translation of the binary ranges in the relevant table of TS 24.008 is straightforward: a field value falling below 16 tells the receiver that the field value conveys a "registration message"; a field value of 16 to 31 means that the field value is a "security message"; a field value of 32 to 47 means a "connection management message"; and a field value of 48 to 63 means a "miscellaneous message." J.A. 2419; *see* J.A. 3059–60. This technique teaches using distinct ranges of values of a single field to convey that the field value is one or another of different types of information. *See Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1076 (Fed. Cir. 2015) ("A reference must be considered for everything it *teaches* by way of technology and is not limited to the particular *invention* it is describing." (quotation marks omitted)). The combination of this teaching with the particular types of information in the Kim references would be a common field that conveys payload size and RV using distinct ranges. The Board properly found that the combination teaches the claimed invention.

B

As to motivation to combine TS 24.008 with the Kim references, the Board found that a relevant artisan would have been motivated to combine TS 24.008 with Kim '379 and Kim '470 in order to "reduce overhead and increase efficiency." *Samsung*, 2018 WL 6519541, at *15. There is substantial-evidence support for that finding.

Dr. Madisetti testified that signaling two parameters using a common field, thereby reducing the number of bits transmitted, would increase transmission efficiency. Specifically, if the common field itself could indicate by its own value which parameter was conveyed, a relevant artisan would have recognized that a separate NDI field, used in the prior art to indicate the contents of the common field, could be eliminated. Moreover, as noted by the Board, both Kim '379 and '470 expressly refer to increased efficiency as a benefit to transmitting payload and RV information in a single field. *Id.*; J.A. 2075 ("It is preferable to inform the receiver of the transport block size . . . without additional information bits."); J.A. 2078 ("In accordance with the present invention . . . information about the number of the padding bits can be transmitted without an additional information bit field through efficient use of an existing control field."); J.A. 2093 ("It is [an] object of the present invention to . . . minimiz[e] an amount of control information to be transmitted on a shared control channel in a[] [High Speed Downlink Packet Access] communication system."). This desire expressed by the Kim references provides substantial-evidence support for the Board's finding that a relevant artisan would have been motivated to modify the common field taught by Kim '470 to use distinct ranges to indicate whether payload size or RV is conveyed

Huawei contends that a generic interest in increasing efficiency is insufficient motivation to combine, particularly where the Kim references indicate no dissatisfaction with their disclosed method for transmitting payload size

and RV. The efficiency interest here, however, is expressed in a concrete form: reducing numbers of bits to be transmitted. And the fact that the Kim references showed their own forms of increasing efficiency compared to what came before them hardly means that a relevant artisan would not have been motivated to increase efficiency still further. Samsung's expert Dr. Madisetti testified that "network efficiency and reduced overhead is one of the most fundamental design principles in developing 3GPP communications systems." J.A. 2005. The Board credited this testimony and found that "collaborative work to increase efficiency in the 3GPP field was iterative and ongoing." *Samsung*, 2018 WL 6519541, at *16.

This is not a case where the motivation of increased efficiency is asserted so generically as to be legally insufficient. In *ActiveVideo Networks, Inc. v. Verizon Communications, Inc.*, we held that an expert's proffered motivation to combine was legally insufficient because it amounted to little more than a motivation to combine the references in unspecified ways in the hope of making "something better." 694 F.3d 1312, 1328 (Fed. Cir. 2012). "Efficiency" was just one of several generic improvements the expert asserted might result from combining various aspects of the prior art. *Id.* Here, the evidence establishes that efficiency is one of the "fundamental design principles" in the relevant field, and the improved efficiency is realized in a concrete way—by reducing the number of bits that must be transmitted. Nor is this case like *Rovalma, S.A. v. Bohler-Edelstahl GmbH*, where we held that the Board failed to adequately explain why a relevant artisan would have been motivated to increase the thermal conductivities of steels disclosed in the prior art. 856 F.3d 1019, 1025–26 (Fed. Cir. 2017). We determined that one reference's disclosure of the general desirability of high thermal conductivity was not enough to show that a relevant artisan would have been motivated to increase thermal conductivity beyond levels achieved in the prior art. *Id.* at 1026. Here,

however, substantial evidence—in the form of expert testimony—establishes that increased efficiency is a "powerful motivation" because "it is axiomatic that network bandwidth is limited." J.A. 2005.

