

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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

v.

EMPIRE TECHNOLOGY DEVELOPMENT LLC,
Patent Owner.

Case No. IPR2024-00897
U.S. Patent No. 8,565,331

PETITIONER'S REQUEST FOR DIRECTOR REVIEW

I. INTRODUCTION

Petitioner Samsung seeks Director Review of the Board’s decision to deny institution based on (1) an incorrect claim construction created *sua sponte* by the Board and (2) the Board’s misapprehension of the Haustein grounds. Correcting either one or both of these errors should result in institution.

Neither Samsung nor Patent Owner argued (in the IPR or at the related district court Markman hearing) that the term “decoding subsequently received signals over the communications channel using the updated estimate of the channel matrix” requires construction. However, without notice, the Board misapprehended Patent Owner’s POPR as having raised a claim construction dispute and improperly narrowed the term “subsequently received.” The Board then compounded its first mistake by misapprehending the teachings of Petitioner’s reference, Haustein, and not following *KSR* or recent office obviousness guidance. Respectfully, the panel’s decision is not only wrong but also presents important policy questions, such as whether the Board should, at the institution stage, allow parties to be heard on a new claim construction before rendering a decision to deny institution.

II. BACKGROUND

The challenged ’331 patent is directed to improving wireless communication efficiency by using replicated data to improve channel estimation. Ex-1001, 3:30-53. In the prior art, a transmitter may send a signal including pilot symbols and data

symbols to a receiver through a noisy communication channel. The noisy channel distorts the symbols, such that a received symbol looks different from what was transmitted. Pilot symbols, which are known *a priori* to both the transmitter and receiver, can be used to form a “channel estimate” because the amount of distortion applied to known pilot symbols is assumed to have been applied also to unknown data symbols, thus allowing the receiver to “undo” the channel distortion to determine what data symbols were transmitted. Pet. 4; Ex-1001, 2:1-6.

However, because pilot symbols are reference symbols known in advance, they are overhead, using bandwidth that could otherwise be used to convey data. Pet. 4. Accordingly, in an ideal environment, where channel characteristics do not change over time, pilots could be sent once or infrequently so as to not consume data bandwidth. But in a mobile environment, where transmitter and receiver may be moving with respect to each other, sometimes rapidly, the channel characteristics change due to fading and other effects. Ex-1002 ¶¶ 58-59, 115. Accordingly, pilots must be resent more frequently because the channel characteristics may remain constant only for a short time period (known as the “coherence time”) before a new channel estimate is needed. Ex-1002 ¶ 59. The claimed invention attempts to use replicated data as a partial substitute for pilot symbols. As shown in Figure 3, the transmission includes known pilot symbols in black (310, 314), regular data in white (e.g., 311, 313), and certain replicated data symbols (312, 316 (cross-hatched)).

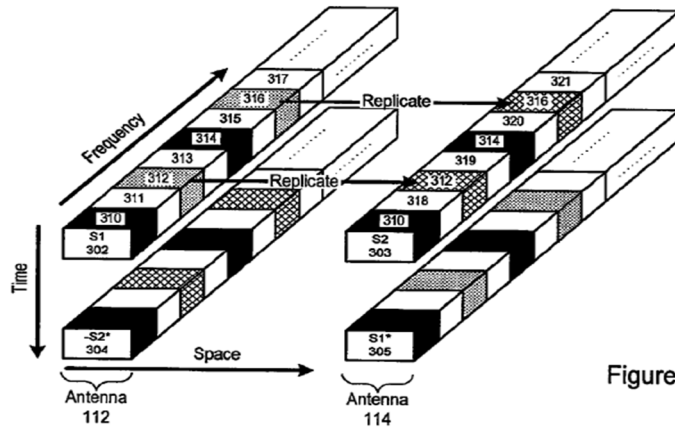


Figure 3

The knowledge that certain data symbols are replicated enables the receiver to estimate the channel by treating the replicated

symbols like pilots, while still receiving additional data payload, thus improving data bandwidth over using only predefined pilot symbols. The replicated data is used to generate an updated estimate of the channel, which is used to decode subsequently received signals.

