UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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

v.

JAWBONE INNOVATIONS, LLC, Patent Owner.

> IPR2022-01147 Patent 8,019,091 B2

Before GEORGIANNA W. BRADEN, JASON M. REPKO, and JULIET MITCHELL DIRBA, *Administrative Patent Judges*.

REPKO, Administrative Patent Judge.

DECISION Denying Institution of *Inter Partes* Review 35 U.S.C. § 314

I. INTRODUCTION

Apple Inc., Samsung Electronics Co., Ltd., and Samsung Electronics America, Inc. (collectively "Petitioner") filed a petition requesting *inter partes* review of claims 1–20 of U.S. Patent No. 8,019,091 B2 (Ex. 1001, "the '091 patent"). Paper 4 ("Pet.", "Petition"). Jawbone Innovations, LLC ("Patent Owner") filed a Preliminary Response. Paper 8 ("Prelim. Resp."). With the Board's authorization, Petitioner filed a Preliminary Reply (Paper 9), and Patent Owner filed a Preliminary Sur-reply (Paper 10).

To institute an *inter partes* review, we must determine "that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition." 35 U.S.C. § 314(a). For the reasons discussed below, Petitioner has not shown a reasonable likelihood that it would prevail with respect to any claim challenged in the Petition. Thus, we do not institute an *inter partes* review.

A. Related Matters

The parties identify the following related matters: *Jawbone Innovations, LLC v. Samsung Elecs. Co.*, No. 2:21-cv-00186-JRG (E.D. Tex.); *Jawbone Innovations, LLC v. Amazon.com, Inc.*, No. 2:21-cv-00435-JRG (E.D. Tex.); *Jawbone Innovations, LLC v. Apple Inc.*, No. 6:21-cv-00984-ADA (W.D. Tex.); *Jawbone Innovations, LLC v. Google LLC*, No. 6:21-cv-00985-ADA (W.D. Tex.); and IPR2022-00649, also challenging the '091 patent. Pet. 85; Paper 6, 2 (Mandatory Notices).

B. The '091 Patent

The '091 patent relates to acoustic noise suppression in a multiplemicrophone system using a voice activity detector (VAD). Ex. 1001, Abstract. Figure 2, below, shows an embodiment of the system.



Figure 2, above, shows signal microphone 102, noise microphone 103, and a VAD 204. *Id.* at 3:25–45. VAD 204 determines when a speaker is speaking by, for example, sensing the tissue vibration from voicing activity. *Id.* at 3:39–45. The system generates a first transfer function $H_1(z)$ when it determines that the acoustic signal does not have voicing information for a specified period of time. *Id.* at 7:50–53. The system generates a second transfer function $H_2(z)$ when it determines that the acoustic signal has voicing information for a specified period of time. *Id.* at 7:53–56. The first transfer function $H_1(z)$ and the second transfer function $H_2(z)$ are used for denoising. *Id.* at 7:56–60.

C. Claims

Of those challenged, claims 1, 11, and 18 are independent. Claim 1 is reproduced below:

1. A method for removing noise from acoustic signals, comprising:

- receiving at least two acoustic signals using at least two acoustic microphones positioned in a plurality of locations;
- receiving a voice activity signal that includes information on vibration of human tissue associated with human voicing activity of a user;

- generating a voice activity detection (VAD) signal using the voice activity signal;
- generating at least two transfer functions representative of a ratio of energy of the acoustic signal received using at least two different acoustic microphones of the at least two acoustic microphones when the VAD indicates that user voicing activity is absent, wherein the at least two transfer functions comprise a first transfer function and a second transfer function; and
- removing acoustic noise from at least one of the acoustic signals by applying the first transfer function and at least one combination of the first transfer function and the second transfer function to the acoustic signals and generating denoised acoustic signals.

Ex. 1001, 14:63–15:17.

Name	Reference	Exhibit No.
Hietanen	US 6,415,034 B1, issued July 2, 2002	1004
Burnett	US 6,377,919 B1, issued Apr. 23, 2002	1005
Weinstein	Ehud Weinstein et al., Multi-Channel	1006
	Signal Separation by Decorrelation, IEEE	
	Transactions on Speech and Audio	
	Processing, Vol. 1, No. 4, Oct. 1993	
Takano	JP H11-305792, published Nov. 5, 1999	1008
Hussain	Amir Hussain et al., A New Metric for	1012
	Selecting Sub-Band Processing in Adaptive	
	Speech Enhancement Systems, 5 th European	
	Conference on Speech Communication and	
	Technology (EuroSpeech '97), Sept. 1997,	
	pp. 2611–2614	

D. Evidence of Record

Petitioner also relies on the Declaration of Dr. Thomas W. Kenny. Ex. 1003.

