

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

Case IPR2023-00948
Patent 10,866,619

PATENT OWNER'S RESPONSE

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RELEVANT CLAIM LANGUAGE

Claim 1	
[1.pre]	An electronic device comprising:
[1.a]	an enclosure having an enclosed volume and an opening formed in a sidewall;
[1.b]	a processor positioned in the enclosed volume;
[1.c]	a button assembly within the opening, the button assembly comprising: an input member having an input surface; and a biometric sensor positioned below the input member and configured to produce an output signal in response to a touch on the input surface, the output signal corresponding to a biometric characteristic;
[1.c.i]	a button assembly within the opening, the button assembly comprising: an input member having an input surface;
[1.c.ii]	[a button assembly within the opening, the button assembly comprising:]...a biometric sensor positioned below the input member and configured to produce an output signal in response to a touch on the input surface, the output signal corresponding to a biometric characteristic;

[1.d]	a seal positioned between a sealing surface of the button assembly and the enclosure;
[1.e]	a flexible conduit coupled to the biometric sensor and configured to transmit the output signal to the processor; wherein:
[1.f]	a portion of the flexible conduit is sandwiched between the seal and the sealing surface or between the seal and the enclosure.
Claim 2	
[2.pre]	The electronic device of claim 1, wherein the button assembly further comprises:
[2.a]	a tactile dome switch configured to compress in response to a press on the input surface;
[2.b]	a plunger positioned below the biometric sensor and above the tactile dome switch, the plunger displacing and compressing the tactile dome switch in response to the press on the input surface;
[2.c]	a retainer defining an aperture housing the plunger;
[2.d]	the retainer defines the sealing surface of the button assembly
Claim 3	
[3.pre]	The electronic device of claim 1, wherein:

[3.a]	the seal includes a gasket and a pressure sensitive adhesive (PSA) layer; and
[3.b]	the portion of the flexible conduit is positioned between the gasket and the sealing surface of the button assembly.
Claim 4	
The electronic device of claim 1, wherein the seal is overmolded around the portion of the flexible conduit.	
Claim 5	
The electronic device of claim 1, wherein the flexible conduit passes through an aperture in the seal.	
Claim 6	
The electronic device of claim 1, further comprising a passage extending from the opening to the enclosed volume, wherein the flexible conduit passes through the passage.	
Claim 7	
[7.pre]	The electronic device of claim 6, wherein:
[7.a]	an enclosure shelf is defined at the bottom of the opening;
[7.b]	the passage is formed in the enclosure shelf;
[7.c]	the seal encircles the passage.

Claim 8

The electronic device of claim 6, wherein the portion of the flexible conduit encircles the passage.

Claim 9

The electronic device of claim 1, wherein the biometric sensor is a fingerprint sensor and the biometric characteristic is a fingerprint.

Claim 10

The electronic device of claim 1, wherein: the biometric sensor comprises an array of capacitive sensing elements that are configured to detect either or both of ridges and grooves of a user's finger.

LIST OF EXHIBITS

APPLE-2001	Memorandum: Interim Procedure for Discretionary Denials in AIA Post - Grant Proceedings with Parallel District Court Litigation (June 21, 2022)
APPLE-2002	Plaintiff Apple Inc.’s Disclosure of Asserted Claims and Infringement Contentions, <i>Apple Inc. v. AliveCor, Inc.</i> , 22-CV07608-HSG (N.D.Cal Jul. 25, 2023)
APPLE-2003	Declaration of Michael Amon
APPLE-2004	Transcript of April 13, 2024 deposition of Dr. Ronald D. Berger
APPLE-2005	Ahmer Syed, “Packaging Challenges for the Next Generation of Mobile Devices,” IMAPS 2017 KEYNOTE SLIDES, 50th International Symposium on Microelectronics - Raleigh, NC USA, Oct. 9-12, 2017 (“Syed”)
APPLE-2006	U.S. Patent Publication No. 2017/0032169 (“Pi”)
APPLE-2007	U.S. Patent No. 8,031,186 (“Oestergaard”)
APPLE-2008	Order Granting Motion to Stay, <i>Apple Inc. v. AliveCor, Inc.</i> , 4-22-cv-07608 (NDCA Dec. 29, 2023)
APPLE-2009	Declaration and Curriculum Vitae of Dr. Brian Anthony

I. INTRODUCTION

The Petition challenges the patentability of claims 1-10 (“Challenged Claims”) of U.S. Pat. No. 10,866,619 (“the ’619 Patent”) based on alleged anticipation and obviousness in view of four references—Kim (Ex-1004), Jung (Ex-1005), Myers¹ (Ex-1007), and Chang (Ex-1015). The grounds advanced based on these references, however, have both substantive and procedural defects demonstrating that AliveCor has not shown that the Challenged Claims are unpatentable over the asserted prior art.