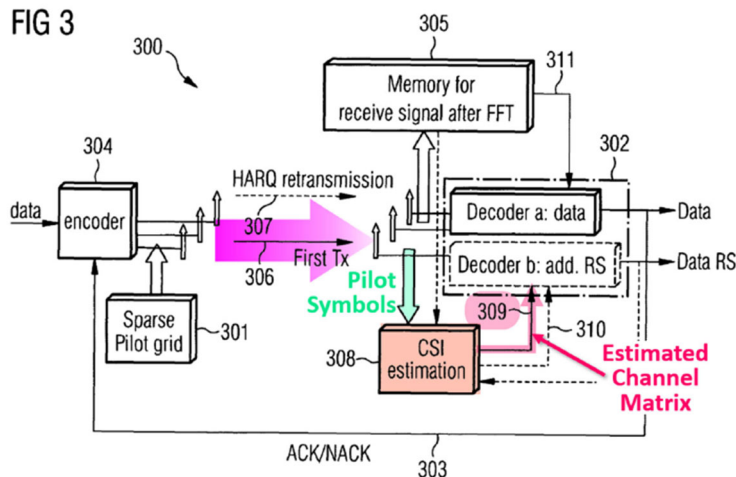
Claim 1 is illustrative of the claimed method, with key terms italicized.

1. A method of decoding a signal transmitted over a communications channel, the method comprising:

- [a] *receiving* a pilot symbol over the communications channel;
- [b] estimating a channel matrix of the communications channel based, at least in part, on the pilot symbol;
- [c] *receiving* replicated data from multiple data streams transmitted over the communications channel;
- [d] decoding the replicated data using the estimated channel matrix;
- [e] generating an updated estimate of the channel matrix based, at least in part, on the replicated data; and
- [f] decoding *subsequently received signals* over the communications channel using the updated estimate of the channel matrix.

Petitioner relied on Haustein (Ex-1005) alone as teaching all of claim 1’s limitations [a]-[f]. Pet. 3, 15-31. Haustein’s system is depicted in annotated Figure 3 (Pet. 10).

FIG 3



Petitioner mapped Haustein’s

first transmission 306

(above, pink) to limitations of claims 1[a]-1[e] (Pet. 16-28)

and mapped Haustein’s

retransmission 307 (dashed line “HARQ retransmission”)

to the “decoding subsequently received signals” limitation of claim 1[f] (*id.* at 29).

For convenience, Petitioner’s complete mapping of Haustein to each limitation of claim 1 is provided in Appendix A below.

III. ARGUMENT

Respectfully, the Board denied institution based on the combination of two significant errors: one, an improper claim construction, and the other, a misunderstanding why Haustein teaches claim 1 even under the improper construction. Reversing either error should result in institution.

A. The Board Denied Institution Based on an Erroneous and Unnecessary *Sua Sponte* Claim Construction of “Subsequently Received Signals”

Though neither party requested construction, the Board interpreted

“subsequently received signals” in claim limitation 1[f], as “refer[ring] to signals received *after* updating the channel estimate.” Decision 17 (original emphasis). Adopting a narrow construction advanced by neither party to deny institution and providing no opportunity for the petitioner to respond animates the same fairness and due process concerns of the APA as it does for final decisions. *See Qualcomm Inc. v. Intel Corp.*, 6 F.4th 1256, 1265 (Fed. Cir. 2021) (holding that the Board cannot create a new claim construction *sua sponte* without affording the parties an opportunity to be heard); *see also Axonics, Inc. v. Medtronic, Inc.*, 75 F.4th 1374, 1384 (Fed. Cir. 2023) (unfair gamesmanship for patent owner to withhold an express claim construction pre-institution and then assert it later unless petitioner is given an opportunity to respond). It is also contrary to the Office Trial Practice Guide, which envisions notice and opportunity to respond when new claim construction issues are raised by the parties or the Board. *See* CTPG 44-45. Significantly, the Director has previously vacated erroneous, *sua sponte* claim constructions used to deny institution. *See Samsung Elecs. Co., Ltd. v. Slyde Analytics, LLC*, IPR2024-00040, Paper 14 (PTAB Aug. 2, 2024) (vacating denial of institution because a *sua sponte* claim construction was inconsistent with the specification and claims). Here, as in *Slyde*, the Board adopted a dispositive claim construction advanced by neither party to deny institution. Director Review is especially important where, as here, Petitioner Samsung has no appeal or recourse other than to pursue its prior art challenges in

district court and/or via *ex parte* reexamination, which is inefficient for the system, given there is already a meritorious petition that should have been instituted.

