

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner

v.

APPLE INC.,
Patent Owner

Case No. IPR2023-00950

U.S. Patent No. 10,076,257 B2

PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE

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LIST OF EXHIBITS

Exhibit	Short Name	Description
Ex. 1001	'257 Patent	U.S. Patent No. 10,076,257 B2
Ex. 1002	'257 File History	Prosecution History of U.S. Patent No. 10,076,257 B2
Ex. 1003	Berger Declaration	Declaration of Dr. Ronald D. Berger
Ex. 1004	Berger CV	Curriculum vitae of Dr. Ronald Berger
Ex. 1005	Markel	U.S. Patent Appl. No. 11/492,278
Ex. 1006	Nissilä	U.S. Patent No. 6,775,566
Ex. 1007	Righter	U.S. Patent No. 5,191,891
Ex. 1008	Farrington	U.S. Patent No. 7,502,643
Ex. 1009	Cardiology Explained	EUAN A. ASHLEY & JOSEF NIEBAUER, CARDIOLOGY EXPLAINED (2004)
Ex. 1010	Cudahy	U.S. Patent No. 5,184,620
Ex. 1011	Sujdak	U.S. Patent No. 6,847,836
Ex. 1012	Geddes	U.S. Patent No. 4,606,352
Ex. 1013	Ceballos	U.S. Patent No. 6,522,915
Ex. 1014	Gilles	U.S. Patent No. 4,635,646
Ex. 1015	Weiss	U.S. Patent No. 5,623,926
Ex. 1016	Apple's Complaint	Complaint, <i>Apple Inc. v. AliveCor, Inc.</i> , Case No. 4:22-cv-07608-HSG, Dkt. No. 1 (N.D. Cal., Dec. 12, 2022)
Ex. 1017	Hobson	U.S. Patent No. 7,876,274

Exhibit	Short Name	Description
Ex. 1018	National Judicial Caseload Profile	U.S. District Courts – National Judicial Caseload Profile (accessed via https://www.uscourts.gov/sites/default/files/cms_na_distprofile0331.2022.pdf)
Ex. 1019	Ducker Decl.	Declaration of Philip Ducker
Ex. 1020	Engstrom	U.S. Patent Application Publication No. 2008/0113650
Ex. 1021	Berger Second Decl.	Second Declaration of Ronald D. Berger, M.D., Ph.D., F.H.R.S.
Ex. 1022 ¹	Kenny Tr.	Transcript of June 19, 2024 deposition of Dr. Thomas W. Kenny

¹ Ex. 1022 was inadvertently omitted in the List of Exhibits for Petitioner’s Response to Patent Owner’s Motion to Amend (Paper 24). Ex. 1022 was identified as Ex. 1019, which should be the Declaration of Philip Ducker.

I. INTRODUCTION

Apple and its expert, Dr. Kenny, have not “really considered all of the boundaries” of the ’257 patent’s claims (Ex. 1022, 85:3-7, 133:11-17, 26:19-22, 31:21-3), leading them to improperly conflate a key claim term (i.e., “pad”) with a term that does not even appear in the ’257 patent (i.e., “electrode”). They also rely on manufactured claim construction positions and misinterpretations of the prior art. The Board should thus cancel the Challenged Claims.

II. CLAIM CONSTRUCTION

A. Preambles

Apple’s Patent Owner Response (“POR”) fails to address Petitioner’s argument that elements [1.pre] and [15.pre] are limiting and deserve their plain and ordinary meaning (Pet., 4-5; Ex. 1022, 23:7-23:19). Thus, Apple has waived any opposition. *See* Paper 13 (Scheduling Order) at 9.

B. “embedded in”

Under guise of articulating plain and ordinary meaning, Apple advances a narrowing construction of “embedded in” that relies on mischaracterizations of the intrinsic record and a cherry-picked dictionary definition of “embedded” (POR, 7-9). Apple and its expert ignore that their own dictionary has a broader definition that

is consistent with the intrinsic evidence.² The Board should refuse to impose Apple’s proposed restriction and instead interpret the plain and ordinary meaning of “embedded in” to allow for an electrode pad that is positioned against or in parallel contact with a portion of the enclosure (as AliveCor contended).

“If more than one dictionary definition is consistent with the use of the words in the intrinsic record, the claim terms may be construed to encompass all consistent meanings.” *Brookhill-Wilk 1, LLC. v. Intuitive Surgical, Inc.*, 334 F.3d 1294, 1300 (Fed. Cir. 2003). Here, Apple’s *own* dictionary demonstrates there were multiple known meanings for the claim term “embedded” (Ex. 2005). Apple and its technical expert self-servingly relied on *only* the first, narrower definition (“incorporated into a surrounding mass or enclosure”) (*id.*; Ex. 1022, 125:17-126:9; 128:20-129:3 (“[Q. Did] you rely on any dictionary definitions other than the one quoted here in

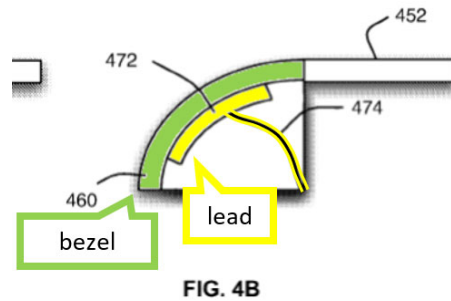
² Apple abandons two other definitions it previously advanced regarding the ’257 patent, presumably because they, too, are much broader than what Apple advocates for here. *See Masimo Corp. v. Apple Inc.*, IPR2023-00745, Paper 15 at 10 (P.T.A.B. Jan. 22, 2024) (“Standard (non electronics) dictionaries define ‘embed’ as ‘to enclose closely in or as if in a matrix’ or ‘to make something an integral part of.’ APPLE-2006, 3; *see also* APPLE-2007, 3 (‘to envelop or enclose’”).

paragraph 34? A. No.”)). That conspicuously ignores the second, broader definition of “embedded,” which simply requires inclusion within a larger entity (“*Also*, that which has been included within a larger entity”) (Ex. 2005).

This broader definition of “embedded” is “consistent with the use of the words in the intrinsic record.” *Brookhill-Wilk*, 334 F.3d at 1300. For example, “FIG. 4B is a cross-sectional view of another illustrative electronic device having a bezel with an ***embedded*** heart sensor lead” (Ex. 1001, 3:33-36).³ During prosecution, Applicant referred to Figure 4B “as a specific example” of claim 29 (now claim 1) (Ex. 1002, 208-209 (also citing “paragraph [0034]”); Ex. 1003, ¶¶61, 69, 73). And Figure 4B discloses the lead is “embedded” when it is included within larger structure of the bezel and housing:

³ Apple relies on Fig. 4B and APPLE-2011 ¶[0034] (“placed on”) as written description support for substitute claims 23-24, and 26, which recite the “embedded in” phrase. *See* IPR2023-00950, Paper 19, 12-13, Claims Appendix.

Ex. 1001, Figs. 4B (annotated)



This is entirely consistent with the broader definition of “embedded” (which simply requires inclusion within a larger entity).

The broader definition of “embedded” is also consistent with the intrinsic evidence cited by Apple (*see* POR, 7-9 (citing Ex. 1001, 10:24-29, 9:44-48)). Column 10, lines 24-29 state “embedded in *or* adjacent to,” which uses the word “or” as equivalent but alternative phrasing. The specification conveys *similarity* between these phrases (Ex. 2013, 57:8-15); not “making a clear distinction” (POR, 8). And in column 9, lines 44-48, Apple acknowledges the specification “describes that ‘lead 472 of the heart sensor can be *positioned against* the back surface of bezel 460’” for the Figure 4B embodiment (*id.* (emphasis in original)). As explained earlier, however, the specification expressly acknowledges Figure 4B’s “positioned against” configuration as an example of “an *embedded* heart sensor lead” (Ex. 1001, 3:33-36). The intrinsic evidence cited by Apple is therefore consistent with the broader definition of “embedded” (which simply requires inclusion within a larger entity) (Ex. 2005).