First, all grounds advanced in the Petition are deficient because AliveCor fails to demonstrate that the asserted prior art discloses or renders obvious the distinct requirements of the *button assembly* of claim 1 to (1) comprise a *biometric sensor*, (2) be *within [an] opening [formed in a sidewall]*, and (3) include a structural arrangement where *[a] portion of the flexible conduit* is *sandwiched* between (a) a *seal* and a *sealing surface*, or (b) the *seal* and the *enclosure*. Each

¹ The Petition incorrectly identifies Ex-1007 as “Meyers.” *See, e.g.,* Pet., vi. Exhibit 1007 lists “Myers” as the first-named inventor and this Response references Ex-1007 by “Myers.”

of the references asserted in the Petition fails to satisfy one or more of these requirements.

AliveCor attempts to mask these failures by advancing six distinct invalidity theories across four prior art references:

AliveCor's Invalidity Theory	Ground
Anticipation—Kim	1
Obviousness—Kim	1
Obviousness—Kim	2
Obviousness—Jung-Myers	3
Anticipation—Chang	4
Obviousness—Chang	4

As to anticipation in Ground 1 (based on Kim) and Ground 4 (based on Chang), AliveCor fails to identify a single embodiment that discloses each of the distinct requirements of the ***button assembly***. Instead, it improperly mixes teachings from distinct embodiments in a manner inconsistent with the law of anticipation. As to the obviousness challenges in Grounds 1 and 2 (based on Kim) and Ground 3 (based on Jung-Myers), neither AliveCor nor its expert witness, Dr. Ronald D. Berger, demonstrate that a person of ordinary skill in the art (“POSITA”) would have been (1) sufficiently motivated to combine the relevant prior art teachings, and (2) expected to reasonably succeed in doing so.

The grounds also suffer from technical deficiencies. Every ground makes a logical leap that—through simple modification—button assembly structures that

the asserted prior art teaches as being positioned on a front surface of an electronic device (e.g., screen surface) can somehow be transformed to be positioned on a lateral surface of the electronic device instead. In making this leap, AliveCor disregards the various technical hurdles and challenges that would have been known to a POSITA for such a modification. And, as explained by Apple's expert, Dr. Brian W. Anthony, the modification would have been anything but simple—it would “necessitate a new sensor design, involve using a different type of user input for fingerprint detection and/or recognition (e.g., from single touch input to swiping touch input), and also require additional complex software and electronics to monitor and account for mechanical scanning of a finger over a smaller available contact surface.” APPLE-2009, ¶80; *see also id.*, ¶¶60-66 (citing APPLE-2006, Abstract; APPLE-2007, Abstract, 1:14-37), 74-76. These and other challenges would have not only prevented a POSITA from being motivated to combine the asserted prior art as proposed by AliveCor, but also prevented any reasonable expectation of success.

Finally, AliveCor also advances two grounds against claim 4, but they rely only on general and conclusory expert testimony in addressing a *seal* that is *overmolded around [a] portion of [a] flexible conduit*. In Ground 2 (obviousness over Kim), AliveCor fails to demonstrate how the seal identified in Kim is allegedly *overmolded*. It instead points to speculative and uncorroborated expert

testimony that assumes, without sufficient justification, that a POSITA would have specifically opted to use overmolding—among several admitted forms of available component assembly techniques—to provide purported enhancements to the quality of the seal. In Ground 4 (obviousness over the Jung-Myers combination), AliveCor incorrectly maps a forming process in Jung involving product injection—a process that Jung expressly describes as being performed *after* sealing—to incorrectly satisfy the *overmolded* requirement.

For these reasons, Apple requests the Board to confirm the patentability of the Challenged Claims.

II. THE '619 PATENT

A. Description

The '619 Patent is generally focused on novel device assembly structures with specific and concrete manufacturing improvements to prevent liquid or other contaminants from damaging the internal electronics. Ex-1001, 1:14-22, 1:26-40. For example, a biometric button assembly may include an input member, e.g., a button, which is configured to receive inputs, for example, a fingerprint and finger press from a user of the electronic device. *Id.* at Abstr. Figure 1 of the '619 Patent is reproduced below (as annotated by the Panel in its Institution Decision).

