

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

XILINX, INC.,
Petitioner,
v.

POLARIS INNOVATIONS LIMITED,
Patent Owner.

IPR2023-00514
Patent 7,145,369 B2

Before JEAN R. HOMERE, GREGG I. ANDERSON,
and NORMAN H. BEAMER, *Administrative Patent Judges*.

BEAMER, *Administrative Patent Judge*.

DECISION
Denying Petitioner's Request for Rehearing
37 C.F.R. § 42.71(d)

I. INTRODUCTION

Xilinx, Inc. (“Petitioner”) has filed a Request for Rehearing (Paper 13, “Request”) of the Decision Denying Institution of *Inter Partes* Review (Paper 12, “Decision”) of claims 1–8, 14–16, and 18 of U.S. Patent No. 7,145,369 B2 (“the ’369 patent”). For the reasons that follow, Patent Owner’s Request for Rehearing is denied.

II. THE REQUEST FOR REHEARING

In pertinent part, 37 C.F.R. § 42.71(d) states:

The burden of showing a decision should be modified lies with the party challenging the decision. The request must specifically identify all matters the party believes the Board misapprehended or overlooked, and the place where each matter was previously addressed in a motion, an opposition, [or] a reply.

When rehearing a decision on institution, we do not review the merits of the decision *de novo*, but instead review the decision for an abuse of discretion. 37 C.F.R. § 42.71(c). An abuse of discretion occurs when a “decision was based on an erroneous conclusion of law or clearly erroneous factual findings, or . . . a clear error of judgment.” *PPG Indus. Inc. v. Celanese Polymer Specialties Co.*, 840 F.2d 1565, 1567 (Fed. Cir. 1988) (citations omitted). The party requesting rehearing has the burden to show that the decision should be modified. 37 C.F.R. § 42.71(d). Thus, a request for rehearing is not an opportunity merely to disagree with the Board’s assessment of the arguments or weighing of the evidence, or to present new arguments or evidence.

Petitioner argues that reconsideration is appropriate because the Board considered the scope of the claim term “desired/lower power range” without

expressly construing the limitation, and then incorrectly limited the required range to be a particular, predetermined and fixed, controlled power range that is a subset of a specification-prescribed range. Request 2. Petitioner also argues that the Board overlooked the combination of Lee and Thomann and the teachings of Thomann advanced in the Petition. *Id.* In addition, Petitioner also argues that the Board incorrectly analyzed the combination of Lee and JESD79, misapprehending JESD79's disclosure, and overlooked expert testimony related to the combination and JESD79's disclosure. *Id.* at 3.

We have reviewed Petitioner's Request and carefully considered all of the arguments presented. For the following reasons, we are not persuaded that we misapprehended or overlooked any arguments or evidence. We, therefore, deny the Request.

III. DISCUSSION

A. Claim Construction

Petitioner asserts that "the claims simply require setting or controlling the driver strength such that at least one of the output line potential/current is in a desired or lower power range of a specification-prescribed potential/current range." Request 2. Our Decision is not inconsistent with that statement. As we determined in the Decision, based on Petitioner's arguments and the testimony of Petitioner's declarant, given that "current-versus-voltage curves for output buffer drivers are specified with minimum and maximum limits for the voltage and current levels," one of ordinary skill would have appreciated that specifying a voltage range also specifies a current range. Decision 14, 16 (citing Pet. 38–40; Ex. 1005, Figs. 2A, 2b, 1:26–33, 6:12–14; Baker Decl. ¶ 101). Furthermore, as also established by

Petitioner, per Ohm’s Law, power consumption is the product of the potential and current values, and therefore one of ordinary skill in the art would be readily apprised how to utilize the specified voltage and current ranges necessarily to determine a corresponding power range. *Id.* (citing Pet. 40, 42; Baker Decl. ¶¶ 102–103).

Given that foundation, the meaning of “desired power range” in the context of the ’369 patent is readily ascertained by noting that the ’369 patent discloses control circuitry that prescribes a “desired potential value range” for the output driver. Decision 17 (citing Ex. 1001, 5:8–13). Given the above relationships, we determined that, in the context of an integrated circuit with specification-prescribed voltage-current relationships, prescribing a desired potential value range would prescribe a desired current value range, and in turn would prescribe a desired power range. *Id.* As an example of a desired power range, the ’369 patent teaches that, in order to reduce the power consumption of the integrated circuit, the desired ranges should lie in a lower power range of the specification-prescribed current intensity range and/or potential range. *Id.* at 17–18 (citing Ex. 1001, 1:39–49, 2:1, 2:17–31, 2:50–67, 3:35–51, 5:16–18, 5:48–64, 6:27–37).