Because the intrinsic record is consistent with the broader definition of “embedded” (Ex. 2005), the Board should interpret “embedded in” to simply require inclusion within a larger entity. *Brookhill-Wilk*, 334 F.3d at 1300. If the Board does so, it should also find that interpretation consistent with the plain and ordinary meaning advanced by AliveCor. As shown in Figure 4B above, the lead’s electrode pad is positioned against or in parallel contact with the bezel. Thus, the Board should allow “embedded in” to include an electrode pad that is positioned against or in parallel contact with a portion of the enclosure (as advanced by AliveCor).

The Board should also explicitly reject Apple’s narrowing construction. *First*, Apple’s narrowing construction is based on testimony from Dr. Kenny, who incorrectly assumed the word “in” is an adverb that modifies and narrows the preceding word “embedded” (POR, 7-9 (citing Ex. 2004, ¶¶27-35); Ex. 1022, 127:14-128:19). The claim language recites a “pad that is embedded *in a first portion*” (Ex. 1001, Cl.1). The word “in” is a preposition that modifies the object “portion”; it does *not* narrow “embedded” into the construction advanced by Apple. *Second*, there is nothing inconsistent in the testimony of AliveCor’s expert, Dr. Berger (*cf.* POR, 9 (citing APPLE-2013, 61:2-62:5)). Dr. Berger explained that in the ’257 patent, “embedded in” means “*one of those structures is this perhaps larger, hard enclosure*” (APPLE-2013, 61:3-8). He thus confirmed that the plain and

ordinary meaning of “embedded in” simply requires inclusion within a larger entity, which is consistent with the broader definition of “embedded” (Ex. 2005).

C. “a first pad . . . the first portion”

AliveCor’s Petition relied on Apple’s Complaint to infer an apparent interpretation “in which a ‘surface of an exposed electrode pad that is configured to detect a cardiac signal via direct contact with the user’s skin’ can satisfy both the claimed first pad and the claimed first portion of the enclosure which the first pad is both ‘embedded in’ and ‘positioned underneath’” (POR, 9-12 (citing Pet., 16-17)). Now, Apple has disavowed the apparent interpretation and stated that “[t]he claim requires that the first pad be a distinct component from the first portion of the enclosure and that the first pad be both ‘embedded in’ and ‘positioned underneath’ the first portion of the enclosure” (POR, 11). Based on these representations, the parties appear to agree the first portion of the enclosure and the first pad cannot be met by the same structure. AliveCor maintains its invalidity theory under the “[c]orrect interpretation of [1.c.iii]” (Pet., 19-21).

D. “bezel”

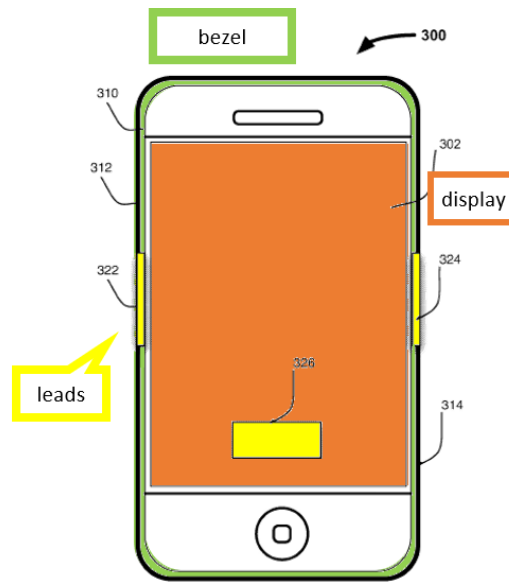
The Board should reject Apple’s proposed construction because it is based exclusively on extrinsic evidence and contradicts the intrinsic record.

Plain and ordinary meaning should apply unless there is lexicography or disclaimer. *See Thorner v. Sony Comp. Entm’t Am. LLC*, 669 F.3d 1362, 1365 (Fed.

Cir. 2012) (citation omitted). Here, Apple does not advocate the plain and ordinary meaning of “bezel”; it seeks, in conclusory fashion, to construe the term as “[a] rim that secures a transparent covering for an indicating device such as a meter, oscilloscope, or watch” (POR, 12). Apple does not even *allege* lexicography or disclaimer, let alone show either exists (*see id.*). Instead, Apple relies *exclusively* on a few citations to *extrinsic* evidence (i.e., dictionary definitions and expert testimony) (*see id.* (citing APPLE-2008; APPLE-2009; APPLE-2010; APPLE-2004, ¶38)). This is inadequate to justify Apple’s proposed construction. *See 3M Innovative Properties Co. v. Tredegar Corp.*, 725 F.3d 1315, 1333 (Fed. Cir. 2013) (refusing to “narrow a claim term beyond its plain and ordinary meaning unless there is support” in the intrinsic record).

Plain and ordinary meaning should also apply because Apple’s proposed construction conflicts with the intrinsic record. A tribunal should adopt a broader plain and ordinary meaning that is consistent with the intrinsic record, even if there is extrinsic evidence suggesting a narrower interpretation. *See Arthrex, Inc. v. Smith & Nephew, Inc.*, 935 F.3d 1319, 1330–31 (Fed. Cir. 2019). Here, Apple’s narrower construction (which requires a “bezel” to “*secure*[]” a “transparent covering”) contradicts the intrinsic record, which demonstrates a “bezel” need *not* “secure” a display. For example, Figure 3 is reproduced and annotated below:

Ex. 1001, Fig. 3 (annotated)



As shown above, a white border separates bezel 310 (green) from display 302 (orange) (*see also* Ex. 1001, Cl. 19 (reciting “a non-conductive component positioned between the bezel and the display screen”)). Because they are separated, bezel 310 cannot “secure[]” display 302 (as required under Apple’s proposed construction of “bezel”). Apple’s proposed construction should therefore be rejected as inconsistent with the intrinsic evidence.

III. DISCUSSION

A. Independent Claim 1

1. *Ground 1*

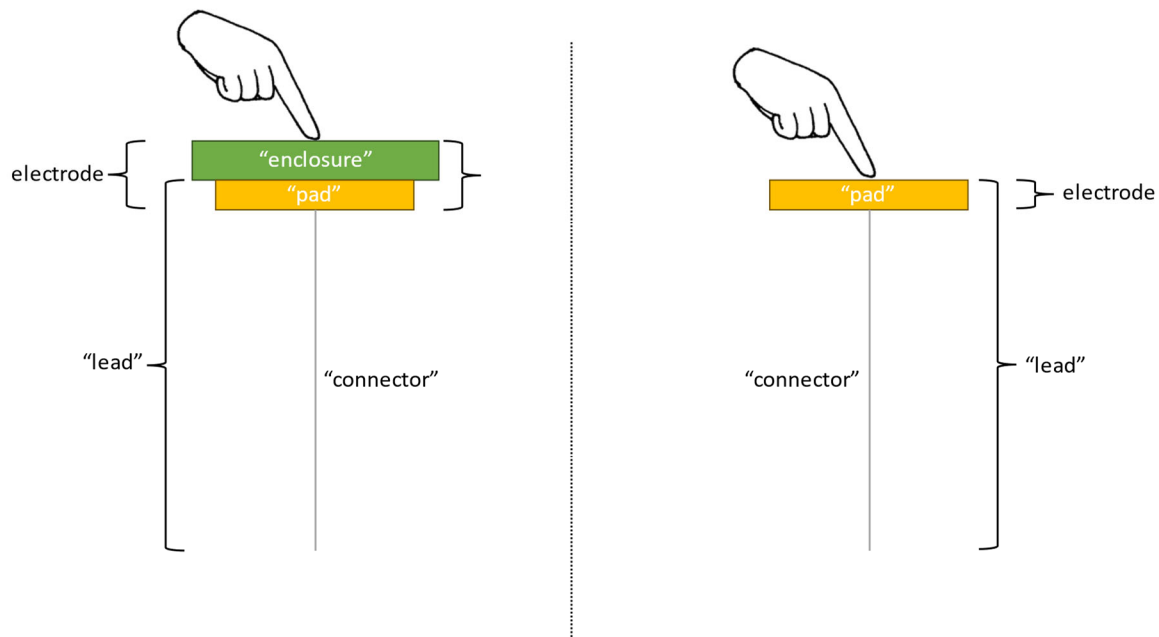
i. *Apple has not shown that Markel fails to render obvious element [1.c.iii].*