APPLE-2009, ¶¶17-18.

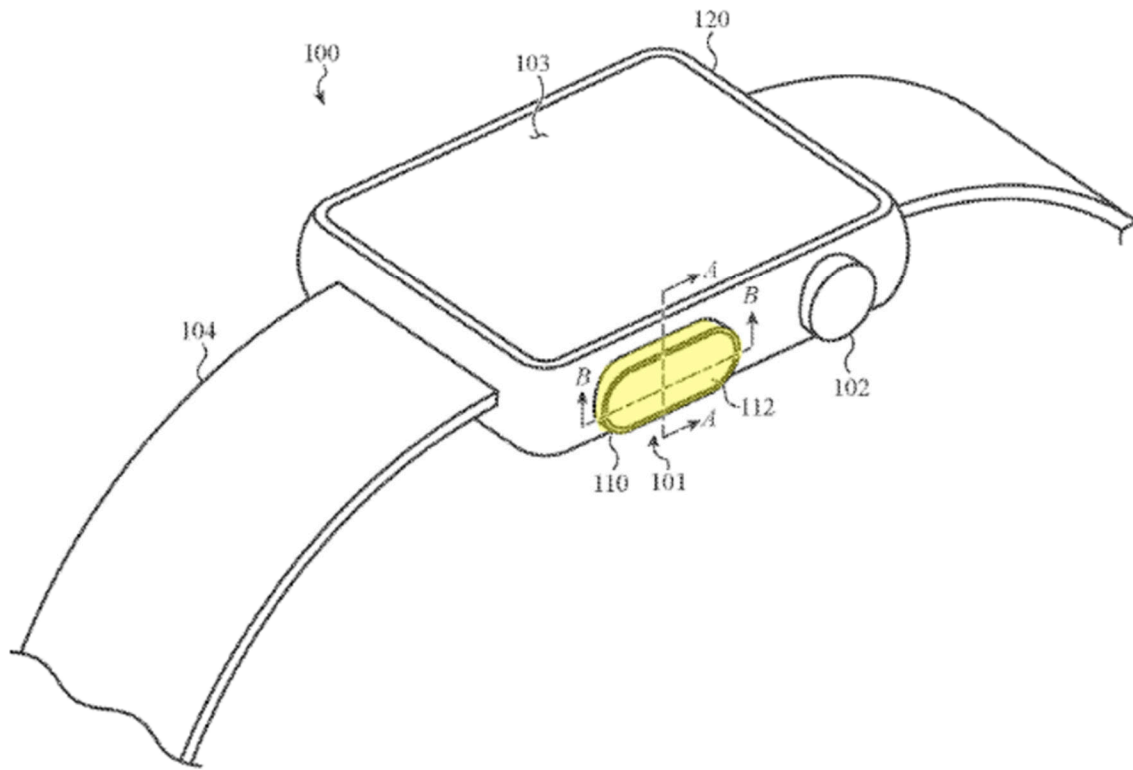


FIG. 1

Inst. Dec., 4 (citing Ex-1001, FIG. 1) (annotation in original)

As shown above, an electronic device 100, e.g., a watch, includes a biometric button assembly 110 (highlighted in yellow). Figure 2B shows a cross-sectional view of a biometric button assembly 210, which includes button housing 203, sensor 230 and flexible conduit 240 (highlighted in pink). APPLE-2009, ¶19.

