

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD., and
SAMSUNG ELECTRONICS AMERICA, INC.,
Petitioner,

v.

HARBOR ISLAND DYNAMIC, LLC,
Patent Owner.

Case IPR2024-01404
U.S. Patent No. 9,147,609

AUTHORIZED RESPONSE TO DIRECTOR REVIEW REQUEST

I. INTRODUCTION

Patent Owner's Second Request for Director Review (Paper 33, "Request") mischaracterizes the trial record, Petitioner's evidence, and the Final Written Decision (Paper 32, "Decision"). After the Director denied Patent Owner's first request for director review, which addressed only *Fintiv*, the district court stayed the related litigation. Contrary to Patent Owner's assertions, the Board then considered both parties' positions carefully and adopted Petitioner's positions over Patent Owner's. Patent Owner's mere dissatisfaction with the Board's Decision does not constitute proper grounds for Director review. Therefore, the Director should deny Patent Owner's Request.

II. LEGAL STANDARD

There are four recognized grounds for granting Director Review, including when a final decision implicates (a) an abuse of discretion, (b) important issues of law or policy, (c) erroneous findings of material fact, or (d) erroneous conclusions of law. USPTO Website, *Director Review Process*, Section 5.A, <https://www.uspto.gov/patents/ptab/decisions/director-review-process> (last visited April 2, 2026). None of these are applicable here.

III. ARGUMENT

A. The Board Did Not Ignore Patent Owner's Evidence Regarding Voids, But Rather Considered it and Rejected it over Petitioner's Evidence

Patent Owner argues that “the Panel ignored [Patent Owner's] evidence.”

Request at 7. Patent Owner asserts that “the Panel adopted Petitioner's assertion that all voids reduce thermal stress while ignoring Patent Owner's unrebutted evidence to the contrary” and that the “failure to credit (or even discuss) this evidence and related arguments was an abuse of discretion.” Request at 8. Patent Owner mischaracterizes the trial record and the Board's Decision.

At the outset, Patent Owner's assertion that its evidence was unrebutted is wrong. Petitioner presented ample evidence, including rebuttal testimony from Petitioner's expert, discrediting Patent Owner's evidence. For example, Petitioner presented evidence that *Birner* and *Kinoshita*, cited by Patent Owner, do not disclose or suggest (1) that only some voids reduce the thermal stress on the substrate surrounding a TSV with a void, or (2) that some voids increase the thermal stress on the substrate surrounding a TSV with a void. Petitioner's Reply (Paper 19, “Reply”) at 2-9, 15. Thus, contrary to Patent Owner's assertion, Petitioner strongly rebutted Patent Owner's evidence.

Patent Owner's allegation that the Board ignored its evidence is also wrong. Although the Board stated that it “do[es] not need to rely on [Patent Owner's]

exhibits” to reach its conclusion regarding Petitioner’s grounds, the Board considered Patent Owner’s evidence but did not adopt it. Decision at 6. For example, the Board acknowledged Patent Owner’s position that “Cooney does not mention ‘thermal stress’ and does not disclose the purpose of optional void 25.” *Id.* at 16 (citing Paper 17, Patent Owner’s Response (POR) at 21). The Board further noted Patent Owner’s argument that “(1) void 25 does not reduce thermal stress in the substrate, (2) all voids cannot be assumed to reduce such thermal stress, and (3) void 25 has not been shown to necessarily reduce thermal stress.” *Id.* And the Board also considered Petitioner’s evidence demonstrating Patent Owner’s failure to establish that all voids do not reduce thermal stress in the surrounding substrate. *Id.* at 32 (citing Reply at 15).

After considering both parties’ positions, the Board “credit[ed] Petitioner’s relied-upon testimonial evidence that the presence of a void was known to reduce thermal stress in the surrounding substrate, because the citations to the record support it.” Decision at 33 (citing Ex. 1002 ¶¶ 124–134; Ex. 1005 ¶¶ 1, 9, 25–28, Fig. 2D; Ex. 1006 ¶¶ 1, 47, 49, Fig. 6F). The Board also decided to “give more weight to Petitioner’s testimonial evidence regarding Pogge and Edelstein.” *Id.* at 36. In doing so, the Board noted Patent Owner’s admission that “a void *can* decrease thermal stress in the substrate” *Id.* at 34.