The Board should reject Apple’s argument that *Markel* fails to render obvious element [1.c.iii]⁴ because *Markel*’s “audio output portion 610” is an exterior “electrode” (POR, 26-36). Apple incorrectly assumes an exterior “electrode” cannot meet element [1.c.iii]’s requirement of a “pad” “positioned underneath the exterior surface of the” enclosure (*id.*). This wrong assumption leads Apple to conclude that *Markel*’s exposed electrode cannot meet element [1.c.iii] (*id.*). Apple’s analysis must be rejected because it improperly equates an “electrode” (which is *never* recited anywhere in the ’257 patent) with a “pad” (which is *actually* recited in element [1.c.iii]).

The terms “electrode” and “pad” are not necessarily equivalent. Further complicating matters, the term “electrode” is not used in the ’257 patent at all. The meaning of “electrode” is thus dependent on the context in which it is found (Ex.

⁴ For the reasons explained in Section II.C, Petitioner addresses Apple’s POR as it relates to the “[c]orrect interpretation of [1.c.iii]” (Pet., 19-21; POR, 26-37).

1022, 70:17-71:3). In general, however, the proper relationship between an “electrode” and a “pad” in the context of the ’257 patent is illustrated below:

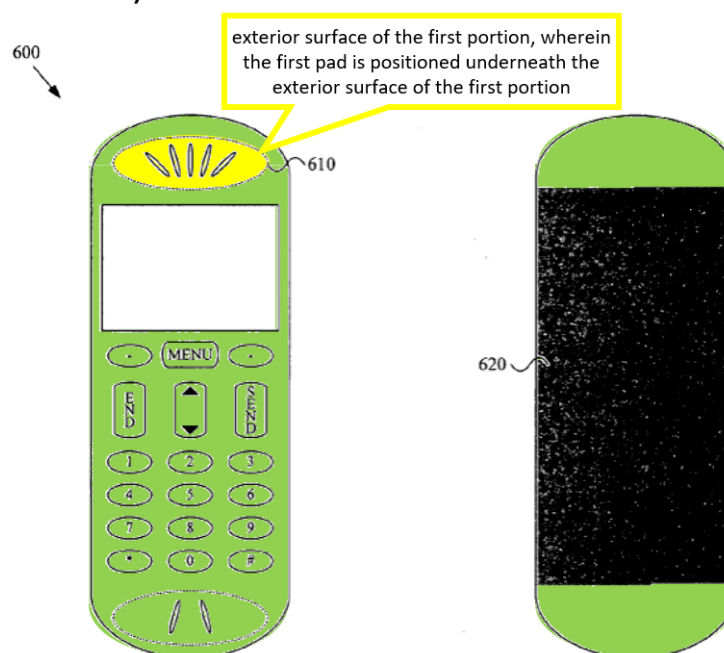


As shown above, a POSITA would have understood that “electrode” generally refers to what a user contacts in order to measure ECG (Pet., 11; Ex. 1003, ¶116; Ex. 2013, 32:7-20, 101:14-22). In this general parlance, an “electrode” is always exterior because it is the part a user contacts. But the ’257 patent *never* uses the word “electrode” (Ex. 1022, 70:1-70:7). Instead, element [1.c.iii] recites a “*pad*” underneath a conductive “enclosure.” A “pad” is a narrower term referring to a specific component of an “electrode.” (Ex. 1003, ¶116; Ex. 1022, 71:6-71:21, 73:3-73:8, 79:6-21). In the context of the ’257 patent, each “pad is also combined with a “connector” to form a “lead” (Ex. 1022, 34:8-35:13). Significantly, the word

“electrode,” by itself, is insufficient to draw any conclusions about whether the “pad” of claim 1 is disclosed (Ex. 1022, 72:22-73:2 (“So an electrode *might or might not* meet [claim 1’s] limitations.”); *see also id.*, 71:22-72:9, 73:9-74:4, 75:10-75:22). Thus, disclosure of an exterior “electrode” does not preclude a prior art reference from rendering obvious the “pad” of element [1.c.iii] (as Apple wrongly assumes).

This reveals the fatal flaw in Apple’s criticisms of Ground 1. The salient question—which Apple fails to address—is whether *Markel* renders obvious that “audio output portion 610” comprises a *pad* underneath the enclosure:

Ex. 1005, Fig. 6 (annotated)



To that, the answer is “yes.” Apple’s expert (Dr. Kenny) testified the area inside of audio output portion 610’s dotted oval identifies “where the electrode is positioned,” and the area outside of the dotted oval is part of the enclosure (Ex. 1022, 94:3-95:22,

96:1-4). With respect to *Markel*'s description of Figure 6, however, Dr. Kenny was unable to identify any disclosure suggesting the areas inside and outside the dotted oval are formed from different materials (*id.*, 96:5-11 ("There's no explicit disclosure of the material that surrounds 610 in figure 6.")). And the "audio output portion 610" clearly meets Dr. Kenny's broad interpretation of "enclosure" (Ex. 1022, 30:13-21). Thus, *Markel*'s enclosure and the surface of "audio output portion 610" must comprise the same material—conductive plastic (Ex. 1005, [0037]). Thus, the surface of "audio output portion 610" is part of *Markel*'s enclosure.

Dr. Kenny's testimony also demonstrates that the sort of conductive "enclosure" disclosed in *Markel* would have an electrode "pad" underneath if it had "superior conductivity" and appropriate geometry⁵ (Ex. 1022, 45:3-48:14, 67:16-69:22; *see also* Ex. 2013, 27:16-28:9, 35:9-18, 44:21-45:19, 115:10-116:7). This is

⁵ For example, Dr. Kenny testified that the claim language could even be met by a "thicker," "silver-based" pad underneath a "stainless steel" enclosure (Ex. 1022, 68:18-69:22; *see also* Ex. 1011, 1:30-31 (describing electrodes as containing conductive pads such as silver chloride)). This is consistent with the '257 patent which discloses a conductive metallic logo having a lead that is coupled to or integrated in this conductive section (Ex. 1001, 10:29-33).

consistent with Dr. Berger’s testimony that when constructing *Markel*’s device, a POSITA would not have connected a wire directly to the exterior conductive plastic of *Markel*’s “audio output portion 610” (Ex. 2013, 101:11-22). Instead, a POSITA would have formed the connection with a conductive metal underneath *Markel*’s conductive plastic (*id.*; *see also* Ex. 1022, 90:8-92:20).⁶ Indeed, this is consistent with the ’257 patent’s disclosure (Ex. 1001, Fig. 4B, 2:44-50, 10:29-33, 8:56-67; Ex. 1022, 30:13-32:11, 35:6-37:9). Dr. Kenny also acknowledged that in a system like *Markel*, which is designed to extract medical information, a POSITA would have been motivated to construct an electrode pad with “superior conductivity” to ensure a “high margin for success” (*id.*, 45:3-48:14). Thus, even though Dr. Kenny could not clearly articulate differences between the claimed “enclosure” and “pad” (Ex. 1022, 56:17-59:14), the experts’ testimony demonstrates how *Markel* renders obvious that “audio output portion 610” comprises a *pad* underneath the enclosure.