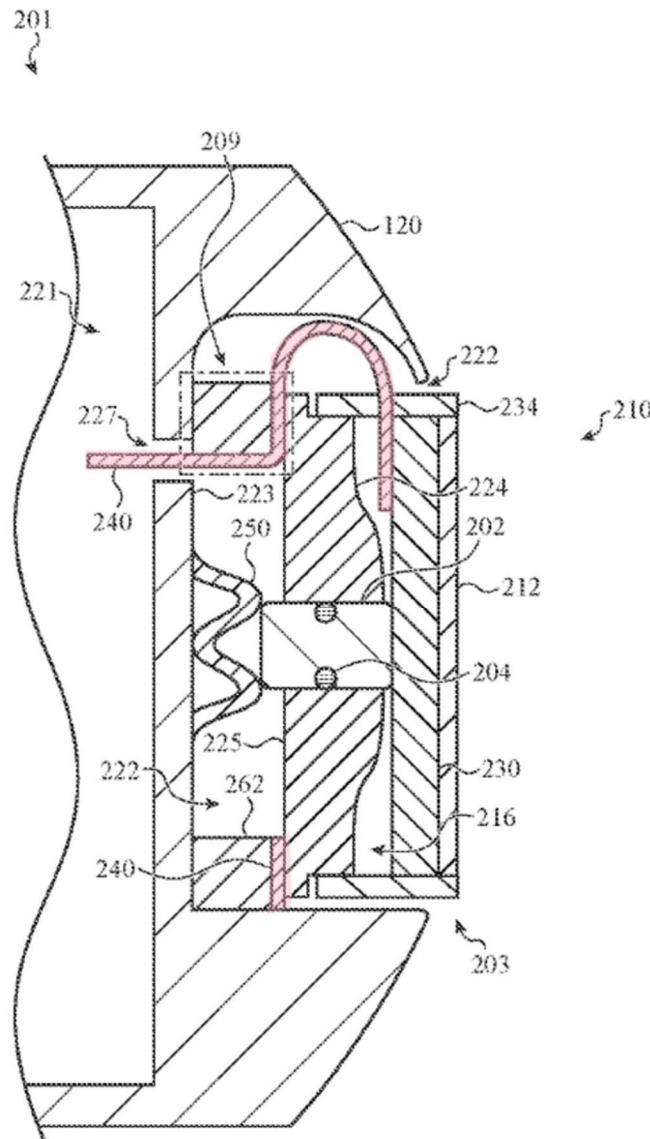


FIG. 2B

Inst. Dec., 5 (citing Ex-1001, FIG. 2B) (annotation in original)

Biometric sensor 230 may be a “fingerprint sensor of an array of capacitive sensing elements.” Ex-1001, 9:1-10. Upon a user touching input surface 212, the biometric sensor 230 “senses a change in capacitance or a value of capacitance of the array of capacitive sensing input surface 212” and further “produces an output

signal that includes the sensor measurements” that “corresponds to a fingerprint of the user.” *Id.* The output signal may be “processed by a processor positioned in an enclosed volume 221 of the electronic device” to “determine the user fingerprint.” *Id.*; APPLE-2009, ¶20.

B. Relevant Challenged Claim Features

Claim 1 is the only independent claim amongst the Challenged Claims and is directed to an *electronic device*² that includes at least the following limitations:

[1.a]³: an enclosure having an enclosed volume
and *an opening formed in a sidewall*;

...

[1.c]: a *button assembly within the opening*, the
button assembly comprising:

[1.c.i] an *input member* having an input
surface; and

[1.c.ii] a *biometric sensor* positioned below
the input member and configured to produce an
output signal in response to a touch on the input
surface, the output signal corresponding to a
biometric characteristic

² Claim language referenced in this Response is bolded and italicized throughout.

³ This Response adopts the numbering convention applied in the Petition for claim limitations. *See, e.g.*, Pet., 11.

[1.d] a *seal* positioned between a *sealing surface* of the button assembly and the enclosure; and

[1.e] a *flexible conduit* coupled to the biometric sensor and configured to transmit the output signal to the processor; wherein:

[1.f] a portion of the flexible conduit is *sandwiched* between the *seal* and the *sealing surface* or between the *seal* and the *enclosure*.

See Ex-1001 at 26:64-27:7 (emphasis added)

Through antecedent basis, the claim language recited in limitations [1.a], [1.c], and [1.c.ii] impose two separate requirements on the *button assembly*—that it (1) comprise *a biometric sensor*, and (2) is *within [an] opening [formed in a sidewall]*. Further, based on a structural arrangement recited in limitation [1.f] for the *seal* and *sealing surface* (recited in limitation [1.d]) and the *flexible conduit* (recited in limitation [1.e]), the *button assembly* further requires that *a portion of the flexible conduit* is *sandwiched* between (a) the *seal* and the *sealing surface*, or (b) the *seal* and the *enclosure*. *See* Ex-1001, 26:64-27:7; APPLE-2009, ¶¶21-22.