Significantly, the Board’s construction is also incorrect, as the Board interpreted “subsequently received signals” in claim 1[f], as “refer[ring] to signals received *after* updating the channel estimate.” Decision 17 (original emphasis).¹ This is wrong for two reasons: *First*, as a general rule, unless “logic or grammar mandates a particular order,” a method claim is not ordinarily construed to require “that its steps be undertaken in the listed order.” *Dionex Softron GmbH v. Agilent Techs., Inc.*, 56 F.4th 1353, 1359 (Fed. Cir. 2023). In claim 1[f], the term “subsequently” modifies “received signals.” The logical antecedents for subsequently received signals are the signals received in the prior two “receiving” steps, claim 1[a] (“receiving a pilot symbol”) and 1[c] (“receiving replicated data”). Therefore, as a matter of logic, claim 1[f]’s subsequently received signals (i.e., retransmission 307) need to be received after claim 1[a] and 1[c]’s receiving steps (i.e., first transmission 306).

Claim 1[f] also requires “decoding” the subsequently received signals “using the updated estimate of the channel matrix.” But, contrary to the Board’s reasoning,

¹ The Board may have been misled into its construction by attorney argument, which asserted that Petitioner was relying on Haustein’s retransmission 307 to meet the “receiving replicated data” step (e.g., POPR 31), when Petitioner was in fact relying on Haustein’s initial transmission 306 for that step (e.g., Pet. 21), as was clear from the Petition as explained further below.

logic or grammar requires **only** “decoding [the] subsequently received signals” using the updated estimate. It does not also require that the updated estimate in claim 1[e] must be generated before the subsequently received signals are **received**. *Dionex* is particularly instructive. There, “the Board did not err in construing the claim language to permit ‘determining a movement amount’ **while** ‘forwarding the piston ... by the determined movement amount.’” *Dionex*, 56 F.4th at 1359 (original emphasis).² As the court noted, the “‘determining’ could occur **during** the forwarding of the piston, much like a fuel pump determines the amount of fuel necessary to fill a vehicle’s fuel tank during filling.” *Id.* Similarly, generating the updated estimate in claim 1[e] can occur **during** (or after) receiving the subsequently received signals in claim 1[f], so long as the “decoding” of those subsequently received signals occurs using the updated estimate, and as long as the updated estimate is generated (“at least in part”) using the replicated data received before the “subsequently received data.”³

Second, the ’331 patent’s specification does not support the Board’s

² All emphasis added unless otherwise indicated.

³ Though the Board faulted Petitioner for not offering “a claim construction or analysis” to support the contention that claim 1[f] does not “preclude decoding of retransmission signal 307” (Decision 17), under *Dionex* and other cases, it is the Board that erred by deviating from plain and ordinary meaning and imposing a “particular order” on the method claim though not required by logic or grammar. *See also Interactive Gift Exp., Inc. v. Compuserve*, 256 F.3d 1323, 1342-43 (Fed. Cir. 2001) (“Unless the steps of a method actually recite an order, the steps are not ordinarily construed to require one.”).

construction. The Board compared claim 1 to Figure 7, which largely repeats the claim language verbatim. Decision 17. Noting that Figure 7’s step 730 is similar to claim 1[f], the Board stated, “[a]s part of this step, the ’331 patent explains that ‘signals received *following the updating of the channel estimate* may be decoded using the updated channel estimate.’” *Id.* (quoting Ex-1001, 10:47-49) (Board’s emphasis). According to the Board, this disclosure “demonstrates that the plain meaning of ‘subsequently received signals,’ refers to signals received *after* updating the channel estimate.” *Id.* But the Board overlooked that this narrower language is exemplary. Ex-1001, 9:43-45 (“FIG. 7 is an example method”); *see Phillips v. AWH Corp.*, 415 F.3d 1303, 1323 (Fed. Cir. 2005) (en banc) (warning against confining claims to disclosed embodiments).