Thus, the Board’s Decision belies Patent Owner’s allegation that the Board

ignored its evidence. Quite the contrary, the Board considered Petitioner’s and Patent Owner’s evidence, and decided to give more weight to Petitioner’s evidence. Patent Owner’s evidence—that not all voids reduce thermal stress or that some voids increase thermal stress—was demonstrated to be incorrect by Petitioner, and the Board correctly gave no weight to that evidence.

Patent Owner cites *Ultratec, Inc. v. CaptionCall, LLC*, 872 F.3d 1267 (Fed. Cir. 2017) and argues that because “the Board’s findings rest on a factual premise that Patent Owner’s evidence directly contradicts, the failure to address that evidence is an abuse of discretion.” Request at 9. But *Ultratec* is inapposite. In *Ultratec*, the Board had denied *Ultratec*’s request for authorization to file a motion to supplement the IPR record with an expert’s district court trial testimony. *Ultratec*, 872 F.3d at 1270. The Federal Circuit held that the “Board abused its discretion when it refused to admit and consider [the expert’s] trial testimony and when it refused to explain its decision.” *Id.* at 1275. That is not the case here. Here, the Board admitted Patent Owner’s evidence and, in fact, dismissed Petitioner’s motion to exclude that evidence. Decision at 6. Furthermore, as explained above, the Board considered Patent Owner’s evidence but chose to give more weight to Petitioner’s evidence. That is not an abuse of discretion.

Patent Owner also argues that “the Panel ... created a new obviousness combination that was not presented in the Petition” and that “the Panel merely

backfilled the missing knowledge of a [(person of ordinary skill in the art)] POSITA with the disclosures of other prior art references, which were nowhere presented as part of any obviousness combination.” Request at 7. This too is incorrect.

Petitioner cited *Pogge* and *Edelstein* to demonstrate that a POSITA would have known about the stress-relieving behavior of TSV voids. Petition (Paper 1) at 21. Specifically, Petitioner pointed to *Pogge*’s disclosure that “a void in a copper filled TSV ‘has an important function in relieving stress caused by differences in thermal coefficient of expansion (TCE) of the various materials in and around the feature.’” *Id.* (citing *Pogge*, ¶[0027]; Ex-1002, ¶¶126-127). Similarly, Petitioner identified *Edelstein*’s disclosure that a “through-via becomes compliant when voided, resulting in a lower effective modulus and a lower effective Poisson ratio, and therefore exhibiting lower stresses and forces due to surrounding structures.” *Id.* (citing *Edelstein*, ¶[0047]; Ex-1002, ¶¶128-131). Petitioner explained:

In view of the well-known thermal stress relieving behavior of voids in TSVs filled with conductive materials, if not explicitly disclosed, a POSITA would have found it obvious to include a void enclosed in the conductor layer in Cooney’s TSV to cause a reduction in the thermal stress in the surrounding substrate.

Id. at 22 (citing Ex-1002, ¶133).

The Board considered and agreed with Petitioner’s evidence. Decision

at 33-34. The Board stated:

In view of what the full record shows was known in the art, we further agree with Petitioner’s declarant that one of ordinary skill in the art “would have understood that voids in TSVs like those of Edelstein or Cooney would reduce the amount of thermal stress in the substrate generated due to the differences in coefficient of thermal expansion of materials like the conductive filler and the substrate.”

Decision at 34-35 (citing Ex-1002, ¶ 131). The Board concluded that “[b]ased on the full record, Petitioner persuades us, and we determine, that one of ordinary skill in the art would have modified Cooney to include a void ‘to reduce thermal stress in said semiconductor substrate’ with a reasonable expectation of success.” *Id.* at 36. Contrary to Patent Owner’s allegations, the Board neither manufactured an obviousness combination nor backfilled missing knowledge of a POSITA. Instead, the Board credited Petitioner’s evidence of obviousness based on *Cooney*, including evidence such as *Pogge* and *Edelstein*. That is not an abuse of discretion.

Citing *In re NuVasive, Inc.*, 842 F.3d 1376 (Fed. Cir. 2016) and *Alacritech, Inc. v. Intel Corp.*, 966 F.3d 1367, Patent Owner alleges that the Board violated the APA by “summarizing and adopting a petitioner’s arguments, without providing reasoned explanations for crediting those arguments over the patent owner’s evidence.” Request at 8. The Board did not.

In *NuVasive* and *Alacritech*, the Federal Circuit faulted the Board for not explaining why a POSITA would have had a motivation to combine teachings from two references. *NuVasive*, 842 F.3d at 1384; *Alacritech*, 966 F.3d at 1371-1372. Unlike those cases, here, the Board explained why a POSITA would have included the optional void in *Cooney*'s TSV to reduce stress in view of the well-known behavior of TSV voids as evidenced by *Pogge* and *Edelstein*. Decision at 33-36. Thus, Patent Owner has failed to demonstrate that the Board violated the APA.

