

NOTE: This disposition is nonprecedential.

**United States Court of Appeals
for the Federal Circuit**

QUALCOMM INCORPORATED,
Appellant

v.

INTEL CORPORATION,
Cross-Appellant

2022-1824, 2022-1825, 2022-1826, 2022-1828, 2022-1829,
2022-1830

Appeals from the United States Patent and Trademark
Office, Patent Trial and Appeal Board in Nos. IPR2018-
01326, IPR2018-01327, IPR2018-01328, IPR2018-01329,
IPR2018-01330, IPR2018-01340.

Decided: September 23, 2024

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gued for appellant. Also represented by MARC BLACKMAN;
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Before MOORE, *Chief Judge*, LOURIE and STARK, *Circuit Judges*.

STARK, *Circuit Judge*.

Qualcomm Incorporated (“Qualcomm”) appeals the final written decisions issued in four *inter partes* review (“IPR”) proceedings¹ in which the Patent Trial and Appeal Board (“Board”) found claims 1-15, 17-25, and 27-33 of U.S. Patent No. 9,608,675 (“’675 patent”) unpatentable as obvious. Intel Corporation (“Intel”) cross-appeals the final written decisions in two other IPR proceedings² in which the Board found claims 1-3, 5, 7-15, 17-21, 23-25, and 27-30 of the same ’675 patent not obvious. We affirm in Qualcomm’s appeal and dismiss Intel’s cross-appeal.

I

A

Qualcomm owns the ’675 patent, entitled “Power Tracker for Multiple Transmit Signals Sent Simultaneously.” The ’675 patent discloses “[t]echniques for generating a power tracking supply voltage for a circuit (e.g., a power amplifier).” ’675 patent, Abstract. According to the patent, the prior art required multiple transmitters to transmit multiple signals. But “operating multiple

¹ *Intel Corporation, et al v. Qualcomm Incorporated*, IPR2018-01326 -01327, -01329, -01340 (PTAB 2018).

² *Intel Corporation, et al v. Qualcomm Incorporated*, IPR2018-01328, -01330 (PTAB 2018).

transmitters . . . concurrently for multiple transmit signals” can increase the number of circuits and, therefore, costs. *Id.* at 6:16-19. The ’675 patent discloses a solution to these drawbacks by transmitting multiple signals using a single power amplifier having a single power tracking supply generator. In particular, “a single PA [power amplifier] with power tracking may be used to generate a single output RF [radio frequency] signal for multiple transmit signals being sent simultaneously” and “[a] single power supply voltage may . . . track the power of all transmit signals being sent simultaneously.” *Id.* at 6:20-25.

Independent claim 1 of the ’675 patent is illustrative:

An apparatus comprising:

a power tracker configured to determine a single power tracking signal based on a plurality of inphase (I) and quadrature (Q) components of a plurality of carrier aggregated transmit signals being sent simultaneously, wherein the power tracker receives the plurality of I and Q components corresponding to the plurality of carrier aggregated transmit signals and generates the single power tracking signal based on a combination of the plurality of I and Q components . . . ;

a power supply generator configured to generate a single power supply voltage based on the single power tracking signal; and

a power amplifier configured to receive the single power supply voltage and the *plurality of carrier aggregated transmit signals* being sent simultaneously to produce a single output radio frequency (RF) signal.

Id. at 14:28-48 (emphasis added).

B

Intel petitioned for, and the Board instituted, a total of six IPRs relating to claims of Qualcomm’s ’675 patent. In attempting to prove obviousness, four of Intel’s IPR petitions (the “Yu IPRs”) relied on European Patent Application Publication 2,442,440 A1 (“Yu”). Yu “relates to a method of operating a control unit for controlling an operation of a power amplifier (PA), wherein said power amplifier (PA) is configured to amplify a radio frequency, RF, signal (S_{RF}) that is obtained from at least two input signals.” J.A. 2469 (internal reference number omitted). Yu recites that its benefits include obtaining a control signal efficiently without needing a dedicated PA, by using only one transmitter and one PA. Yu specifically discloses a power amplifier that may be used in base stations or “wireless transceivers of mobile terminals and the like.” J.A. 2472 ¶ 34.

In the other two IPRs (the “Chen IPRs”), Intel relied primarily on a prior art research paper by Wenhua Chen et al., *Hybrid Envelope Tracking for Efficiency Enhancement in Concurrent Dual-Band PAs*, 54 *Microwave & Optical Tech. Letters* 662 (Mar. 2012) (“Chen”).

In all six IPRs, the parties disputed the correct construction of the term “plurality of carrier aggregated transmit signals.” The Board construed the term as “signals for transmission of multiple carriers.” This construction differed from both Qualcomm and Intel’s proposed constructions. Accordingly, after the Board found all challenged claims to be unpatentable, Qualcomm appealed, arguing that the Board had violated the Administrative Procedure Act, 5 U.S.C. §§ 551-559, by failing to give it notice of, and an opportunity to respond to, the Board’s construction. *See Qualcomm Inc. v. Intel Corp.*, 6 F.4th 1256, 1262 (Fed. Cir. 2021). We agreed with Qualcomm, vacated the final written decisions, and remanded for further proceedings. *See id.* at 1267.