III. LEVEL OF ORDINARY SKILL

On or about the claimed priority date of the '619 Patent, a POSITA would have had at least a bachelor's degree in electrical engineering, mechanical engineering, biomedical engineering, computer engineering, physics, or a related field, and would have had at least two years of relevant work experience with

capture and processing of data or information, including but not limited to physiological information, or equivalents thereof. APPLE-2009, ¶¶23-24. Less work experience may be compensated by a higher level of education and vice versa. *Id.*

IV. CLAIM INTERPRETATION

A. *Biometric Characteristic*

This term does not require an express construction because claim terms only require construction “to the extent necessary to resolve the controversy.” *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011) (citing *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)); APPLE-2009, ¶¶25-27. While AliveCor expressly construes *biometric sensor* to mean “a human characteristic that is so distinctive and measureable [*sic*] that a particular human individual may be identified,” the Petition fails to explain why such a construction is even required. Pet., 5-6. Further, the counterpart litigation involving the '619 Patent was stayed before the parties progressed to claim construction proceedings. *See* APPLE-2004.

Regardless, the proposed construction is improper. AliveCor characterizes the use of “as used herein” as representing “definitional syntax,” but fails to demonstrate how this rises to the level of the lexicographer rule. *Merck & Co. v. Teva Pharms. USA*, 395 F.3d 1364, 1370 (Fed. Cir. 2005) (“When a patentee acts

as his own lexicographer in redefining the meaning of particular claim terms away from their ordinary meaning, he must clearly express that intent in the written description”). AliveCor also ignores the use of permissive language in the same sentence:

A “biometric characteristic” or a “biometric identifier,” as used herein, **may refer to** a human characteristic that is so distinctive and measureable that a particular human individual may be identified. Fingerprints and DNA are example biometric characteristics.

Ex-1001, 5:9-14

AliveCor further overlooks disclosure within the '619 Patent specification confirming that the above-referenced description should not be deemed definitional. Certain examples of the “biometric sensor” (which senses the “biometric characteristic”) include a “sensor that can identify or determine a human physical characteristic” and “provid[es] an output that corresponds to a biometric characteristic,” such as “fingerprint, palm veins, DNA, heart rate, and blood pressure.” Ex-1001, 4:51-67. But “heart rate” and “blood pressure” are embodiments of biometric characteristics that are specifically excluded from AliveCor’s proposed construction because they are not sufficiently distinctive to enable identification of a particular human individual. APPLE-2009, ¶28; *see Oatey Co. v. IPS Corp.*, 514 F.3d 1271, 1276 (Fed. Cir. 2008) (“We normally do

not interpret claim terms in a way that excludes embodiments disclosed in the specification”); *see also Verizon Servs. Corp. v. Vonage Holdings Corp.*, 503 F.3d 1295, 1305 (Fed. Cir. 2007) (rejecting proposed claim interpretation that would exclude disclosed examples in the specification); *Invitrogen Corp. v. Biocrest Mfg., L.P.*, 327 F.3d 1364, 1369 (Fed. Cir. 2003) (finding district court's claim construction erroneously excluded an embodiment described in an example in the specification, where the prosecution history showed no such disavowal of claim scope).

There also is no (and AliveCor also fails to identify any) disclaimer in the '619 Patent specification, or during prosecution, that would warrant a construction excluding disclosed embodiments. *Oatey*, 514 F.3d at 1277 (“...where claims can reasonably be interpreted to include a specific embodiment, it is incorrect to construe the claims to exclude that embodiment, absent probative evidence on the contrary”); APPLE-2009, ¶29. As recited in claim 1, a ***biometric sensor*** is ***configured to produce an output signal [corresponding to a biometric characteristic] in response to a touch on the input surface***. This limitation can be reasonably interpreted to encompass embodiments of the ***biometric sensor*** where “an input (e.g., a touch, a press, or the like) occurs” and a “measure of the input” includes “a measurement of absolute capacitance or capacitance change” to determine, for example, a biometric characteristic of “heart rate.” Ex-1001, 4:51-

67; *see also id.*, 8:60-9:10, 10:37-48; APPLE-2009, ¶30. Thus, the plain and ordinary meaning of the claim language itself accurately captures the scope of the invention, and there is no need for construction.