E. Asserted Challenges to Patentability

Petitioner challenges the patentability of claims 1–20 based on the following combinations of references. Pet. 1.

Claims Challenged	Pre-AIA ¹ 35 U.S.C. §	Reference(s)/Basis
1–5, 7, 8, 11, 13, 14, 16, 18–20	103	Hietanen, Burnett, Weinstein
1–3, 5–8, 10–14, 16– 20	103	Hietanen, Takano, Weinstein
3, 9, 15	103	Hietanen, Burnett or Takano, Weinstein, Hussain

II. ANALYSIS

A. Level of Ordinary Skill in the Art

Petitioner asserts that a person of ordinary skill in the art "would have at least a bachelor of science in electrical engineering, computer engineering, computer science, or a related discipline, with at least two years of relevant experience in a field related to acoustics, speech recognition, speech detection, or signal processing." Pet. 4 (citing Ex. 1003 ¶ 22). Petitioner also asserts that "[a]dditional education or industry experience may compensate for a deficit in one of the other aspects of the requirements stated above." *Id*.

Patent Owner adopts Petitioner's proposed level of ordinary skill in the art at this stage of the proceeding. Prelim. Resp. 6–7.

To determine whether to institute, we also apply Petitioner's proposed definition.

¹ Congress amended § 103 when it passed the Leahy-Smith America Invents Act (AIA). Pub. L. No. 112–29, § 3(c), 125 Stat. 284, 287 (2011). Here, the previous version of § 103 applies.

B. Claim Construction

We need only construe terms that are in controversy. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (citing *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

Petitioner asserts that "no formal claim constructions are necessary in this proceeding." Pet. 5. Petitioner, though, discusses certain terms for which claim constructions allegedly have been agreed upon or disputed in district court. *See id*.

Patent Owner argues that "Petitioners do not identify whether the proposed constructions represent the plain and ordinary meaning of these claim terms or are the result of disclaimer or lexicography," and thus, because the Petitioner does not "identify '[h]ow the challenged claim is to be construed," we should not institute an *inter partes* review. Prelim. Resp. 6 (quoting 37 C.F.R. §42.104(b)(3)).

The dispositive issues here do not turn on a disagreement about the meaning of any specific term. *See supra* § II.C. Thus, to determine whether to institute, we need not construe any terms.

C. Alleged Obviousness over Hietanen, Burnett, and Weinstein

Petitioner asserts that claims 1–5, 7, 8, 11, 13, 14, 16, and 18–20 are unpatentable as obvious over Hietanen, Burnett, and Weinstein. *See* Pet. 6–49.

1. Claim 1

Independent claim 1 recites a method for removing noise from acoustic signals. Ex. 1001, 14:63–15:17. Of relevance to the dispositive issue, the recited method generates a voice-activity detection (VAD) signal

6

and at least two transfer functions. *See id*. The claim requires using the recited transfer functions for noise removal. *Id*.

Petitioner asserts that claim 1 is unpatentable as obvious over Hietanen, Burnett, and Weinstein. *See* Pet. 6–49. Hietanen describes an earphone with two microphones for detecting speech and removing noise. *See* Ex. 1004, 2:17–29. Burnett describes a sensor that detects tissue motion corresponding to human speech. *See* Ex. 1005, 2:62–65. Weinstein uses transfer functions to decorrelate signals captured by two microphones. Ex. 1006, 1.

Petitioner asserts that Hietanen recommends using VAD to enhance noise cancellation, but Hietanen does not specify what type of VAD should be used. Pet. 12 (citing Ex. 1004, 7:57–65). Petitioner argues that incorporating Burnett's VAD in Hietanen's system would improve the accuracy and reliability of its noise cancellation. *Id.* at 14.

As for the recited transfer functions, Petitioner asserts that Hietanen generates transfer function $K(\Box)$. See, e.g., *id.* at 15, 23. But the challenged claim requires generating at least two transfer functions:

generating *at least two transfer functions* representative of a ratio of energy of the acoustic signal received using at least two different acoustic microphones of the at least two acoustic microphones when the VAD indicates that user voicing activity is absent, wherein the at least two transfer functions comprise *a first transfer function and a second transfer function*.