B. The Board Did Not Construe Claims Because it Was Not Necessary to do so to Resolve the Parties' Dispute

Patent Owner argues that “[t]he Board’s failure to conduct claim construction is reversible error.” Request at 10. Patent Owner further asserts that the claim language reciting “to reduce thermal stress in said semiconductor substrate” “is not a statement of intended or preferred uses” and is “entitled to patentable weight.” Request at 10-11. But this contradicts Patent Owner’s concession below that “[t]he claim language in the ’609 Patent is intended to convey the purpose of the hollow center: to reduce thermal stress in the substrate,” indicating that this phrase is a statement of intended use. POR at 13. Now, under the guise of the Board’s alleged abuse of discretion, Patent Owner seeks to have the Director adopt an exactly opposite claim construction position. The Director should not allow Patent Owner to belatedly change its position.

Patent Owner cited *Realtime Data, LLC v. Iancu*, 912 F.3d 1368 (Fed. Cir. 2019), alleging that because the obviousness analysis is fundamentally flawed and must be overturned, the claim construction dispute must be addressed. Request at 9. But the obviousness analysis is *not* flawed and should *not* be overturned. *Realtime* merely holds that “[t]he Board is required to construe ‘only those terms ... that are in controversy, and only to the extent necessary to resolve the controversy.’” *Realtime*, 912 F.3d at 1375. Consistent with this precedent, the Board did not construe the claim terms because it determined that such construction was not necessary to resolve the parties’ dispute. Decision at 10 (citing *Realtime*, 912 F.3d at 1375). This was not error.

Patent Owner also cited *O2Micro Int’l, Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351 (Fed. Cir. 2008) alleging that “[e]ven absent the errors in the obviousness analysis, the Panel was still required to decide the claim construction dispute.” Request at 9-10. But *O2Micro* does not so hold. In the portion of *O2Micro*, cited by Patent Owner, the Federal Circuit held that “[w]hen the claim construction is resolved pre-trial, and the patentee presented the same position in the Markman proceeding ..., a further objection to the district court’s pre-trial ruling may indeed have been not only futile but unnecessary.” *O2Micro*, 521 F.3d at 1359. Further, the Federal Circuit addressed whether a party may raise new claim construction arguments on appeal. *Id.*

And though the Federal Circuit held in *O2Micro* that “[a] determination that a claim term ‘needs no construction’ ... may be inadequate ... when reliance on a term’s ‘ordinary’ meaning does not resolve the parties’ dispute,” that is not the case here. *O2Micro*, 521 F.3d at 1361. The ultimate dispute between the parties in this case was not regarding the “ordinary” meaning of a claim term. Rather, the dispute centered around whether claim 1 of the ’609 patent is invalid over *Cooney*. The Board determined that even if the phrase “to reduce thermal stress in said semiconductor substrate” was entitled to patentable weight, claim 1 of the ’609 patent was invalid as obvious over *Cooney*. Decision at 10, 41. And consistent with *O2Micro*, the Board concluded that it did not need to determine whether to give patentable weight to the above limitation because the parties’ dispute could be resolved without claim construction. *Id.* at 10. Thus, Patent Owner has failed to demonstrate that the Board committed any error related to claim construction.

Finally, Patent Owner asserts that “[t]he Director need not remand the claim construction issue to the Board, because Petitioner’s claim construction position is based upon the same flawed assumptions as its obviousness analysis.” Request at 10. Patent Owner further asserts that the “Director should issue a claim construction that this disputed term is entitled to patentable weight, and reverse the Panel’s decision that *Cooney* anticipates the Challenged Claims.” Request at 10-11.

But Petitioner presented ample evidence and expert testimony to show that

Petitioner's position regarding voids reducing thermal stress in the substrate is correct. Petition at 21-22; Reply at 2-9, 15. Indeed, Petitioner's evidence demonstrated that Patent Owner's position is untenable. Reply at 2-9, 15. It would be improper to ignore Petitioner's evidence as Patent Owner proposes. And to the extent any additional claim construction is needed, the panel that conducted the trial would be best situated to handle it and any resulting additional analysis of the prior art grounds.