The Board should also reject Apple’s argument that a POSITA would not have been motivated to modify *Markel* to arrive at element [1.c.iii] (POR, 36-37). *First*, Apple improperly suggests *Markel* must explicitly disclose a reason to modify itself

⁶ That *Markel* does not address these implementation details makes *DePuy Spine* and *Sony* inapposite (POR, 36-37).

(POR, 36 (citing *Fritch, Gordon, Smithkline Diagnostics*). But “[r]equiring an explicit teaching to [modify the prior art] is precisely the sort of rigid application of the TSM test that was criticized in KSR.” *Aventis Pharma Deutschland GmbH v. Lupin, Ltd.*, 499 F.3d 1293, 1301 (Fed. Cir. 2007).

Second, even if *Markel* were required to explicitly disclose a reason to modify and arrive at element [1.c.iii] (it isn’t), *Markel* does so (*cf.* POR, 31, 36-37). As explained in the Petition, *Markel* teaches that conductive plastic “may be integrated into various ***molded*** components of the mobile communication device, and that concealing an electrode by including “***molded*** conductive plastic with little or no visible indication of the electrode presence” (Pet., 20; Ex. 1005, [0037]). AliveCor’s expert opined a POSITA would be motivated to “substantially conceal[] (or hid[e])” the pad of the electrode from the user to increase aesthetics while protecting the pad (Pet. 20 (quoting Ex. 1005 [0040]); Ex. 1003, ¶ 135). Apple’s expert did not even analyze (or dispute) that this modification would yield predictable results, or that there was a reasonable expectation of success (Ex. 1022, 108:8-109:10).

Thus, element [1.c.iii] is met at least because *Markel* renders obvious that “audio output portion 610” comprises a ***pad*** underneath the enclosure.

ii. Apple has not shown that Markel fails to disclose or render obvious element [1.c.i]

The Board should reject Apple’s argument that *Markel* fails to disclose element [1.c.i] (POR, 37-39) because it relies on Apple’s faulty claim construction

position for “embedded in” (POR, 37-39). *See Bot M8 LLC v. Sony Interactive Ent. LLC*, 2023 U.S. App. LEXIS 22911, at *14 (Fed. Cir. 2023). For the reasons explained (Section II.B), the Board should reject Apple’s improper construction. If the Board agrees, then it can discard Apple’s additional arguments based on that construction.

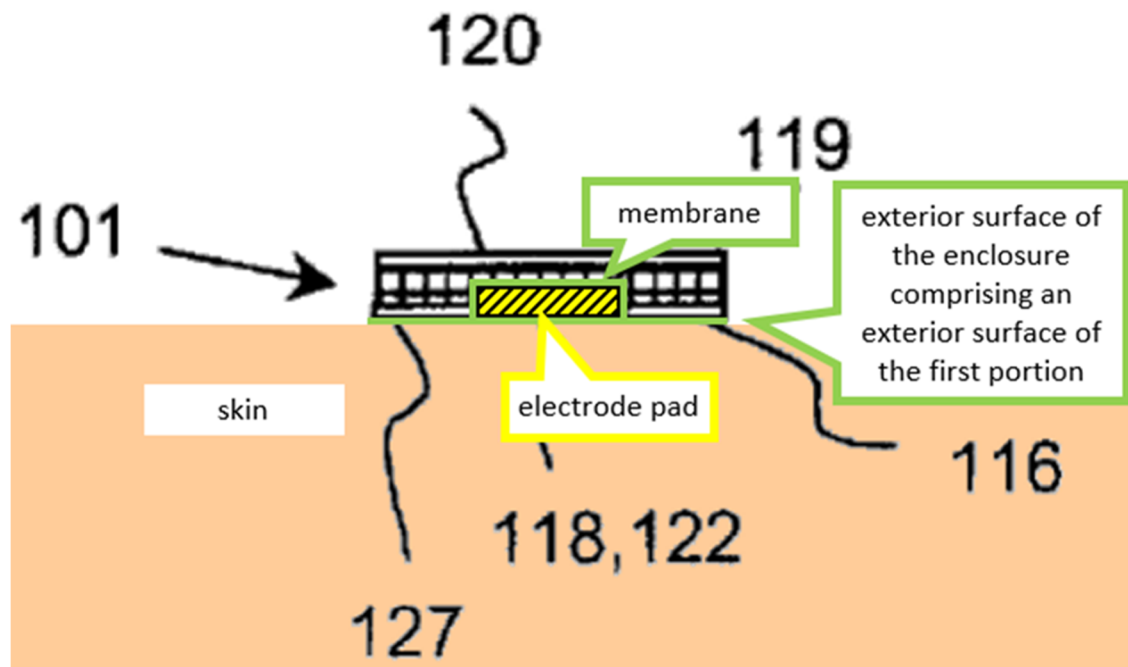
2. Ground 2

i. Apple has not shown that Nissilä fails to render obvious Elements [1.c.i]-[1.c.iii] and [1.d.i]-[1.d.ii].

In its Petition, AliveCor properly characterized *Nissilä* and demonstrated how it discloses elements [1.c.i]-[1.c.iii] and [1.d.i]-[1.d.ii] (Pet., 71-77). As explained below, furthermore, Apple’s attempts to suggest otherwise are based on mischaracterizations of *Nissilä* itself, as well as AliveCor’s positions regarding that reference (*see* POR, 39-59). The Board should therefore credit AliveCor’s proper characterization of *Nissilä* and find elements [1.c.i]-[1.c.iii] and [1.d.i]-[1.d.ii] are obvious in view of the *Markel-Nissilä* combination.

AliveCor properly characterized Nissilä and showed it discloses elements [1.c.i]-[1.c.iii] and [1.d.i]-[1.d.ii]. AliveCor’s Petition properly characterized *Nissilä* as disclosing a membrane 119 between electrode pads 118/122 and the wearer’s skin (Pet., 71-77):

Ex. 1006, Fig. 5 (annotated)



This characterization was based, for example, on *Nissilä*'s explicit disclosure that membrane 119 comes “into contact with the person’s skin surface” (Ex. 1006, 5:40-41; POR, 54 (conceding *Nissilä*’s “membrane 119” contacts the user’s skin “on the inner surface 116”). From this, AliveCor accurately depicted *Nissilä*’s membrane 119 between electrode pads 118/122 and the wearer’s skin—i.e., the green layer that AliveCor drew. The disclosure of *Nissilä* allows for no other interpretation. AliveCor properly characterized *Nissilä* and correctly explained why this disclosure clearly meets elements [1.c.i]-[1.c.iii] and [1.d.i]-[1.d.ii] (Pet., 71-77).