Huawei further argues that there is no evidence that a relevant artisan would have been motivated to combine the Kim references with TS 24.008 in particular. As discussed above, the idea borrowed from TS 24.008 is a simple one: certain ranges of a data field may be allocated to specific uses. Indeed, Dr. Madisetti testified that it was "commonplace in 3GPP communication protocols to combine two signaling fields into one 'common' field wherever possible." J.A. 1981. Dr. Madisetti further explained that, when combining payload size and RV into a common field, the "most straightforward and intuitive approach would be [to] set aside one range of values for payload size and another range of values for RV." J.A. 2020.

Additionally, the Kim references and TS 24.008 all discuss transmitting control signals in 3GPP communication systems. *Samsung*, 2018 WL 6519541, at *7–8. Huawei argues that a relevant artisan would not have looked to TS 24.008 when modifying the Kim references because TS 24.008 is directed to a different aspect of the 3GPP system. But the Board found that TS 24.008 is directed to communication with user terminals—as are the Kim references—in addition to core network messaging and that TS 24.008 is "generally applicab[le] to 'messages exchanged over the control channels of the radio interface.'" *Id.*, at *16 (citing J.A. 2101; quoting J.A. 2124). In any event, given the high level of skill in the art, and the simplicity and familiarity of the range-allocation technique, the Board had a sufficient basis to find that a relevant artisan would not be dissuaded from applying the teachings of TS 24.008 to the Kim references by any differences in the focus of the communications contexts being addressed. *Id.*

Huawei further contends that Kim '470 uses every value of the six-bit common field to indicate a payload size and, therefore, a skilled artisan would not modify Kim '470 to use distinct ranges of the common field for payload size and RV because doing so would require reducing the number of values available to indicate payload size. This contention relies on premises simply not compelled by the evidence. The evidence does not show that Kim '470 requires use of all 64 values in the six-bit field for payload size or that a skilled artisan would resist sacrificing even a small number of such values to RV use (say, four) to gain a one-bit reduction in what must be transmitted. This argument therefore does not undermine the Board's finding of motivation to combine.

C

Huawei briefly argues that the Board failed to explain why a relevant artisan would have had a reasonable expectation of success when combining the prior art. A relevant artisan "need only have a reasonable expectation of success of developing the *claimed invention*." *Allergan, Inc. v. Apotex Inc.*, 754 F.3d 952, 962 (Fed. Cir. 2014). Here, the claims require only that a terminal receive a control signal formatted with the common field discussed above and transmit a packet to the base station according to the received signal. *See* '278 patent, col. 11, line 60, through col. 12, line 11. Huawei's argument on this obviousness component relies on requiring something more, but no more is required. In this case, we think that the findings made by the Board leave no doubt that the combination would succeed in doing what the claim requires. *See Intelligent Bio-Systems, Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1367 (Fed. Cir. 2016).

D

Huawei contends that the Board, in making its determination, departed from the grounds for unpatentability presented in the petition and failed to provide sufficient

reasoning and support in its decision. We see no sufficient reason to disturb the Board's decision on these grounds.

Huawei argues that Samsung, in its petition, relied only on the combination of Kim '379 with *either* Kim '470 *or* TS 24.008, not on a combination of all three references. The Board could readily conclude otherwise. Samsung stated in the petition that it "incorporated Kim '470 into this ground of unpatentability" but still contended that "the challenged claims are obvious in view of Kim '379 and TS 24.008 alone." J.A. 171 n.7. This argument-in-the-alternative style, using all three references, is further evinced in Samsung's analysis of each claim limitation. *See* J.A. 172–83. Thus, the petition was fairly understood by the Board as contemplating a combination of both Kim references with TS 24.008.

Huawei also argues that the Board's repeated citation to lengthy sections of Dr. Madisetti's declaration fails to provide an adequate explanation for its reasoning. The passages in question are claim charts incorporated into Dr. Madisetti's declaration. J.A. 2008–38. Given that the Board cited these sections when discussing particular claim limitations, it is clear what portion of the charts the Board was referring to in each instance. The Board's style of citation has not deprived us our ability to discern the bases for its decisions.

III

For the foregoing reasons, the Board's decision is affirmed.[1]

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[1] On November 7, 2019, Huawei filed a letter with the court asking us to vacate the Board's decision and remand for consideration by a different Board panel under this court's decision regarding the Appointments Clause in *Arthrex, Inc. v. Smith & Nephew, Inc.*, 941 F.3d 1320

AFFIRMED

(Fed. Cir. 2019). We reject this request. Huawei did not raise this issue before filing its opening brief or in that brief. We see no sound basis for distinguishing this case from our precedent deeming the challenge forfeited in such circumstances. *See Customedia Technologies, LLC v. Dish Network Corp.*, 941 F.3d 1173, 1174 (Fed. Cir. 2019).