Ex. 1001, 14:63–15:17 (emphasis added). In Patent Owner's view, the Petition does not expressly state that Hietanen generates only one transfer function, but "Petitioners implicitly admit that Weinstein is needed to supply two transfer functions." PO Resp. 11 (citing Pet. 24–25).

Patent Owner's view is reasonable because, in addressing the limitation on generating the two transfer functions (labeled 1[d]), the only transfer function that Petitioner identifies from Hietanen is K(\Box). See Pet. 22–28. The Petition never expressly states that Hietanen lacks a second transfer function. See *id*. And we see no clear correspondence from the second transfer function to any of Hietanen's teachings. *Id*.

In Petitioner's proposed combination, the relationship between the transfer functions of Hietanen and Weinstein is ambiguous. *Id.* This ambiguity leads to the Petition's deficiency: Petitioner does not explain what Hietanen lacks or how Weinstein's transfer functions are used in the Hietanen-Burnett-Weinstein combination. *See id.* at 22–28. Nor does Petitioner explain how Weinstein's two transfer functions would enhance Hietanen's noise removal. *See id.* at 15–17, 22–28.

This deficiency is apparent in the Petition's section about the generating limitation (1[d]), the section about enhancing noise removal, and the section about combining the transfer functions (1[e]).

a. Limitation 1[d]: "generating at least two transfer functions..."

Petitioner asserts that Hietanen's transfer function $K(\Box)$ specifies the relationship between the output and input signals, just like the recited transfer functions. *Id.* at 22–23 (citing Ex. 1003 ¶¶ 89–90; Ex. 1004, 6:35–

48, 6:65–7:11, 7:23–33). Hietanen's system is shown in Figure 1,

reproduced below with Petitioner's annotations. Id. at 7.



Figure 1, above, shows earphone unit 11 with microphone 13 in auditory tube 10 and microphone 14 on the outer surface. Ex. 1004, 4:22–75. Microphone 13 detects speech in the auditory tube. *Id.* at 7:42–38. Hietanen uses microphone 14 to compensate for external signals. *Id.* Specifically, Hietanen determines the transfer function by comparing the differences between the speech signals from microphone 13 and the speech signals received by microphone 14. *Id.*

After discussing Hietanen's transfer function $K(\Box)$, Petitioner asserts that a person of ordinary skill in the art would have found it obvious that when Burnett's VAD indicates that user voicing activity is absent, "the Hietanen-Burnett system generates a transfer function $K(\Box)$ "—i.e., a single transfer function—that is "a ratio of energy of the acoustic signal received using at least two different acoustic microphones," as recited. Pet. 23–24. At

this point in the analysis, Petitioner does not discuss any other transfer functions that are the same as the ones generated in step 1[d]. *See id.* Rather, the basis for the challenge appears to be Hietanen's transfer function $K(\Box)$ as modified by Burnett. *Id.* at 23.

After discussing the Hietanen-Burnett combination, the Petition states that Weinstein "renders obvious a similar transfer function." *Id.* at 24. This "similar transfer function" might refer to Hietanen's transfer function, the transfer function in the Hietanen-Burnett system, or the transfer functions from the '091 Patent. *Id.* at 24 (emphasis added). *See id.* Under any of these interpretations, the Petition does not explain why the combined teachings would have generated two transfer functions, as required by the claim, or that one of ordinary skill in the art would have understood it to do so. *Id.* So, to the extent that Hietanen lacks more than one transfer function, identifying a single transfer function "render[ed] obvious" by Weinstein adds little to the combination. *Id.*

Also, we note that Petitioner uses the phrase "renders obvious" here. *Id.* at 24. This raises further questions about what Petitioner believes Weinstein adds to the combination. For example, Petitioner's statement could mean that Weinstein does not teach or suggest the recited transfer function, but renders it obvious only when combined with the teachings from Hietanen. If so, the analysis is deficient because there is no further substantive discussion of Hietanen. *See id.* Although Petitioner analyzes Hietanen in connection with Burnett, the relevance of this analysis to the combination with Weinstein is unstated and unclear. *See, e.g., id.* at 27 (citing Ex. 1004, 7:23–33).