On remand, Intel contended that the Board’s pre-appeal construction of the “plurality” term, “signals for transmission on multiple carriers,” was correct. Qualcomm countered with a construction identical to the one Intel had proposed earlier in the proceedings: “signals for transmission on multiple carriers at the same time to increase the bandwidth for a user.” The Board decided that its initial construction was “overly broad.” *E.g.*, J.A. 30. It now agreed with Qualcomm that the disputed term should be construed more narrowly to mean “signals for transmission on multiple carriers at the same time to increase the bandwidth for a user.” J.A. 38.

The Board further found that increasing bandwidth for a “user” does not include increasing bandwidth for a base station. J.A. 48-49. But the Board also found that even though Figures 3 and 4 of Yu were directed to base stations, “it would have been obvious” to a person of ordinary skill in the art “to take advantage of Yu’s invention in a mobile device,” and increasing bandwidth for a mobile device would be increasing bandwidth for a “user.” J.A. 48-50. More particularly, a person of ordinary skill in the art “would have made any necessary modifications” to Yu “so that a mobile device could appropriately implement Yu’s power amplifier.” J.A. 50. The Board’s finding was based, in part, on Yu’s Figure 2, which discloses a “mobile-terminal-appropriate system for controlling a supply voltage of a power amplifier,” as well as Yu’s paragraph 34, which expressly taught that Yu’s power amplifier may be used in base stations or “wireless transceivers of mobile terminals and the like.” J.A. 50-51 (quoting J.A. 1421); *see also* J.A. 49-50 (citing J.A. 2472 ¶ 34). In the Board’s view, an ordinarily skilled artisan would have, based on these disclosures, been motivated to modify Yu to operate on mobile devices.

The Board concluded, therefore, that Intel had shown by a preponderance of the evidence that claims 1-5, 17-25, and 27-33 of the ’675 patent were unpatentable for

obviousness over Yu. In the Chen IPRs, by contrast, the Board determined that Intel had not shown that Chen's teachings could be applied to mobile devices or that it would have been obvious to modify Chen for use in a mobile device. Thus, the Board concluded that Intel had failed to show by a preponderance of the evidence that any claims of the '675 patent were unpatentable over Chen.

Both Qualcomm and Intel timely appealed. The Board had jurisdiction under 35 U.S.C. § 316(c). We have jurisdiction under 28 U.S.C. § 1295(a)(4)(A) and 35 U.S.C. §§ 141(c), 319.

II

Obviousness is a question of law based on underlying findings of fact. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 427 (2007). The underlying fact findings include: (1) the scope and content of the prior art; (2) differences between the prior art and the claims at issue; (3) the level of ordinary skill in the pertinent art; and (4) secondary considerations such as commercial success, long-felt but unsolved needs, and failure of others. *See Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966).

We review the Board's legal conclusion on obviousness de novo and its findings of fact for substantial evidence. *See HTC Corp. v. Cellular Commc'ns Equip., LLC*, 877 F.3d 1361, 1369 (Fed. Cir. 2017). "Substantial evidence is such relevant evidence as a reasonable mind might accept as adequate to support a conclusion." *Intel Corp. v. PACT XPP Schweiz AG*, 61 F.4th 1373, 1378 (Fed. Cir. 2023) (internal quotation marks omitted). Further, we "defer to the Board's findings concerning the credibility of expert witnesses." *Yorkey v. Diab*, 601 F.3d 1279, 1284 (Fed. Cir. 2010).

III

Substantial evidence supports the Board's underlying factual findings. Hence, we agree with its conclusion that

Intel proved that the claims challenged in the Yu IPRs are unpatentable.

A

The Board’s finding that a person of ordinary skill in the art would have been motivated to modify the embodiments of Yu’s Figures 3 and 4 is supported by substantial evidence. Yu expressly teaches, in its paragraph 34, that “[t]he power amplifier PA may e.g. be employed in wireless communications systems such as base stations of cellular communications networks or *wireless transceivers of mobile terminals* and the like.” J.A. 2472 ¶ 34 (emphasis added). Moreover, as even Qualcomm’s expert acknowledged, “Figure 2 of Yu discloses a *mobile-terminal-appropriate* system for controlling a supply voltage of a power amplifier.” J.A. 3984 ¶ 65 (emphasis added). These explicit disclosures in Yu, of its power amplifier being used in a mobile device, provide substantial evidence for the Board’s finding that a person of ordinary skill in the art would have been motivated to do just that, i.e., to use Yu’s power amplifier in a mobile device. *See KSR*, 550 U.S. at 417 (“[I]f a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.”).