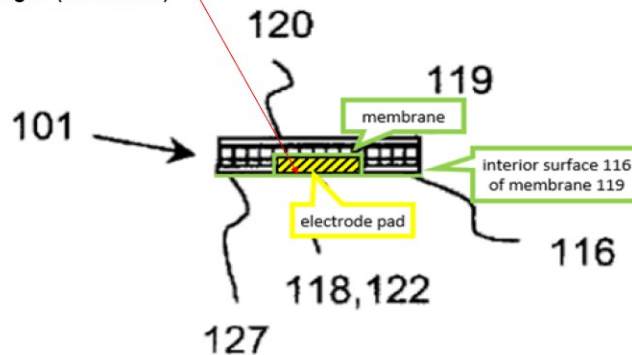
Apple’s interpretation of Nissilä should be rejected. Apple’s POR is based on the mistaken interpretation that *Nissilä*’s electrode pads 118/122 and membrane 119 are all one and the same (*see* POR, 42-52 (“each of the electrodes 118 and 122

is a membrane 119”) (emphasis in original)). From this misguided premise, Apple urges that the green layer AliveCor annotated on *Nissilä* has “no support” (see POR, 39-52):

POR, 41 (annotating Pet., 72’s annotation of Ex. 1006, Fig. 5)

No support in *Nissilä* for this additional green layer drawn by AliveCor between electrode 118, 122 and the wearer’s skin

Ex. 1006, Fig. 5 (annotated)



But the Board should reject Apple’s misinterpretation of *Nissilä*’s electrode pads 118 and 122 and membrane 119 (see POR, 42-52). Using different reference numerals demonstrates the identified structures are distinct. See *Apple Inc. v. Masimo Corp.*, IPR2022-01465, Paper 72, 2024 Pat. App. LEXIS 670, *40 (P.T.A.B. Feb. 2, 2024); *DynaEnergetics Europe GmbH v. SWM Int’l, LLC*, IPR2022-01372, Paper 27, 2024 Pat. App. LEXIS 504, *21 (P.T.A.B. Feb. 5, 2024). *Nissilä* plainly uses different reference numerals for electrode pads 118/122 and membrane 119 (Ex. 1006, Fig. 5, 5:33-49). This is underscored by the fact that electrode pads 118/122 are in some embodiments *without* membrane 119 (Ex. 1006, Figs. 7-9, 5:25-32; POR, 47 (“[R]eference numeral 119 appears in only one figure

in Nissilä—FIG. 5.”). *Nissilä*’s electrode pads 118/122 and membrane 119 are therefore distinct structures.⁷

The Board should also dismiss Apple’s arguments based on the phrase “consist of” in *Nissilä*’s specification (POR, 43-46, 51). Apple’s cited authority addresses the word “consist” in claim language; it does *not* suggest that “consist” has a “closed” meaning when used in a specification (*see id.*). Moreover, *Nissilä*’s actual claim language *does* use “open” “comprise” language for a “membrane”:

Ex. 1006, Cl.6

6. An electrode structure as claimed in claim 1, wherein
the first electrode and the second electrode of the electrode
structure comprise a conductive membrane located at both

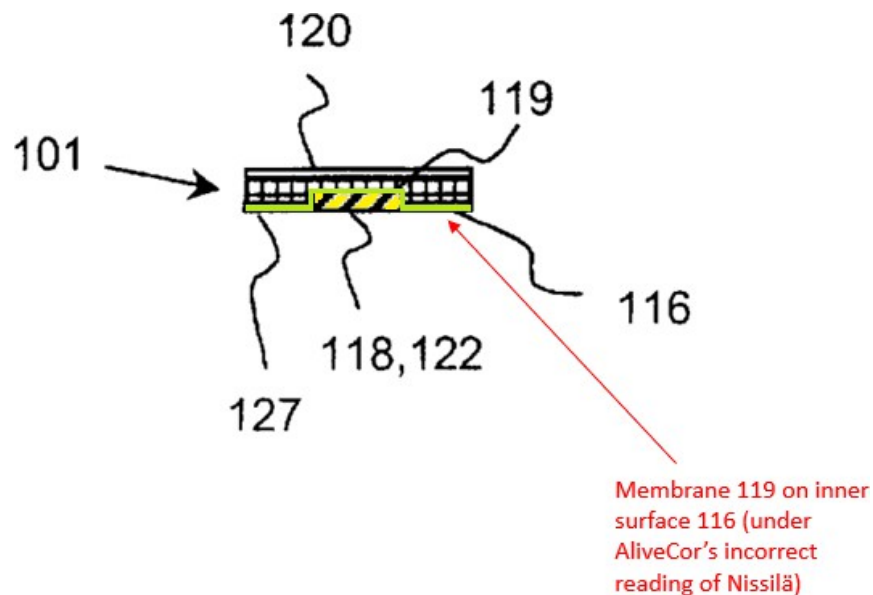
The “comprising” language in *Nissilä*’s Claim 6 demonstrates that the “conductive membrane” must be an *additional*, distinct structure from the first and second electrodes (Ex. 1022, 24:2-22).

⁷ Apple’s arguments based on *Nissilä*’s Finnish application (POR, 48-50) are irrelevant because AliveCor’s Petition never relied on that reference. The Board should decline to “depart from the petition” and consider “a different *inter partes* review” from the one AliveCor filed. *SAS Inst., Inc. v. Iancu*, 584 U.S. 357, 365, (2018).

Because *Nissilä*'s electrode pads 118/122 and membrane 119 are distinct structures, there is no merit to Apple's misinterpretation of *Nissilä*. It should be rejected, along with Apple's corresponding argument that the green layer AliveCor annotated on *Nissilä* has "no support" (see POR, 39-52).

Apple's mischaracterization of AliveCor's interpretation of Nissilä should also be rejected. Apple's alternative argument—i.e., *Nissilä* fails to render obvious Elements [1.c.i]-[1.c.iii] and [1.d.i]-[1.d.ii] "[e]ven under AliveCor's interpretation of [*Nissilä*]" (POR, 52-59)—also lacks merit. Apple's argument depends on conveniently omitting the part of the membrane 119's "inner surface 116" that is underneath electrode pads 118/122:

POR, 41 (annotating Ex. 1006, Fig. 5)



According to Apple, its annotation is justified because *Nissilä*'s Figure 4 shows electrode pads 118/122 as "visible" and "distinct from surrounding portions of the

band” (POR, 56-57). But this assumes—incorrectly—that *Nissilä*’s Figure 4 was intended to illustrate membrane 119. It is not, which is why numeral “119” is absent:

Ex. 1006, Fig. 4

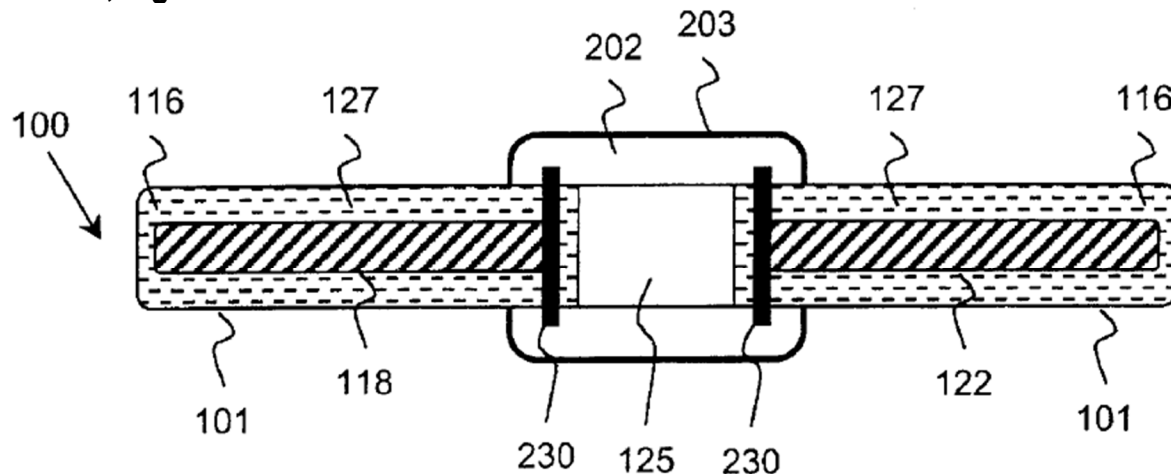


FIG. 4

Thus, Apple misinterpreted *Nissilä*’s Figure 5 when it omitted the membrane 119’s “inner surface 116” underneath electrode pads 118/122.