The Petition states that "the '091 patent describes calculating a 'new transfer function'... in the same form as Weinstein's that 'depends only on

10

the noise sources and their respective transfer functions." Id. at 27 n.4 (citing Ex. 1001, 5:37–7:45). But, here (*id.*) and elsewhere (*see*, *e.g.*, *id.* at 24 n.3), the Petition suffers from "the distortion caused by hindsight bias" because it relies on the challenged patent's own written description as support of its obviousness conclusions. See Zoltek Corp. v. US, 815 F. 3d 1302, 1313 (Fed. Cir. 2016) (citing KSR, 550 U.S. at 421); see also InTouch Tech., Inc. v. VGO Commc'ns, Inc., 751 F.3d 1327, 1351 (Fed. Cir. 2014) ("It appears that [the expert] relied on the . . . patent itself as her roadmap for putting what she referred to as pieces of a jigsaw puzzle together."); W.L. Gore & Assocs., Inc. v. Garlock, Inc., 721 F.2d 1540, 1553 (Fed. Cir. 1983) ("To imbue one of ordinary skill in the art with knowledge of the invention in suit, when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher."); Ex. 1003 ¶ 91 (stating that it would have been obvious to combine Hietanen and Burnett to generate the recited transfer function and then stating that the '091 uses the "same transfer function"), \P 93 (stating that it would have been obvious to generate the recited transfer functions and then stating then stating that the '091 calculates a new transfer function "in the same form as Weinstein's").

None of Petitioner's analysis of the similarities between the transfer functions in the cited references explains why it would have been obvious to use two transfer functions in Hietanen. At most, Petitioner has shown that one of the two transfer functions from Weinstein is similar to the single transfer function in Hietanen. After discussing Weinstein's transfer functions, the analysis simply ends. *See* Pet. 27–28. There is no conclusion about how two transfer functions enhance Hietanen. *See id*.

The Petition could also be interpreted as relying on Weinstein alone to teach or suggest the two transfer functions. For example, the Petition explains that "[a] POSITA would have understood or found it obvious that each of the *first and the second transfer* function is any one of H₁₂, H₂₂, G₁₂ (= H₁₂/H₂₂)." *Id.* at 27 (citing Ex. 1006, 4; Ex. 1003 ¶ 94) (emphasis added); *see also id.* at 31 (analyzing the first and second transfer functions of 1[e] in a similar way). Relying on Weinstein alone to teach the two functions, though, obviates the Petition's analysis of Hietanen's transfer function K(\Box) and the Hietanen-Burnett combination. *Id.* at 23. Also, under the Weinstein-only rationale, Petitioner fails to identify where Weinstein generates the recited VAD signal (*see id.* at 24–28), which was analyzed only under the Hietanen-Burnett combination (*id.* at 23–24).

The closest that Petitioner comes to addressing the recited VAD with Weinstein is by stating that "[a] POSITA would have understood that 'there is no coupling of the desired signal into the reference sensor, i.e., when the actual coupling system H₂₁ is zero,' occurs when the desired signal, e.g., speech, is absent." *Id.* at 25 (citing Ex. 1003 ¶ 92). Notably, the only support for this conclusion is the Kenny Declaration, which simply repeats this statement verbatim without any citation to the evidence of record. *Compare id.*, *with* Ex. 1003 ¶ 92. We agree with Patent Owner that the "conclusion is wholly unsupported by evidence." PO Resp. 12. And "[e]xpert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight." 37 C.F.R. § 42.65(a). But, even assuming Petitioner's conclusion is correct and crediting Dr. Kenny's testimony, the Petition does not explain sufficiently how a VAD signal in the Hietanen-Burnett combination is related to the period in which speech is alleged to be absent in Weinstein. *See* Pet. 25.

12

In sum, Petitioner does not explain sufficiently how Weinstein and Hietanen would have been combined to obtain the first and second transfer functions recited in limitation 1[d]. The obviousness rationale is unclear and leaves claimed features unaddressed under some of the possible interpretations.

b. The Kenny Declaration

The Petition's analysis of the recited step of generating two transfer functions largely repeats Dr. Kenny's testimony with a few differences. *Compare* Pet. 22–28, *with* Ex. 1003 ¶¶ 89–95. These differences, though, are notable because they highlight the Petition's omission of Hietanen and Barnett in its analysis of Weinstein. *See* Pet. 22–28. Specifically, the Kenny Declaration at least provides some context for its analysis of Weinstein, whereas the corresponding parts of the Petition simply discuss Weinstein in isolation without any explanation about how its teachings are used in the proposed combination. *See id*.