More importantly, in discussing Figure 7, the ’331 patent states the “blocks [in method 700 (705, 710, 715, 720, 725, and/or 730) of figure 7] described herein ***may be performed sequentially, in parallel, or in a different order than those described herein.***” Ex-1001, 9:45-49. That is, the steps may be performed in any logical order consistent with the claim. *See Niazi Licensing Corp. v. St. Jude Med. S.C., Inc.*, 30 F.4th 1339, 1352 (Fed. Cir. 2022) (specification describing steps performed both simultaneously and sequentially “supports our interpretation that the claims broadly encompass both simultaneously and sequentially [performing those steps]”). Indeed, the ’331 patent’s Figure 1 illustrates receiver 172 and channel

estimator 178 as separate blocks connected *in parallel*, emphasizing that a subsequent signal may be received before or while the channel estimate is updated. Ex-1001, Fig. 1.

At bottom, the claim’s logic and grammar merely require that the “subsequently received signals” in claim 1[f] be received “subsequently” to the other “received” signals recited in the claim—namely, claim 1[a]’s “pilot symbol” and claim 1[c]’s “replicated data.” The “updated estimate” may be generated in claim 1[e] either before, during, or after the “subsequently received signals” are received, as long as the updated estimate is used in claim 1[f] to decode those subsequently received signals.

Under a proper construction, Haustein teaches claim 1. Indeed, the Petition explains that Haustein’s *first transmission 306* teaches both claim 1[a] (“receiving a pilot symbol”) and 1[c] (“receiving replicated data”)⁴ and that generating the updated channel estimate, 1[e], is based at least in part on the replicated data received in first transmission 306. This updated estimate is then used to decode subsequently received retransmission 307 in claim 1[f]. Pet. 27-28 (claim 1[e]: “CSI estimation block 308 uses the decoded *redundant payload data/pseudo-pilot data 203 of first transmission 306* (‘replicated data’) as known pilot symbols *to generate an updated*

⁴ See, e.g., Petition at 21 (quoting Haustein Ex-1005 ¶ 48 (redundant data 203 of first transmission 306 are “*transmitted already in the first transmission* with a higher redundancy”)).

channel estimate (‘updated estimate of the channel matrix’) to decode retransmission 307.”), 29 (claim 1[f]: “CSI estimation block 308 provides the updated estimate of the channel matrix to decoder 302, *which uses it to decode retransmission 307.*”). Thus, under a proper construction, Haustein teaches all of claim 1, and, for this reason alone, the Petition should have been instituted.

B. The Board Misapprehended Haustein, Which Teaches Claim 1[f] Even Under The Board’s Overly Narrow Construction, and Misapplied Office Guidance on Obviousness

The Petition also presented additional teachings of Haustein that render claim 1 obvious, even under the Board’s narrow construction of “subsequently received signals.” Assuming, *arguendo*, claim 1[f]’s “subsequently received signals” must follow every other step of claim 1, including being received after the channel update has been generated in claim 1[e], Haustein still teaches or suggests that there are additional non-pilot, data-only transmissions *subsequent to retransmission 307*. Pet. 30-31. Specifically, Haustein discusses separating the pilot symbols by a “certain spacing in time” that is dependent on the time over which the communication channel can be considered constant—the channel “coherence time.” Pet. 30-31 (quoting Ex-1005 ¶ 3). Based on this disclosure, and supported by unrebutted testimony from Dr. Valenti, the Petition explained that “a POSITA would have recognized that the updated estimate of the channel matrix ... will be used not only to decode retransmission 307, *but also subsequently received signals during*

the coherence time.” Pet. 31 (citing Ex-1002 ¶116).