Even more crippling to Apple’s misinterpretation, however, is *Nissilä*’s “electrically conductive adhesive 127”:

The membrane 119 can thus come into contact with the person’s skin surface 102 or ***on the inner surface 116 of the membrane 119[,] which is against the person’s skin[,] there can be an electrically conductive adhesive 127.***

(Ex. 1006, 5:39-46.) The “electrically conductive adhesive 127” is intended to receive electrical signals from skin and assist with conduction (Ex. 1022, 121:10-122:3). Applying an “electrically conductive adhesive 127” to the membrane 119 makes no sense unless the membrane is transmitting the electrical signal to another “electrically conductive” component—i.e., electrode pads 118/122 (APPLE-2013,

132:17-133:19).⁸ Despite what Apple says, therefore, *Nissilä*'s membrane 119 must cover the "inner surface 116" that is underneath electrode pads 118/122 (Ex. 1022, 67:16-69:22 (Apple's expert testifying the claimed "enclosure" can be met by "an intervening layer, which has some electrical conductivity," such as a "thin steel enclosure"))).

Thus, the Board should reject Apple's argument that *Nissilä* fails to render obvious elements [1.c.i]-[1.c.iii] and [1.d.i]-[1.d.ii] "[e]ven under AliveCor's interpretation of [*Nissilä*]" (POR, 52-59).

ii. *Apple has not shown lack of motivation to combine Markel and Nissilä.*

As explained in Section III.A.2.i, AliveCor properly characterized *Nissilä* as disclosing a membrane 119 between electrode pads 118/122 and the wearer's skin. Because they are under the membrane (which "is made of metal, electrically conductive plastic or a similar conductive material" (Ex. 1006, 36-38)),⁹ *Nissilä* expressly contemplates embodiments in which the electrode pads are not visibly

⁸ *Nissilä* also discloses "***non***-conductive adhesive on outer edges of the band 101" "***outside*** the electrodes 118, 122" (Ex. 1006, 5:45-49).

⁹ This undermines any suggestion that *Nissilä*'s structure was unsuitable for a handheld device (POR, 62-63, 65-67).

identifiable. For the reasons explained in the Petition, this is entirely consistent with *Markel*'s disclosure of making the electrodes visually indistinguishable. Thus, *Nissilä* does not distinguish from or hinder the teachings of *Markel* (POR, 59-67).

The Board should also reject Apple's suggestion that a POSITA would not have been motivated to modify *Markel* because it had already achieved its goal (POR, 63-64). "That a particular piece of prior art achieves a desirable goal to some extent hardly means that relevant artisans would have lacked a motivation to achieve the goal to a greater extent." *L'Oreal USA, Inc. v. Olaplex, Inc.*, 844 F. App'x 308, 319 (Fed. Cir. 2021). Here, AliveCor explained a POSITA would have turned to *Nissilä*'s teachings of an "improved electrode structure" having a pad positioned underneath the exterior surface of an enclosure (Pet., 71). AliveCor also contended (and Apple has not disputed) a POSITA would have had a reasonable expectation of success in combining *Markel* and *Nissilä* (see Pet., 70-71; POR, 59-67). The Board should therefore find motivation to combine *Markel* and *Nissilä*.

C. Independent Claim 15 and Dependent Claims 2-4, 10-11, 14, 16-18, and 21-22

Apple's POR fails to address Petitioner's argument that independent Claim 15 and the additional limitations of dependent claims 2-4, 10-11, 14, 16-18, and 21-22 are obvious (Pet., 29-34, 46-47, 51-65, 68-69, 81-84). Thus, Apple has waived any opposition. See Paper 13 (Scheduling Order) at 9.

D. Dependent Claim 5

Apple disputes obviousness of elements [5.a]-[5.b] (POR, 67-68). The Board should reject each of Apple's arguments.

First, the Board should reject Apple's arguments regarding *Markel's* purported lack of disclosure (POR, 67). Unrebutted expert testimony deserves substantial weight when supported by documentary evidence. *See Philip Morris Products, S.A. v. Rai Strategic Holdings, Inc.*, IPR2020-00920, Paper 21 at 22 (P.T.A.B. Nov. 15, 2021). AliveCor's expert testified elements [5.a]-[5.b] would have been within a POSITA's skill (Pet., 35-36 (citing Ex. 1003, ¶¶187-93)). This testimony was corroborated by documentary evidence (*see* Ex. 1003, ¶¶189, 192 (citing supporting evidence from *Hobson*, *Sujdak*, and *Geddes* and incorporating Section VI.C of declaration by reference)). While the experts disagree on the adequacy of the documentary evidence, Apple's expert fails to substantively dispute elements [5.a]-[5.b] would have been within a POSITA's skill (*see* Ex. 2004, ¶¶145-149). The Board should therefore give substantial weight to AliveCor's unrebutted evidence that elements [5.a]-[5.b] would have been within a POSITA's skill.

Second, the Board should reject Apple's argument regarding a purported "four-way combination" of *Markel* with *Hobson*, *Sujdak*, and *Geddes* (POR, 67-68). As explained earlier, Petitioner did not rely on a combination at all; instead, Petitioner relied on expert testimony regarding the knowledge of a POSITA as it was

applied to the cited references, which was properly corroborated by documentary evidence (i.e., *Hobson*, *Sujdak*, and *Geddes*) (Pet., 35-36 (citing Ex. 1003, ¶¶187-93)). See *Koninklijke Philips N.V. v. Google LLC*, 948 F.3d 1330, 1338 (Fed. Cir. 2020) (finding no error when Board relied on expert testimony, corroborated by documentary evidence, in an obviousness analysis).

Apple therefore failed to rebut obviousness of elements [5.a]-[5.b].

E. Dependent Claim 6

Apple disputes obviousness of element [6.e] (POR, 67-68). Apple says this element requires additional “analysis as to the conductivity of the insulating region 415 of [Markel]” “in comparison to the thickness of the second portion of the enclosure of [Markel]’s device” (*id.*). But unrebutted expert testimony deserves substantial weight when supported by documentary evidence. See *Philip Morris*, IPR2020-00920, Paper 21 at 22. AliveCor’s expert testified element [6.e] would have been within a POSITA’s skill (Pet., 38-39 (citing Ex. 1003, ¶¶208-211)). Contrary to what Apple says, this testimony was corroborated by documentary evidence (see Ex. 1003, ¶210 (citing supporting evidence from *Markel* and incorporating Section VI.B of declaration by reference)). While Apple’s expert parrots Apple’s criticisms, he fails to substantively dispute element [6.e] would have been within a POSITA’s skill (see Ex. 2004, ¶150-51). The unrebutted testimony of AliveCor’s expert deserves substantial weight as to element [6.e]. Moreover,

Apple's expert admitted these design decisions were within a POSITA's skill (Ex. 1022, 40:7-20, 41:17-43:12).

Apple therefore failed to rebut obviousness of element [6.e].

F. Dependent Claim 7

Apple disputes obviousness of element [7.a] (POR, 69-70). Apple says element [7.a] requires additional analysis on the positions of “the alleged first and second pads of [Markel]” (*id.*). AliveCor's expert testified element [7.a] would have been within a POSITA's skill (Pet., 39-40 (citing Ex. 1003, ¶¶214-218)). Again, this testimony was corroborated by documentary evidence (*see* Ex. 1003, ¶214-218 (citing supporting evidence from *Markel* and incorporating Section VI.B of declaration by reference)). Again, Apple's expert fails to substantively dispute the relevant claim language would have been within a POSITA's skill (*see* Ex. 2004, ¶152). The un rebutted testimony of AliveCor's expert deserves substantial weight as to element [7.a]. *See Philip Morris*, IPR2020-00920, Paper 21 at 22. Moreover, Apple's expert admitted these design decisions were within a POSITA's skill (Ex. 1022, 40:7-20, 41:17-43:12).