In concluding that Intel had proven the challenged claims obvious over Yu, the Board made an implicit finding that a person of ordinary skill in the art would have had a reasonable expectation of being able to successfully implement Yu’s power amplifier into a mobile device. “[A]n implicit finding on reasonable expectation of success under such circumstances is acceptable” where, as here, the Board’s path can be reasonably discerned. *Elekta Ltd. v. ZAP Surgical Sys., Inc.*, 81 F.4th 1368, 1376 (Fed. Cir. 2023). The Board, after pointing to Yu’s paragraph 34 and its Figures 2-4, found that a skilled artisan “would have

made any necessary modifications so that a mobile device could appropriately implement Yu’s power amplifier.” J.A. 49-50. We can reasonably discern that the Board found – from Yu’s paragraph 34 and its Figures, as supplemented by Intel’s expert’s opinion and Qualcomm’s expert’s concession – that a person of ordinary skill would have had a reasonable expectation of being successful in implementing Yu in a mobile device. Given Yu’s explicit teaching that one may successfully implement a power amplifier on a mobile device, the Board’s finding of reasonable expectation of success is supported by substantial evidence.

B

Qualcomm faults the Board for failing to detail precisely how Yu would have been modified for a mobile-device implementation. The amount of explanation the Board is required to provide to justify an obviousness determination “necessarily depends on context.” *Pers. Web Techs., LLC v. Apple, Inc.*, 848 F.3d 987, 994 (Fed. Cir. 2017). Here, where Yu expressly teaches that power amplifiers may be employed both in base stations and mobile devices, and discloses an actual mobile device implementation, the Board’s explanation is sufficient.

Qualcomm contends that Yu teaches away from the integration of Yu into a mobile device. Qualcomm asserts that since the “desired frequency spacing . . . is comparatively large” in Figures 3 and 4, relating to base stations, J.A. 2474 ¶ 59, the “power amplifiers that cover the bandwidth described with respect to Figures 3 and 4” would “necessarily be too large for use in a mobile device,” J.A. 3985 ¶¶ 67, 68. Qualcomm relatedly argues that Yu’s power amplifier could not, therefore, be physically incorporated into a mobile device. None of this undermines our conclusion that the Board had substantial evidence for its findings. The Board was free to reject the opinions of Qualcomm’s expert, as it did, and to instead be persuaded by Intel’s expert and what the Board determined to be the

teachings of Yu itself. *See Velandar v. Garner*, 348 F.3d 1359, 1371 (Fed. Cir. 2003) (“It is within the discretion of the trier of fact to give each item of evidence such weight as it feels appropriate.”); *see also Consolo v. Fed. Mar. Comm’n*, 383 U.S. 607, 620 (1966) (“[T]he possibility of drawing two inconsistent conclusions from the evidence does not prevent [a] . . . finding from being supported by substantial evidence.”). Moreover, as the Board correctly pointed out, a finding of obviousness does not require a showing that the features of one embodiment may be bodily incorporated into the structure of another. *See In re Keller*, 642 F.2d 413, 425 (CCPA 1981).

Qualcomm also attacks the Board’s reliance on *KSR*’s explanation that where “a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.” 550 U.S. at 417. It was no abuse of the Board’s discretion to determine that Intel sufficiently raised this theory in its petition. *See J.A.* 1268 n.6 (“[E]ven if Yu were directed to base stations and the claims were limited to mobile devices, it would have been obvious to a POSA to take advantage of Yu’s invention in a mobile device.”); *see also Corephotonics, Ltd. v. Apple Inc.*, 84 F.4th 990, 1002-03 (Fed. Cir. 2023) (“We review the Board’s assessments of what has been argued to and put before it in an IPR for abuse of discretion.”). And Yu itself, as supplemented by Intel’s expert’s opinions, *see J.A.* 52, 2472-73, 2357, 2397 n.4, provides substantial evidence for the Board’s finding, particularly because Yu makes no distinctions between implementations for mobile devices and base stations. Nor does Yu describe any of its figures as limited to specific power amplifier implementations.

Finally, Qualcomm analogizes this case to *DSS Technology Management, Inc. v. Apple Inc.*, 885 F.3d 1367, 1374 (Fed. Cir. 2018), where we faulted the Board for relying on a skilled artisan’s “ordinary creativity” to fill in a claim

limitation that was absent from the prior art references. Here, however, the Board did no such thing. Yu's paragraph 34 and Figure 2 both teach that Yu could be implemented in mobile devices.

Accordingly, and notwithstanding Qualcomm's critiques, substantial evidence supports the Board's findings underlying its conclusion that the claims challenged by Intel in the four Yu IPRs are unpatentable.

C

Intel made clear, in its briefing and at oral argument, that it is pressing its Chen-based cross-appeal only in the event that we do not affirm the Board's findings of unpatentability in the Yu IPRs. Given our conclusions regarding the Yu IPRs, and Intel's statements to us, we decline to address Intel's cross-appeal.

IV

We have considered Qualcomm's remaining arguments and find them unpersuasive. Hence, we affirm the Board's final written decisions holding claims 1-15, 17-25, and 27-33 of the '675 patent unpatentable as obvious. We dismiss Intel's cross-appeal.

AFFIRMED IN PART AND DISMISSED IN PART

COSTS

Costs awarded to Intel.