For instance, unlike the Petition, the Kenny Declaration provides a conclusion to its section on the generating limitation that discusses both Weinstein and Hietanen:

Given the similarities between Hietanen and Weinstein, a POSITA would have appreciated that the benefits provided by Weinstein's techniques for removing background noise in a twomicrophone system would apply to Hietanen's system.

Ex. 1003 ¶ 95. The Petition does not develop or discuss this testimony. *See* Pet. 58. Rather, the Petition cites paragraph 95 as support for a different assertion:

A POSITA would have understood and found it obvious to generate the first transfer function H_{22} and the second transfer function G_{12} (= H_{12}/H_{22}) for the background noise when the VAD indicates that user voicing activity is absent.

Id. (citing Ex. 1004, 7:23–33; Ex. 1005, 11:59–12:49, 17:48–18:17; Ex. 1006, 2–3, 8–9; Ex. 1003 ¶ 95; Section III.A.4 of the Petition). This assertion is found, not in paragraph 95 of the Declaration, but in paragraph 94:

Based on Hietanen's, Burnett's, and Weinstein's disclosures of characterizing noise and determining a transfer function when speech is absent, a POSITA would have understood and found it obvious to generate the first transfer function H_{22} and the second transfer function G_{12} (= H_{12}/H_{22}) for the background noise when the VAD indicates that user voicing activity is absent.

Ex. 1003 ¶ 94 (citing Ex. 1004, 7:23–33; Ex. 1005, 11:59–12:49, 17:48– 18:17; Ex. 1006, 3) (emphasis added). Notably, the Petition omits the emphasized text mentioning Hietanen and Burnett. *Compare* Ex. 1003 ¶¶ 93–94, *with* Pet. 25–28. Although Dr. Kenny's testimony about the three references together does not add much to the obviousness analysis, it at least provides some context for better understanding the conclusion.

We note, however, that "[a]rguments must not be incorporated by reference from one document into another document." 37 C.F.R. § 42.6(a)(3). The Petition cites paragraph 95 from the Kenny Declaration without presenting the obviousness analysis in that paragraph or further developing it in the Petition itself. Pet. 27. Thus, it would be improper to incorporate paragraph 95 of the Kenny Declaration, or the additional discussion of Hietanen and Burnett, to supplement the Petition's obvious analysis.

But even importing Dr. Kenny's testimony in paragraphs 93 through 95 into the Petition would not change our view that the Petition is deficient. Specifically, the basis for Dr. Kenny's analysis is simply that the references are similar in some respects. *See* Ex. 1003 ¶ 95. As with the

Petition's analysis, the Kenny Declaration does not expressly discuss how or whether two transfer functions are used in the proposed combination with Hietanen. *Id.*

In sum, the Petition presents Dr. Kenny's testimony about Weinstein but removes it from the original context. *Compare* Pet. 22–28, *with* Ex. 1003 ¶¶ 89–95. Without the original context, the Petition merely presents a summary of Weinstein's teachings. Pet. 22–28. And, in general, how Petitioner intends to use Weinstein's transfer function in the proposed combination is unstated or at best unclear. *See id*.

c. Enhancing Noise Removal (§ III.A.4)

Section III.A.4 of the Petition claims that Weinstein's teachings would have enhanced Hietanen's noise-removal technique. Pet. 15–17. Petitioner's analysis of the step of generating at least two transfer functions refers to this section. *See id.* at 27. But Section III.A.4 does not sufficiently address how Hietanen would remove noise by applying the first and second transfer functions from Weinstein. *See id.* at 15–17.

Petitioner, for example, explains that Hietanen discloses transfer function $K(\Box)$. Pet. 15 (citing Ex. 1004, 6:34–7:48, 5:42–46). Petitioner then asserts that "[h]owever Hietanen goes on to state that '[i]t is self-evident to persons skilled in the art that [Hietanen's] invention is not limited to the details' of its examples, which 'should be regarded as illustrating but not limiting." Pet. 15 (quoting Ex. 1004, 11:35–46).