Apple therefore failed to rebut obviousness of element [7.a].

G. Dependent Claim 8

Apple disputes obviousness of elements [8.a]-[8.b] under Ground 1 (POR, 70). According to Apple, AliveCor's expert “has not even attempted to demonstrate

that the claimed pocket is ‘necessarily present’ in [*Markel*]’s device” (*id.*). Untrue. AliveCor’s expert *did* identify supporting disclosure in *Markel* and *did* explain why that disclosure would have required the “pocket” of elements [8.a]-[8.b] (*see* Ex. 1003, ¶¶221-224 (citing Ex. 1005, Fig. 6, [0035], [0040])). Moreover, Apple’s expert fails to substantively dispute the relevant claim language would have been required (*see* Ex. 2004, ¶153). The un rebutted testimony of AliveCor’s expert deserves substantial weight as to elements [8.a]-[8.b]. *See Philip Morris*, IPR2020-00920, Paper 21 at 22.

Apple’s POR fails to address this claim under Ground 2 (Pet., 80-81). Thus, Apple has waived any argument Claim 8 is non-obvious under Ground 2. *See* Paper 13 (Scheduling Order) at 9.

Apple therefore failed to rebut obviousness of elements [8.a]-[8.b].

H. Dependent Claim 9

Apple disputes obviousness of element [9.a] (POR, 71). According to Apple, AliveCor “asserts that ‘at least a portion of the exterior surface of the electronic device is behind the ‘display 140’ of [*Markel*]” based on only unsupported expert testimony (POR, 71). Again, untrue. AliveCor’s expert identified support in *Markel* (*see* Ex. 1003, ¶¶221-224 (citing Ex. 1005, Fig. 1, [0034])). Based on this, AliveCor’s expert testified a POSITA would have understood “at least a portion of the exterior surface of the electronic device is behind the ‘display 140’” of *Markel*

(Ex. 1003, ¶228). That testimony was substantively undisputed by Apple’s expert (see Ex. 2004, ¶153). The un rebutted testimony of AliveCor’s expert deserves substantial weight as to element [9.a]. See *Philip Morris*, IPR2020-00920, Paper 21 at 22.

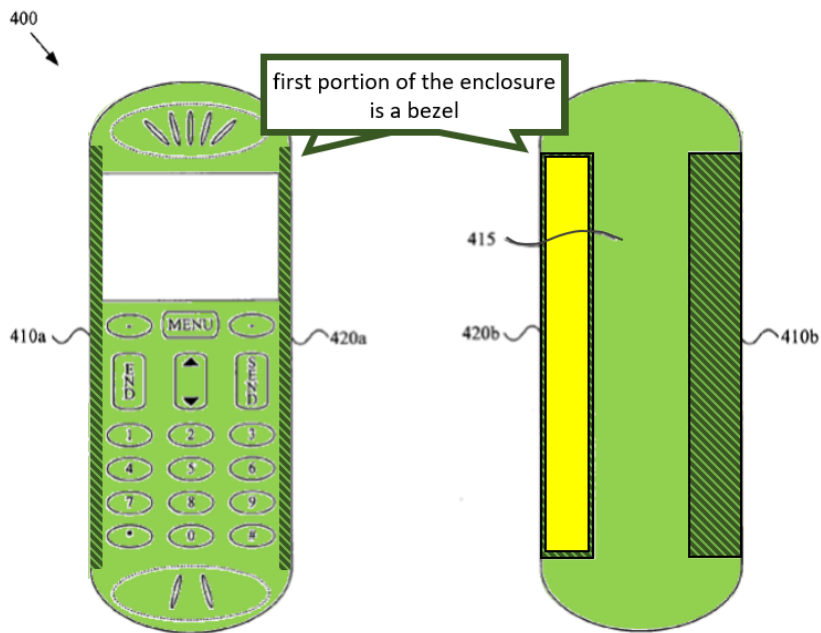
Apple therefore failed to rebut obviousness of element [9.a].

I. Dependent Claims 12, 13, and 19

Apple disputes obviousness of elements [12.a], [13.a], and [19.a]-[19.b] (POR, 71-76). The Board should reject each of Apple’s arguments.

First, the Board should reject Apple’s argument that *Markel* does not obviate elements [12.a], [13.a], or [19.a] because *Markel* does not disclose an electrode on the bezel (POR, 71-73). Apple says this is evident from *Markel*’s Figure 4, which allegedly “shows only electrodes positioned on the back side” (POR, 72). But the Board previously found that in *Markel*’s Figure 4, electrodes 410 and 420 are *not* limited to the “back side” (as Apple contends); instead, the electrodes are “*molded into side portions*” of the device. See *Masimo Corp. v. Apple Inc.*, IPR2023-00745, Paper 8, at 43 (P.T.A.B. Oct. 16, 2023). This is consistent with AliveCor’s analysis, which demonstrates the second electrode extends to the bezel of *Markel*’s electronic device (see Pet., 47-49):

Ex. 1005, Fig. 4 (annotated)



Second, the Board should reject Apple’s argument that *Markel* does not obviate elements [12.a], [13.a], or [19.a] because *Markel* provides no suggestion to extend the electrodes into the bezels (POR, 73). “[A]n obviousness determination does not require prior art to expressly state a motivation for every obvious combination.” *Intel Corp. v. Qualcomm Inc.*, 2022 WL 880681, at *3 (Fed. Cir. 2022). Rather, motivation to combine can be based on “a known technique to address a known problem using prior art elements according to their established functions.” *CyWee Grp. Ltd. v. ZTE (USA), Inc.*, 90 F.4th 1358, 1366 (Fed. Cir. 2024). Here, AliveCor’s expert explained how and why a skilled artisan would have modified *Markel* to achieve elements [12.a], [13.a], and [19.a] (i.e., by applying the known technique of increasing contact area to improve signal detection) (Ex. 1003, ¶¶252,

260, 328). It is therefore irrelevant that *Markel* itself does not explicitly disclose or suggest increasing the size of its electrode pads to extend into the bezels.

Third, the Board should reject Apple’s argument that the *Markel-Righter* combination does not obviate elements [12.a], [13.a], or [19.a] because *Righter* does not disclose an electrode in a “bezel,” under Apple’s construction of that term (POR, 74-75). For the reasons explained in Section II.D, the Board should reject Apple’s improper construction of “bezel.” If the Board agrees, then it can discard Apple’s additional arguments based on that construction.

Fourth, the Board should reject Apple’s argument that the *Markel-Righter* combination does not obviate elements [12.a], [13.a], or [19.a] because *Righter* does not disclose an electrode in a “bezel,” under AliveCor’s articulation of that term’s plain and ordinary meaning (POR, 75-76). Apple improperly adds a requirement that a “bezel” must have an enclosure with separate “sides form[ing] a ‘rim’ that supports the front of the watch” (*id.*). But AliveCor’s expert never said that. He explained a POSITA would have understood the plain and ordinary meaning of “bezel” to simply be “a rim that encircles an electronic device” (Ex. 1003, ¶249).

Fifth, the Board should reject Apple’s argument that neither *Markel* alone nor the *Markel-Righter* combination obviates element [19.b] because AliveCor has not identified “a non-conductive component positioned between the bezel and the display screen” (POR, 73-74, 76). AliveCor’s expert testified a POSITA would have

known an “insulating region” electrically isolates the “bezel” from the “display 140” (Ex. 1003, ¶333). That testimony was substantively undisputed by Apple’s expert (*see* Ex. 2004, ¶159). The Board should therefore give substantial weight to AliveCor’s un rebutted evidence regarding element [9.a]. *See Philip Morris*, IPR2020-00920, Paper 21 at 22.