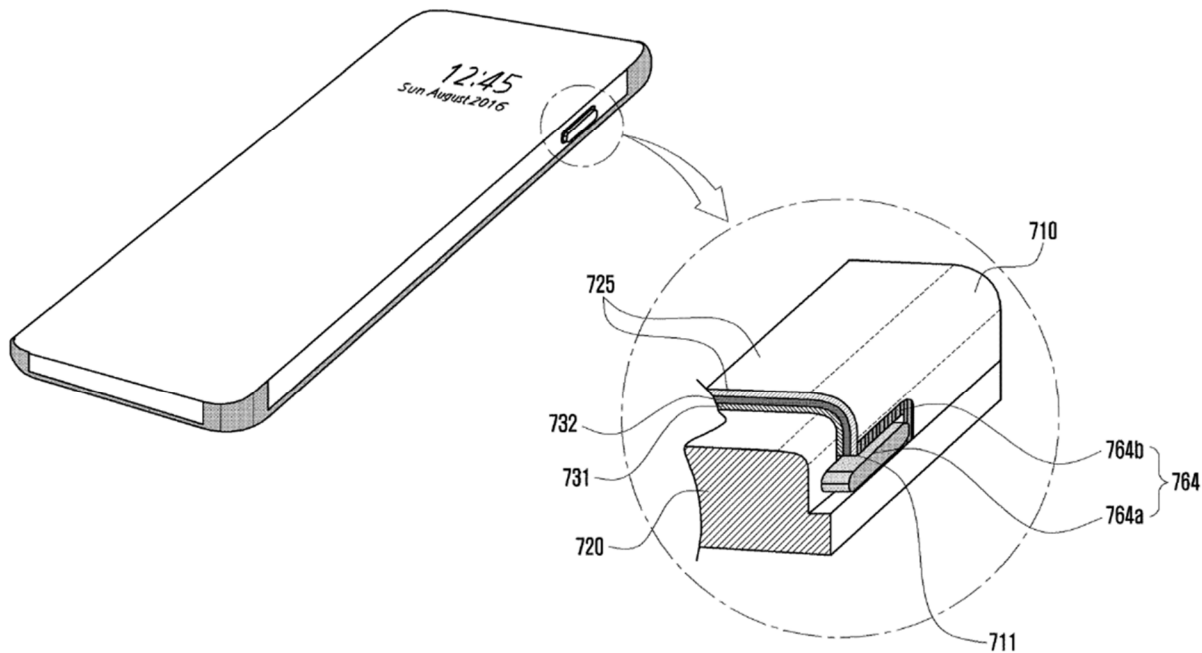
V. THE ASSERTED PRIOR ART

A. Kim (Grounds 1, 2)

Kim teaches an electronic device, such as a mobile phone or tablet, including housing 720, a physical button 760a located in an opening of housing 720, and a processor located within housing 720 connected to button 760a. *See* Ex. 1004, Abstr. (“[A] processor located inside the housing and electrically coupled to the display and the mechanical button.”), 4:19-21; APPLE-2009, ¶31.

Kim’s disclosure is generally focused on providing examples of a “combined button” within an electronic device. Ex-1004, 1:14-16; APPLE-2009, ¶32. The “combined button” is a “combined mechanical and virtual button.” *Id.* In various embodiments, the “combined button” is “implemented as a combination of a physical button and a virtual button in response to an increase in screen size...” *Id.*, 2:30-34. One example of such an embodiment of the “combined button” is shown in Figure 10:

FIG. 18



Ex-1004, FIG. 18

In the Figure 18 embodiment, “the combined button is located on the lateral surface (or the back surface) of the electronic device 701.” Ex-1004, 17:23-30; APPLE-2009, ¶34.