However, we noted that, while claim 4, for example, requires a lower power range in accord with the above power saving teaching of the ’369 patent, claim 1 did not. Decision 19. *I.e.*, claim 1 is not tied to the power savings goal of the patent. Nonetheless, we determined that all of the claims, including claim 1, require at least a *desired* power range, and corresponding potential and current ranges, that are controlled within the specification-prescribed power range. *Id.* (citing Ex. 1001, 6:35–37 “[t]his [desired] range is chosen to lie within the range prescribed by the current-

voltage windows”)). All of the claims require “the ‘desired power range’ to be a range that a ‘control unit . . . provide[s].” *Id.* (citing Ex. 1001, 6:62–67). Or, as Petitioner articulates, “the claims . . . require setting or controlling the driver strength such that at least one of the output line potential/current is in a desired or lower power range of a specification-prescribed potential/current range.” Request 2.

Absent such control:

[T]he exact potential value or current value with which the signal is driven with the aid of the output driver cannot be established from the outset since it is necessary to take account of process deviations, temperature fluctuations and voltage fluctuations which might have the effect that the relevant value is outside the specification-conforming window. Moreover, different loads are possible at the outputs of the integrated circuit, so that this may result in different potential values or current values depending on the connected components or the switching states thereof.

Ex. 1001, 1:53–62. Likewise, the Lee reference, on which Petitioner relies, explains that “active calibration” is needed to account for “the effects of process variance, voltage variation or temperature variation on output buffer drivers.” Ex. 1005, 1:34–37. Therefore, merely allowing the output driver potential or current to uncontrollably vary within specification-prescribed values as a function of “process deviations, temperature fluctuations and voltage fluctuations” or “output loads” is not satisfying the “control” requirement of the claims, wherein “the ‘desired power range’ [is] a range that a ‘control unit . . . provide[s].” Ex. 1001, 6:62–67.

Petitioner asserts that “the Board overlooked the need, given the apparent dispute, to provide an express construction for a ‘desired/lower power range’ and reasoning for such construction if the decision to institute

rests on such a construction.” Request 3. However, our analysis of that claim requirement, summarized above, is sufficient for purposes of our Decision. Petitioner argues error in the Board’s determination that “the desired or lower ‘power range’ must be a particular (i.e., predetermined and fixed), controlled power range.” *Id.* For the reasons repeated above, we are not persuaded that this is an erroneous interpretation, because, as discussed, “the ‘desired power range’ [is] a range that a ‘control unit . . . provide[s].” Ex. 1001, 6:62–67. The ’369 patent explains that: “the claims . . . require setting or controlling the driver strength such that at least one of the output line potential/current is in a desired or lower power range of a specification-prescribed potential/current range.” *Id.* at 2.

Petitioner’s interpretation is in accord, arguing:

[C]laim 1 only requires that the “control unit” is “for providing a control signal” That control signal is “for setting a driver strength of the driver circuit” in order “to provide at least one of” the output line potential/current “in a desired power range” There is no requirement that the control unit actively determine whether the output is in a bounded range of values.

Request 5. However, given the above-discussed linkage between potential, current and power, that is precisely what the claim does require — the desired power range is a bounded range of power values. Petitioner bellies its own argument by further arguing:

[T]he “control unit” simply provides “a control signal for setting a driver strength” that provides (results in) at least one of the output potential/current in a desired/lower power range [T]he plain language of the claim would be met if the control unit controlled the drive strength to provide an output potential/current to be at a particular setpoint (not a range), and that setpoint was previously set at a value that a designer of the circuit previously determined to be within the claimed ranges.

Request 5–6. We agree. Assuming “the claimed ranges” refers to the claimed “desired power range,” and given the above-discussed relationship between potential, current and power, this statement is consistent with our analysis, and does not provide any basis for reconsideration. The requirement of controlling the driver strength such that output line potential or current is in a desired or lower power range is met if, under Petitioner’s (perhaps unlikely) premise, the potential or current value is controlled such that it repeatedly takes on a particular setpoint value within a desired power range. (A more likely scenario, however, given the above discussed effects of process deviations, temperature fluctuations, voltage fluctuations and output loads, is that the potential or current value varies but is controlled to remain within a desired power range.)