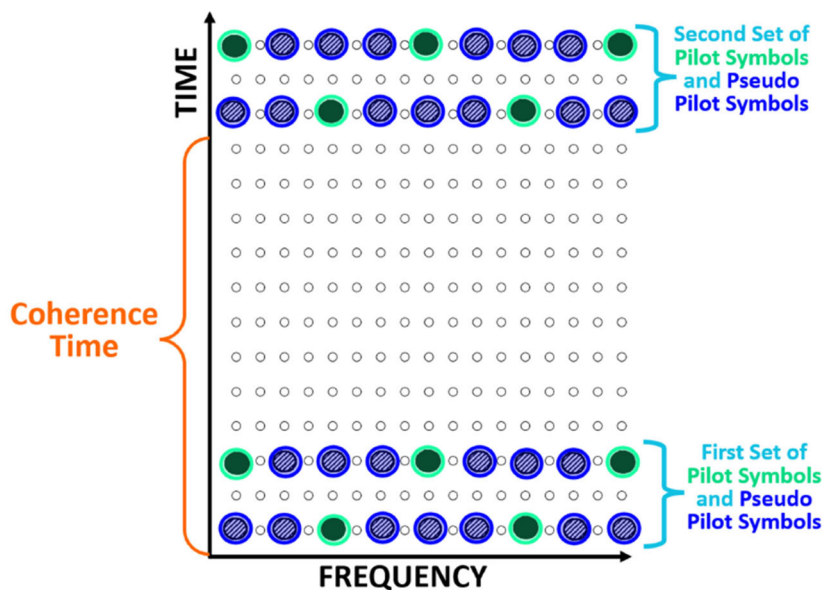
The Board’s rejection of this un rebutted testimony was based on a misapprehension of the nature of Haustein’s transmissions. Relying on Patent Owner’s attorney argument mischaracterizing Haustein’s retransmission 307 as “only a single signal” (POPR 31), the Board mistakenly viewed Haustein as disclosing only “two types of signals”—first transmission 306 and retransmission 307—both of which are always “transmitted with pilot symbols.” Decision 19. And the Board thus mistakenly concluded that Haustein “never expressly discloses signals that are ‘payload-only data between pilot grid transmissions’” (*id.* 18 (quoting Ex-1002 ¶ 115)), despite Haustein’s clear disclosure otherwise. Pet. 22 (Figure 2B illustrates transmitted symbols “separated ... (vertically) in *time*.”)

Respectfully, by focusing too much on “express disclosures” of Haustein rather than what Haustein teaches or suggests to a person of ordinary skill in the art, the Board used an anticipation analysis and failed to follow *KSR* and recent office guidance in its approach to obviousness. *See* Updated Guidance for Making a Proper Determination of Obviousness, 89 Fed. Reg. 14449 (Feb. 27, 2024) (the “Guidance”). The Guidance explains that “the Supreme Court taught that a proper understanding of the prior art extends to all that the art reasonably suggests, and is not limited to its articulated teachings.” *Id.* at 14450 (citing *KSR Int’l Co. v. Teleflex, Inc.*, 550 U.S. 398 (2007)). And, it states that “[t]he Federal Circuit has made it clear

that a *narrow or rigid reading of prior art* that does not recognize reasonable inferences that a PHOSITA would have drawn is inappropriate.” *Id.* But that is what happened here.

Dr. Valenti relied specifically on Haustein’s description of “coherence time” (Ex-1005 ¶3), which he testified is known to a POSITA as the time during which a channel can be assumed not to vary. Pet. 30 (citing Ex-1002 ¶115). During this time, in which pilot sets are separated by a “certain spacing in time” (Ex-1005 ¶3), Dr.

Valenti illustrated how a number of payload-only transmissions (i.e., the rows of small dots in the figure below) would occur subsequent to a transmission 306 and retransmission 307.



The Board found that the Petition impermissibly “relies on Dr. Valenti’s testimony to essentially supply a limitation that is missing from Haustein.” Decision 18. This is simply an incorrect characterization.⁵ Dr. Valenti did not supply a missing

⁵ It is also legally incorrect. The Board quoted *Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 9, 16 (PTAB Aug. 24, 2022) (precedential) as noting that reliance on testimony is particularly problematic to supply a missing limitation. Decision 18. But, *Xerox* is inapposite because it addressed a situation in which the

limitation, but instead relied on Haustein’s Figure 2B, from a time period over which a single set of pilot/pseudo-pilot signals are transmitted, followed by a time of data-only transmissions, to a time when an additional set of pilot/pseudo-pilot signals are transmitted, based on Haustein’s disclosure of a channel “coherence time.” Pet. 20, 30 (citing Ex-1002 ¶115). That is what coherence time means. Ex-1002 ¶¶ 59-60, 115 (citing Ex-1026, Ex-1026, Ex-1030).