C. The Board Did Not Create New Modifications, but Correctly Adopted the Proposed Modification of Cooney Presented by Petitioner

Patent Owner asserts that "Petitioner explicitly disclaimed any argument based upon modifications to the void in Cooney" and "[y]et the FWD repeatedly refers to 'modifications' to Cooney, none of which were presented in the Petition or any other paper, and which Patent Owner had no ability to rebut." Request at 11. This is incorrect.

First, Patent Owner conflates "**modifications to the void** in Cooney" with **modifying Cooney's TSV** to include an "optional" void. Although Petitioner did not propose to make modifications to *Cooney's* void, Petitioner identified references (*Pogge* and *Edelstein*) that would have informed a POSITA about the state of the art regarding beneficial effects of stress reduction provided by TSV voids. Petition at 21. With that background established, Petitioner noted that "at a minimum, a POSITA

would have found it obvious to include Cooney's void 25 to 'reduce thermal stress in said semiconductor substrate,' as [claimed], based on the POSITA's knowledge of the state of the art." *Id.* And further that "[i]n view of the well-known thermal stress relieving behavior of voids in TSVs filled with conductive materials, if not explicitly disclosed, a POSITA would have found it obvious to include a void enclosed in the conductor layer in Cooney's TSV to cause a reduction in the thermal stress in the surrounding substrate." *Id.* at 22. Thus, Petitioner's proposed modification of *Cooney's* TSV to include the "optional" void was presented in the Petition and was before the Patent Owner and the Board throughout the proceedings below.

Because Petitioner presented these obviousness arguments in the Petition, Patent Owner's contention that the Board somehow "[c]reat[ed] these 'modifications'" is also false. *See* Request at 11-12. The Board did not create any new modifications to the prior art in its Decision. Rather, the Board "g[a]ve more weight to Petitioner's testimonial evidence regarding Pogge and Edelstein," agreeing with Petitioner's proposed modification of *Cooney*. Decision at 36. Specifically, the Board credited Petitioner's expert, stating "[p]articularly, in view of the evidence in Pogge and Edelstein, we agree with Petitioner's declarant" that a POSITA would have been aware of the well-known thermal stress relieving behavior of TSV voids and would have found it obvious that *Cooney's* TSV void would also reduce the thermal stress in the surrounding substrate consistent with the voids in Pogge and

Edelstein. *Id.* at 34-35 (citing Ex. 1002, ¶131). The Board also agreed with Petitioner’s expert that “there would have been a reasonable expectation of success in including a void in Cooney’s conductor layer to cause a reduction in thermal stress in the surrounding substrate, because Cooney itself discloses including such a void.” *Id.* at 35 (citing Ex. 1002 ¶133.).

Second, Patent Owner’s contention that it “had no ability to rebut” “‘modifications’ to *Cooney*” (*see* Request at 11) is demonstrably false. Patent Owner had ample opportunity to rebut Petitioner’s proposed modifications and indeed did so. For example, in the POR, Patent Owner noted Petitioner’s position that “a POSITA would have found it obvious to include a void enclosed in the conductor layer in Cooney’s TSV to cause a reduction in the thermal stress in the surrounding substrate.” POR at 33-34. Patent Owner also presented its rebuttal to this argument. *Id.* at 34. The Board considered Patent Owner’s rebuttal in its Decision. Decision at 30-31. As discussed above, however, after considering Petitioner’s and Patent Owner’s arguments, the Board concluded that Petitioner’s declarant was more credible and chose not to adopt Patent Owner’s position.

Third, Patent Owner asserts that “[i]n addition to violating the Constitution and the APA, the new modifications also violated Federal Circuit case law by deciding a ground not raised in the Petition.” Request at 12. This too is incorrect.

As explained above, the Board did not decide a new ground. It considered an

obviousness ground presented in the Petition. Petition at 21-22; Decision at 30-31.

The Board also considered Patent Owner's rebuttal to Petitioner's position. *Id.*

at 30-34. And then the Board accepted Petitioner's arguments, while rejecting Patent

Owner's positions. *Id.* at 34. No new ground was addressed by the Board. Patent

Owner's complaints that the Board violated the Constitution, the APA, and Federal

Circuit case law are factually incorrect.

IV. CONCLUSION

Patent Owner's Request establishes no justification for review. The Director should deny the Request.

Respectfully submitted,

Dated: April 2, 2026

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CERTIFICATE OF SERVICE

The undersigned certifies that a copy of the foregoing **Authorized Response to Director Review Request** was served electronically via email on April 2, 2026, in its entirety on the following:

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Dated: April 2, 2026

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