Petitioner asserts that the Board overlooked portions of the intrinsic record that do not require a controlled “power range,” referring to an alleged disclosure “that only one reference potential may be provided.” Request 7 (citing Ex. 1001, 3:19–25, 7:26–30 (claim 6)). However, the cited portions of the ’369 patent do not support that characterization. The portion of column three that Petitioner refers to merely describes one of the comparators that the disclosed embodiment of the patent provides for each reference potential. As disclosed, there are two reference potentials, and thus two comparator devices, for the upper and lower bounds of the desired potential range:

[T]he control unit 8 includes a comparator unit 12 comprising a first comparator 13 and a second comparator 14. A first reference potential V_{Ref1} provided by a multiplexer 11 is applied to the first comparator 13 and a second reference potential V_{Ref2} is applied to the second comparator 14. The first and second

reference potentials V_{Ref1} , V_{Ref2} define a potential range within which the potential on the output line 4 is intended to lie.

Ex. 1001, 4:41–49. The portion of column three that Petitioner refers to describes one of the comparators, with no suggestion of an alternative one-reference-potential embodiment. *Id.* at 3:19–25. Claim 6 refers to an alternative embodiment in which a reference current value may be compared, rather than a reference potential value, and does not suggest a one-reference embodiment. *Id.* at claim 6.

Petitioner also asserts that the Decision required “that the ‘desired power range’ [of claim 1] must be a subset of a specification-prescribed range.” Request 3–4, 7–9. Not so. As Petitioner states, claims 14 and 18, for example, do require a “lower power range,” which of necessity is a subset of the specification-prescribed potential/current range. *Id.* at 5. As we noted in our Decision, claim 4 is to like effect. Decision 19. But, as discussed above, claim 1 does not require a subset, and our Decision did not hold otherwise. As noted above, the ’369 patent states that the desired range “is chosen to lie *within* the range prescribed by the current-voltage windows.” Ex. 1001, 6:35–37 (emphasis supplied). That is, the desired power range is bounded by the specification-prescribed power range. Although a desired power range controlled to completely overlap the specification-prescribed power range would not be in accord with the power-savings goal of the disclosed embodiments of the ’369 patent, as stated above, we agree that claim 1 is not tied to that goal, and nothing in our Decision holds otherwise. As we held in our decision, claim 1 requires the “desired power range” to be a range that a “control unit . . . provide[s].” Decision 19 (citing Ex. 1001, 6:62–67).

Petitioner further argues that the Decision is in conflict with Patent Owner’s “implicit claim interpretation in litigation.” Request 9–10. Petitioner cites Patent Owner’s allegation “that adjusting an output voltage (VRN) relative to a *single* reference voltage (VREF) affects the driver strength of the driver circuit, which provides the output line current/potential in a desired power range, and thus allegedly satisfies the claims.” *Id.* (citing Ex. 1015, ¶¶ 36–37; Ex. 1016, 309). We do not consider this as inconsistent with our treatment of “desired power range” here, and in any event we are not persuaded that Patent Owner’s infringement allegations in related litigation require reconsideration of our Decision.

In sum, our Decision rests on the plain language of the claim, informed by the disclosures in the ’369 patent and the above-described relationships between potential, current and power that were well known to persons of ordinary skill in the art. As stated in our Decision, “claim 1 requires the ‘desired power range’ to be a range that a ‘control unit . . . provide[s].’” Decision 19 (citing Ex. 1001, 6:62–67). Petitioner’s Request does not persuade us that we overlooked or misapprehended the proper interpretation of the claim language.

B. The Combination of Lee and Thomann

In our Decision, we determined that both Lee and Thomann were directed to matching transistor strengths to address timing issues, rather than controlling the power ranges of the transistor outputs. Decision 25–26. As we discussed, unlike Lee, Thomann disclosed (in its Figure 3) the existence of specification-prescribed potential ranges for logic high and logic low outputs. *Id.* at 23 (citing Ex. 1006, Fig. 3, 1:26–31; Baker Decl. ¶¶ 66, 127). But neither Lee nor Thomann, individually or in combination, teaches or

suggests providing an “output line potential [or current] *in a desired power range* of a specification-prescribed potential range and a specification-prescribed current range,” as required by claim 1. *Id.* at 25–26.