We are unpersuaded that "[a] POSITA would have been motivated by this and related disclosure to explore applicable techniques for determining and using transfer functions to remove noise from a speech signal." *Id.* (citing Ex. 1003 ¶ 77). The quotation from Hietanen says nothing about transfer functions. Ex. 1004, 11:35–46, *quoted in* Pet. 15. And we see no

invitation to enhance any particular part of the Hietanen's invention. *Id.* At most, the quotation indicates that the disclosed embodiments are non-limiting. *See id.*

The Petition then discusses Weinstein's purported benefits. *See* Pet. 15–16 (citing Ex. 1006, 2–3, 8–9). Section III.A.4, though, does not discuss why using two transfer functions confers those benefits. *See id.* In fact, the Petition does not explain sufficiently how Weinstein's benefits correspond to any specific feature used in the combination. *Id.*

Petitioner states that a person of ordinary skill in the art combining the teachings "would have improved the recovery of the speech signal in the presence of background noise as compared to other known techniques." *Id.* at 16. But Hietanen's system already has a solution for recovering the speech signal in the presence of background noise. *See, e.g.*, Ex. 1004, 7:65–67.

For example, Hietanen analyzes speech to prevent "noise of nearby machinery or other corresponding source of noise and speech of nearby persons from passing on after the processor." *Id.* at 7:57–65. Indeed, Hietanen claims to optimize voice quality. *Id.* at 2:34–37. The Petition does not explain, for example, why it would have been obvious to replace Hietanen's noise-prevention processing with Weinstein's teachings or whether doing so would be an improvement. *See* Pet.

Petitioner also asserts that Weinstein discloses that "its technique 'treats the signals as being equally important' to reduce 'a reverberant distortion in the reconstructed signal' that may be present when using *other techniques*." *Id.* at 15–16 (citing Ex. 1006, 2–3, 8–9) (emphasis added). Petitioner may intend the phrase "other techniques" to refer to Hietanen's

technique. *See id*. But this is not stated explicitly. *See id*. The Petition is unclear on this point.

Still, Hietanen's patent application was filed five years after Weinstein's paper was published. Ex. 1004, code (22); Ex. 1006, 1. The Petition does not explain sufficiently why Weinstein's discussion of "other techniques" applies to Hietanen, or why Hietanen suffers from the distortion issue described by Weinstein. *See, e.g.*, Ex. 1006, 2–3, 8–9, *cited in* Pet. 16. No evidence is cited in support of this argument apart from Dr. Kenny's testimony, which largely repeats the argument itself without further supporting evidence. *Compare* Pet. 16, *with* Ex. 1003 ¶ 78. Thus, we assign the testimony little weight. *See* 37 C.F.R. §42.65(a).

The Petition explains that Weinstein and Hietanen are similar and can be combined "according to known methods to yield predictable results." Pet 16 (citing *KSR*, 550 U.S. at 417). But the known methods are not identified. *Id.* at 16–17. Rather, the Petition essentially shows that both processes remove noise from speech signals using transfer functions and microphones. *Id.* at 16 (citing Ex. 1006, 1). This alone does not sufficiently support the conclusion that "a POSITA would have enhanced Hietanen's system based on Weinstein's noise removal techniques." *Id.* at 16–17 (citing Ex. 1003 ¶ 80).

Even assuming there is a reason to combine these references, the Petition does not explain how the proposed combination addresses every claim limitation. *See supra* § II.C.2. In fact, in the section analyzing limitation 1[d], the Petition merely surveys Hietanen's and Weinstein's teachings without sufficiently explaining how they would work together. *See id.* The Petition's analysis of limitation 1[e] is similar: Hietanen is first analyzed and then Weinstein's first and second transfer functions are

discussed separately. *See id.* at 28–33. Thus, Petitioner at best shows that the references individually teach or suggest some of the claimed subject matter without fully explaining how its proposed combination renders obvious the claim as a whole.

Because the obviousness rationale is deficient for all the reasons discussed above, Petitioner has not shown a reasonable likelihood of prevailing on its challenge to claim 1.

2. Claim 11

Independent claim 11 recites limitations similar to those of claim 1. One difference is that claim 11 recites "wherein the first transfer function is generated in response to a determination that voicing activity is *absent* from the acoustic signals for a period of time," and "the second transfer function is generated in response to a determination that voicing activity is *present* in the acoustic signals for a period of time." Ex. 1001, 16:17–24 (emphasis added). By contrast, claim 1 recites that "generating at least two transfer functions . . . when the VAD indicates that the user voicing activity is *absent*." *Id.* at 15:6–13 (emphasis added).