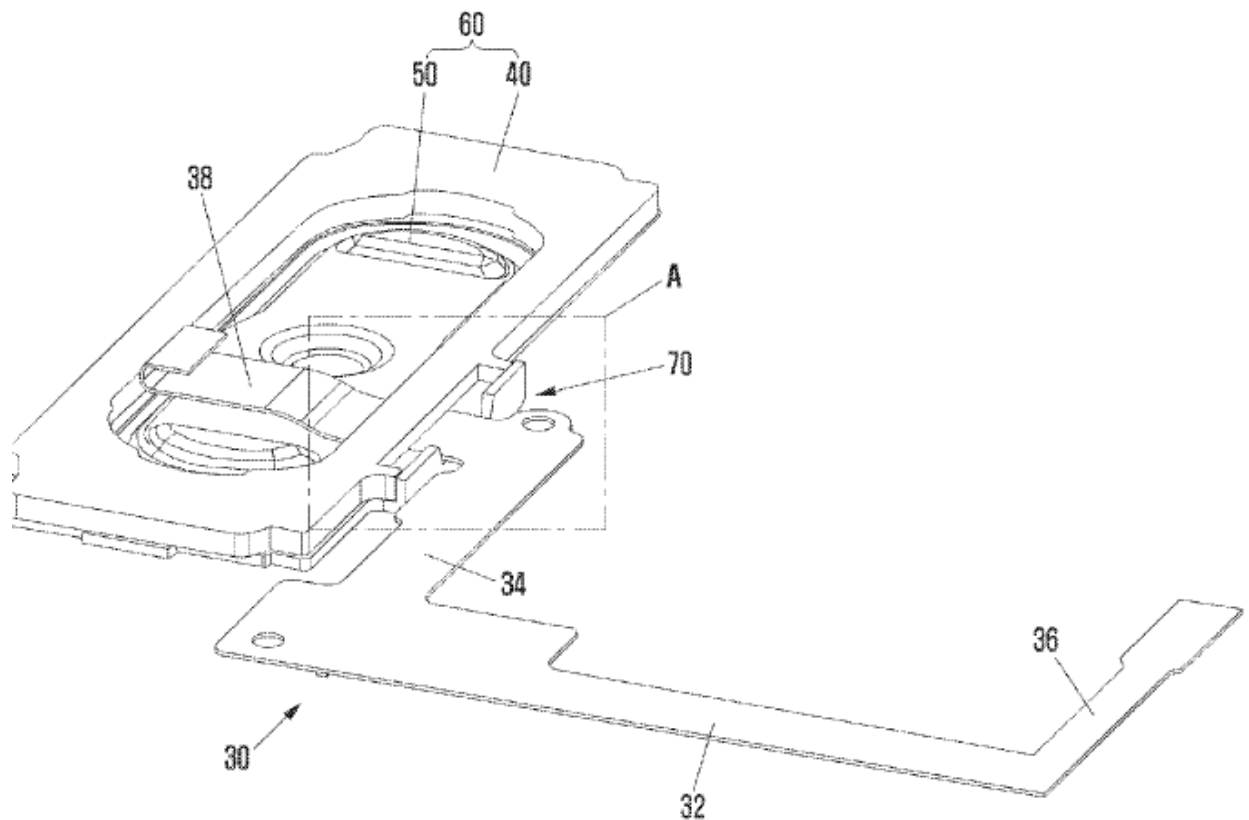
B. Jung (Ground 3)

Jung describes “an electronic device and a method of waterproofing a key” using a “key-waterproof structure.” Ex-1005, Abstract. This structure includes “an insert-injected product that includes an insert-injected sealing area, and a bonding area where a silicon-not-attached portion is formed.” *Id.* Figure 10 shows

the insert-injected product to which a flexible printed circuit board is assembled.

APPLE-2009, ¶35.

FIG. 10



Ex-1005, FIG. 10

C. Myers (Ground 3)

Myers describes “structures and methods...for packaging a biometric sensor, such as a capacitive biometric sensor.” Ex-1007, Abstract. Figure 1 shows “an assembly of parts disposed to form the fingerprint recognition sensor 102 circuit

and position the sensor 102 circuit below a push button.” Ex-1007, [0042];

APPLE-2009, ¶36.