Petitioner cites the disclosure in Thomann of setting the drive strength of a transistor to a minimum setting and incrementally adjusting it to achieve a balanced output voltage swing using calibration. Request 11–12 (citing Ex. 1006, 6:23–31, 4:3–5:19; Baker Decl. ¶ 120). However, the purpose of that operation is to adjust the drive strengths of the pull-up and pull-down transistors so that they match, in order to minimize transition times. Ex. 1006, 1:16–22, 2:28–30, 2:53–57, 4:58–63. The Lee/Thomann calibration technique sets the logic high and logic low outputs to be at a desired ratio, but does not control where in the specification-prescribed ranges those voltages actually lie. *Id.* at 2:50–57. As explained in Lee, the actual values vary due to “the effects of process variance, voltage variation or temperature variation on output buffer drivers,” and are only controlled to maintain their ratio, not their values. Ex. 1005, 1:34–37. *I.e.*, like Lee, the Thomann technique ensures that the high and low logic levels are symmetric about a midpoint voltage. Ex. 1006, 3:33–36. There is no suggestion of controlling the output potential of current values to lie within a “desired power range.” Decision 25–26. Therefore, we are not persuaded to reconsider our determination that the Petition does not demonstrate a reasonable likelihood that Petitioner would prevail in establishing that claim 1 is unpatentable under 35 U.S.C. § 103(a) over the combination of Lee and Thomann. Decision 26.

C. The Combination of Lee and JESD79

In challenging our determination regarding the combination of Lee and JESD79, Petitioner focuses on the disclosure in JESD79 of recommended current-voltage characteristic curves and tables that define the maximum, minimum, and “typical” values for “Pulldown” and “Pullup” characteristics. Request 13–14; Ex. 1007, 59–60. We noted that the “typical” values are the recommended specifications for implementation in a memory device being designed using the “IBIS” simulation tool. Decision 26 (citing Ex. 1007, 59, 64). Petitioner challenges our statement regarding the “typical” values curves, arguing that JESD79 does not “*limit* the use of its curves from data driver output to merely design/simulation.” Request 13 (citing Ex. 1007, 64). However, our analysis did not assume that the typical values curves were only used for simulation, given that the whole point of a simulation is to design an actual device. Rather, we determined that the typical values curves were an example of the claimed “specification-prescribed potential range and a specification-prescribed current range.” Decision 30. As we determined, there is no teaching or suggestion in the combination of controlling potential or current values to lie within any desired power range, or lower power range, within specification-provided ranges. *Id.*

Petitioner argues that we overlooked the unrebutted testimony of Petitioner’s expert regarding the JESD79 recommended current-voltage characteristic curves and tables. Request 13–14. However, nothing in the declarant’s testimony indicates that the JESD79 recommended current-voltage characteristic curves and tables are anything other than specification-prescribed curves, or are ranges that are controlled by an integrated circuit

memory device. Petitioner relies on a provision in JESD79 for setting a “mode register” to indicate “normal” or “weak” drive strength, the latter for “lighter load and/or point-to-point environments.” *Id.* at 13–14 (citing Ex. 1007, 16). This discloses that there are two alternative sets of specification-prescribed ranges, not that there is intended to be a capability to control values within a desired power range.

Petitioner also argues that the Board overlooked the combination of Lee and JESD79. Request 14–15. However, the fact that JESD79 provides specific values for the specification-prescribed potential and current ranges does not alter the fact the Lee is directed to matching transistor strengths to address timing issues, rather than controlling the power ranges of the transistor outputs. Petitioner points to its declarant’s testimony that “drive strength would be adjusted to provide an output within the I-V curve such that ‘the voltage . . . is maintained at a minimum level that allows current to be largely independent of [voltage] while minimizing [the voltage] to minimize power dissipated during voltage swings.’” *Id.* at 15 (citing Baker Decl. ¶ 147). However, this testimony is directed to a reference (“Horowitz”) not relied on by Petitioner for any of its obviousness grounds, and was used to describe transistor behavior in general, not directed to the “desired power range” claim requirement at issue. Baker Decl. ¶ 147 (citing Ex. 1010).

Therefore, we are not persuaded to reconsider our determination that the Petition does not demonstrate a reasonable likelihood that Petitioner would prevail in establishing that claims 1 and 14 are unpatentable under 35 U.S.C. § 103(a) over the combination of Lee and JESD79. Decision 30.

IV. CONCLUSION

Accordingly, Petitioner does not persuade us that we overlooked or misapprehended any matter, or sufficiently show that not instituting an *inter partes* review of claims 1–8, 14–16, and 18 the '369 patent was an abuse of discretion.

IV. ORDER

For the reasons given, it is:

ORDERED that Petitioner's Request for Rehearing is *denied*.

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