Apple therefore failed to rebut obviousness of elements [12.a], [13.a], or [19.a]-[19.b].

J. Dependent Claim 20

Apple disputes obviousness of element [20.a] (POR, 76-77). Apple says: “Grounds 1 and 2 fail with respect to claim 20 for the same reasons as claim 1” (POR, 76). For the reasons explained earlier, however, Apple failed to rebut obviousness of independent claim 1. Thus, Apple has similarly failed to rebut obviousness of the additional recitations of dependent claim 20.

IV. CONCLUSION

Petitioner requests cancellation of the Challenged Claims.

Date: June 26, 2024

By: /Christopher TL Douglas /
Christopher TL Douglas

CLAIMS APPENDIX

<u>Claim</u>	<u>Recitation</u>
1.pre	An electronic device for detecting a user's cardiac signal, comprising:
1.a	an enclosure;
1.b	a heart sensor configured to detect the user's cardiac signal, the heart sensor comprising:
1.c.i	a first lead comprising a first pad that is embedded in a first portion of the enclosure,
1.c.ii	wherein an exterior surface of the enclosure comprises an exterior surface of the first portion, wherein the first pad is positioned underneath the exterior surface of the first portion, and
1.c.iii	wherein the first pad is configured to detect a first electrical signal of the user's cardiac signal via the user's skin's contact with the exterior surface of the first portion of the enclosure; and
1.d.i	a second lead comprising a second pad that is embedded in a second portion of the enclosure,
1.d.ii	wherein the second pad is configured to detect a second electrical signal of the user's cardiac signal via the user's skin's contact with at least one of the second pad and the second portion of the enclosure; and
1.e	a processor coupled to the heart sensor and configured to receive and process the detected cardiac signal, wherein the first lead further comprises a first connector coupled to the first pad and configured to provide the first electrical signal detected by the first pad to the processor, and wherein the second lead further comprises a second connector coupled to the second pad and configured to provide the second electrical signal detected by the second pad to the processor.
2.pre	The electronic device of claim 1,

<u>Claim</u>	<u>Recitation</u>
2.a	wherein the first portion and the second portion are located on opposite sides of the electronic device.
3.pre	The electronic device of claim 1,
3.a	wherein the first portion is electrically isolated from the second portion.
4.pre	The electronic device of claim 1, wherein:
4.a	the first portion is separated from the second portion by a third portion of the enclosure;
4.b	at least the third portion is constructed from a material having a first conductivity; and
4.c	the first conductivity is insufficient to transmit the first electrical signal from the first pad to the second pad via the third portion.
5.pre	The electronic device of claim 4, wherein:
5.a	the material having the first conductivity comprises one of aluminum and steel; and
5.b	the second pad is constructed from a silver based compound.
6.pre	The electronic device of claim 4, wherein:
6.a	the exterior surface of the enclosure further comprises an exterior surface of the second portion;
6.b	the second pad is configured to detect the second electrical signal of the user's cardiac signal via the user's contact with the exterior surface of the second portion;
6.c	the second pad is positioned from the exterior surface of the second portion by a thickness of the second portion;
6.d	at least the thickness of the second portion is constructed from material having a second conductivity; and

<u>Claim</u>	<u>Recitation</u>
6.e	the second conductivity is defined such that the second electrical signal is not able to be transmitted through material having the second conductivity over a distance larger than the thickness of the second portion.
7.pre	The electronic device of claim 6,
7.a	wherein the first pad and the second pad are positioned apart from one another at a distance larger than the thickness of the second portion by material having the second conductivity.
8.pre	The electronic device of claim 1, wherein:
8.a	the enclosure further comprises at least one pocket underneath the exterior surface of the enclosure; and
8.b	at least one of the first pad and the second pad is placed within the at least one pocket.
9.pre	The electronic device of claim 1, further comprising:
9.a	a display, wherein the enclosure supports the display, and wherein at least a portion of the exterior surface of the enclosure forms at least a portion of an exterior surface of the electronic device behind the display; and
9.b	a third lead embedded with the display, wherein the third lead is configured to detect a third electrical signal of the user's cardiac signal via the user's contact with at least one of the third lead and the display.
10.pre	The electronic device of claim 1,
10.a	wherein the second lead is configured to detect the second electrical signal of the user's cardiac signal via the user's contact with the second portion of the enclosure.
11.pre	The electronic device of claim 1,

<u>Claim</u>	<u>Recitation</u>
11.a	wherein the second lead is configured to detect the second electrical signal of the user's cardiac signal via the user's contact with the second lead.
12.pre	The electronic device of claim 1,
12.a	wherein the first portion of the enclosure is a bezel.
13.pre	The electronic device of claim 1,
13.a	wherein the second portion of the enclosure is a bezel.
14.pre	The electronic device of claim 1,
14.a	wherein an interior surface of the enclosure comprises an interior surface of the first portion, wherein the first pad is positioned on the interior surface of the first portion.
15.pre	An electronic device for detecting a user's cardiac signal, comprising:
15.a	an enclosure;
15.b	a display screen exposed to the user through an opening in the enclosure;
15.c	a heart sensor configured to detect the user's cardiac signal, the heart sensor comprising:
15.d.i	a first lead embedded in a first portion of the enclosure of the electronic device,
15.d.ii	wherein the first lead is configured to detect a first electrical signal of the user's cardiac signal via the user's contact with at least one of the first lead and the first portion of the enclosure of the electronic device; and
15.e.i	a second lead embedded in the display screen of the electronic device,

<u>Claim</u>	<u>Recitation</u>
15.e.ii	wherein the second lead is configured to detect a second electrical signal of the user's cardiac signal via the user's contact with at least one of the second lead and the display screen of the electronic device; and
15.f	a processor coupled to the heart sensor and configured to process the first and second electrical signals of the user's cardiac signal.
16.pre	The electronic device of claim 15,
16.a	wherein the first lead is configured to detect the first electrical signal of the user's cardiac signal via the user's contact with the first lead.
17.pre	The electronic device of claim 16,
17.a	wherein the second lead is configured to detect the second electrical signal of the user's cardiac signal via the user's contact with the second lead.
18.pre	The electronic device of claim 16,
18.a	wherein the second lead is configured to detect the second electrical signal of the user's cardiac signal via the user's contact with the display screen.
19.pre	The electronic device of claim 15, wherein:
19.a	the first portion of the electronic device comprises a bezel of the enclosure;
19.b	the electronic device further comprises a non-conductive component positioned between the bezel and the display screen for electrically isolating the first lead from the second lead.
20.pre	The electronic device of claim 15,
20.a	wherein the first lead is configured to detect the first electrical signal of the user's cardiac signal via the user's contact with the first portion of the enclosure.

<u>Claim</u>	<u>Recitation</u>
21.pre	The electronic device of claim 20,
21.a	wherein the second lead is configured to detect the second electrical signal of the user's cardiac signal via the user's contact with the second lead.
22.pre	The electronic device of claim 20,
22.a	wherein the second lead is configured to detect the second electrical signal of the user's cardiac signal via the user's contact with the display screen.

CERTIFICATION UNDER 37 C.F.R. §42.24

Under the provisions of 37 CFR §42.24, the undersigned hereby certifies that the word count for the foregoing Petition for inter partes review totals 5,599 words (Sections I-IV), which is less than the 5,600 allowed under 37 CFR §42.24(c)(1).

Date: June 26, 2024

By: / Christopher TL Douglas /
Christopher TL Douglas

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §§42.6(e), 42.105, the undersigned hereby certifies that true and correct copies of the above-captioned PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE and all associated exhibits were served via electronic mail to the following attorneys of record for Patent Owner:

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