In rejecting this analysis and faulting Petitioner for “not provid[ing] any information about the length of the channel coherence time in Haustein,” the Board’s decision misapprehends the teaching. Decision 19. Haustein’s system is not characterized by any specific coherence time; rather, the coherence time is a property of the wireless environment in which Haustein’s system is operating (e.g., transceivers stationary or moving, etc.), and thus a POSITA would have understood that, in context of Haustein’s invention, it would be any amount of time during which the channel remains stable before needing to be estimated again using a new set of pilots. *See, e.g.*, Pet. 30-31; Ex-1002 ¶¶ 53, 58-59, 115-16. Thus, each of Haustein’s payload-only transmissions (received during the coherence time) is both received subsequent to and necessarily decoded using the estimates based on prior

expert testimony was conclusory and merely repeated the petition without further support. *Id.* By contrast, Dr. Valenti’s explanation of the coherence time is extensive and relies on substantial additional record evidence for support. *See* Ex-1002 ¶¶116-117 (citing, e.g., Ex-1027, Ex-1032, Ex-1033); *see also id.*, ¶¶59-60, 115-16.

transmission 306 and retransmission 307, and thus satisfy claim 1[f] even under the Board's narrow and erroneous construction. For this additional reason, institution should be granted.⁶

IV. RELIEF REQUESTED

Petitioner respectfully requests that the Director reverse the Board and institute the inter partes review proceeding.

Respectfully submitted,

/s/ William M. Fink

William M. Fink (Reg. No. 72,332)

⁶ The Board did not discuss Patent Owner's other two arguments, made without supporting testimony, against Haustein, but they are not meritorious. First, Patent Owner argues that when Haustein sends a retransmission, that necessarily means the first transmission was not decoded. POPR 24. But, the Petition explains that at least redundant data 203, sent in the first transmission are assumed correctly decoded and can be used as pseudo-pilot data. Pet. 11, 21, 27. Second, Patent Owner argues that Haustein does not disclose receiving replicated data from two data streams, but Patent Owner admits Haustein discusses using Alamouti coding (POPR 28), which is a known block code that replicates data and transmits it using multiple antennas. Pet. 23-24. This is exactly what is shown in Figure 3 of the '331 patent.

Appendix A. Table of Haustein Mapped to Claim 1	
Claim 1	Haustein
1. A method of decoding a signal transmitted over a communications channel, the method comprising:	Haustein teaches a method for decoding data transmitted over a communications channel between transmitter 304 and receiver/decoder 302. (Pet. 15-16)
[a] <i>receiving a pilot symbol</i> over the communications channel;	<i>First transmission 306</i> of a data packet is received over the communication channel, including a plurality of <i>pilot symbols 201</i> . (Pet. 17)
[b] estimating a <i>channel matrix</i> of the communications channel based, at least in part, on the pilot symbol;	The received pilot signals are used to estimate <i>Channel State Information (CSI) 308</i> , sent at 309. (Pet. 18-19)
[c] <i>receiving replicated data</i> from multiple data streams transmitted over the communications channel;	<i>First transmission 306</i> also includes receiving a plurality of <i>redundant data 203</i> called pseudo-pilot symbols 201. (Pet. 20-21)
[d] decoding the replicated data using the estimated channel matrix;	Decoder 302 uses the channel estimate 309 to decode the redundant payload data/pseudo-pilot data 203 included in <i>first transmission 306</i> . (Pet. 25-26)
[e] generating an <i>updated estimate of the channel matrix</i> based, at least in part, on the replicated data; and	CSI estimation block 308 uses the <i>decoded redundant payload data/pseudo-pilot data 203 of first transmission 306</i> as known pilot symbols to generate an <i>updated channel estimate of the channel matrix</i> . (Pet. 27-28)
[f] decoding <i>subsequently received signals</i> over the communications channel using the updated estimate of the channel matrix.	CSI estimation block 308 provides the updated estimate of the channel matrix to decoder 302, which uses it to <i>decode retransmission 307</i> . (Pet. 29)

CERTIFICATION OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), the undersigned certifies that this Request for Director Review complies with the 15-page limit exclusive of the parts exempted as provided in 37 C.F.R. § 42.24(a).

Respectfully submitted,

/s/ William M. Fink

William M. Fink (Reg. No. 72,332)

CERTIFICATE OF SERVICE

I hereby certify that on February 3, 2025, I caused a true and correct copy of the foregoing PETITIONER’S REQUEST FOR DIRECTOR REVIEW to be served electronically on counsel for Patent Owner at the following addresses:

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