The Petition's obviousness analysis is deficient for the same reasons discussed above because it relies on the analysis from claim 1. *See supra* § II.C.1. For example, the Petition states that it would have been obvious to determine the transfer functions in response to a VAD's determination:

A POSITA would have found it obvious that background acoustic signals are characterized by generating the three background noise transfer functions H_{12} , H_{22} , and G_{12} in response to a determination by the VAD that a time frame is a no-speech time frame ("a determination that voicing activity is absent from the acoustic signals") for a period of time.

Pet. 45 (citing the analysis for 1[d]). Similar to its analysis of claim 1, the Petition also states that the first transfer function in claim 11 is any one of Weinstein's three transfer functions. *Id.* But here and in the Petition's analysis of 1[d], Petitioner does not show that Weinstein alone teaches a determination by a VAD. *See supra* § II.C.1. Nor does Petitioner explain how Weinstein is combined with Burnett's VAD or Hietanen's system. *See id.* Thus, its conclusion about the VAD and the transfer functions are unsupported by the record, and the Petition lacks a sufficient explanation of how the references could be combined to arrive at those features. *See id.*

Because the obviousness rationale is deficient in these ways, Petitioner has not shown a reasonable likelihood of prevailing on its challenge to claim 11.

3. Claims 2–5, 7, 8, 13, 14, 16, and 18–20

Claims 2–5, 7, 8, 13, 14, 16, and 18–20 require the two transfer functions recited in claims 1 and 11. The analysis of these claims does not remedy the deficiencies of the obviousness rationale discussed above in connection with claims 1 and 11. *See* Pet. 32–49. Thus, Petitioner has not shown a reasonable likelihood of prevailing on its challenges to the claims 2-5, 7, 8, 13, 14, 16, and 18–20.

D. Remaining Challenges

Petitioner asserts that claims 1–3, 5–8, 10–14, and 16–20 are unpatentable as obvious over Hietanen, Takano, and Weinstein. *See id.* at 49–66. According to the Petition,

Ground 2A is substantively identical to, and incorporates the analysis of, Ground 1A in all but one respect. Where Ground 1A relies on Burnett's EM sensor, Ground 2A relies on Takano's bone-conduction microphone. Integration of Takano does not

disturb the aspects of Hietanen and Weinstein mapped to the claim elements.

Id. at 51; *see also id.* at 53 ("As previously discussed (*supra* Sections III.A.3, III.A.4), a POSITA would have found it obvious to complement Hietanen with Weinstein's detailed teaching of a technique for determining and using transfer functions to remove background noise from a speech signal."); *id.* at 63–64 (presenting a similar analysis for claim 11). The obviousness rationale based on Hietanen and Weinstein is deficient for the reasons discussed in Section II.C of this decision. Because the rationale in Ground 2 incorporates that analysis, Petitioner has not shown a reasonable likelihood of prevailing on its challenges to the grounds based on Hietanen, Takano, and Weinstein for the same reasons. *See id.* at 49–66.

The challenge based on those references and Hussain (labeled "1B/2B") also relies on the deficient Hietanen-Weinstein obviousness rationale. *See id.* at 1, 66–74.

III. CONCLUSION

Petitioner has not shown a reasonable likelihood of prevailing on the obviousness grounds for any claims. Thus, we do not institute an *inter partes* review. *See* 35 U.S.C. § 314(a).

IV. ORDER

It is ORDERED that the Petition is *denied*, and no trial is instituted.

FOR PETITIONER:

W. Karl Renner Andrew Patrick Kim Leung FISH & RICHARDSON P.C. axf-ptab@fr.com patrick@fr.com leung@fr.com

Ali R. Sharifahmadian Jin-Suk Park J. Christopher Moulder ARNOLD & PORTER KAYE SCHOLER LLP ali.sharifahmadian@arnoldporter.com jin.park@arnoldporter.com chris.moulder@arnoldporter.com

FOR PATENT OWNER:

Peter Lambrianakos Vincent J. Rubino, III Enrique W. Iturralde Richard Cowell FABRICANT LLP plambrianakos@fabricantllp.com vrubino@fabricantllp.com eiturralde@fabricantllp.com rcowell@fabricantllp.com