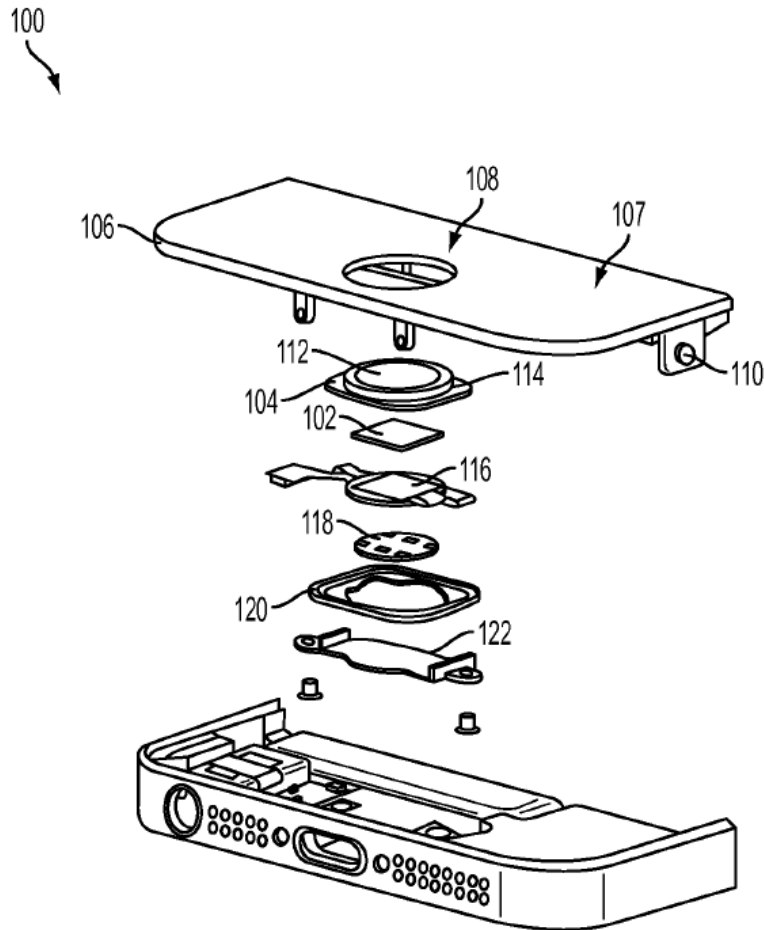


FIG. 1

Ex-1007, FIG. 1

D. Chang (Ground 4)

Chang describes an “electronic device including an input device in which an instable waterproof point is removed and a key click feeling is improved with a

simple structure.” Ex-1015, 1:54-57. This is accomplished using a “key module,” which may include “a fingerprint recognizing member.” Ex-1015, 2:25-39. Figure 3 shows a “key module 20” with several sub-components, including button structure 400 (further including cover layer 410, annular structure 430, fingerprint recognizing member 450), flexible conductive member 500, and sealing member 600. Ex-1015, 7:31-8:41; APPLE-2009, ¶37.

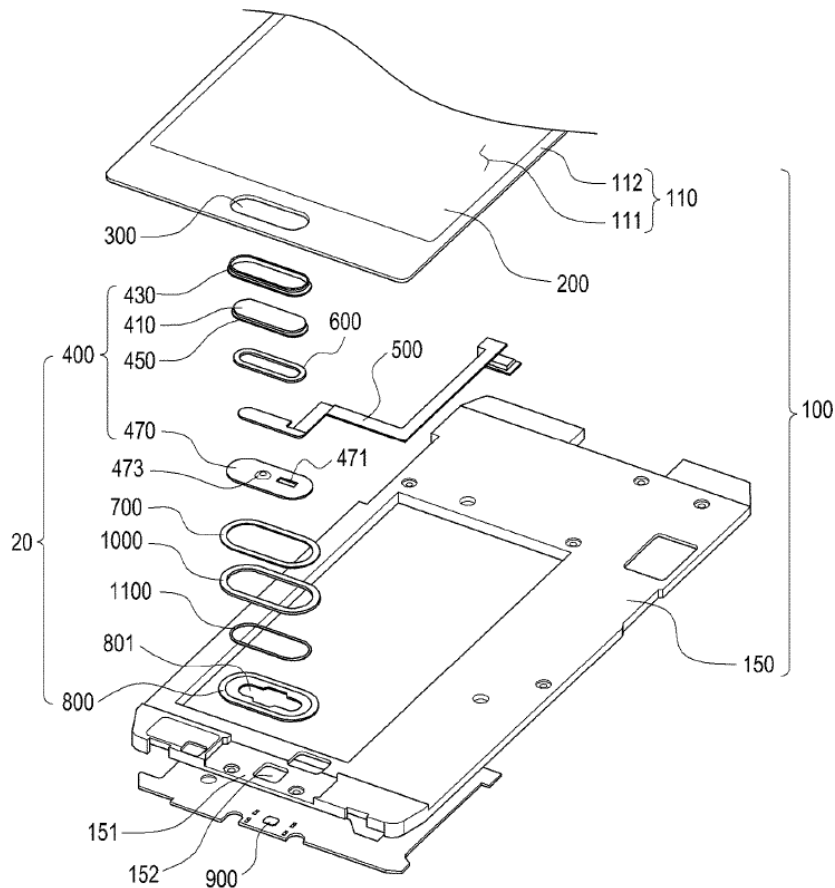


FIG.3

Ex-1015, FIG. 3

VI. ALIVECOR FAILS TO MEET ITS BURDEN OF SHOWING THAT THE CHALLENGED CLAIMS ARE UNPATENTABLE

A. All Grounds Fail Because The Asserted Prior Art Does Not Disclose Or Render Obvious The *Button Assembly* Recited In Claim 1

As explained in §IV.B, *supra*, the *button assembly* recited in claim 1 is required to (1) comprise a *biometric sensor*, (2) be *within [an] opening [formed in a sidewall]*, and (3) include a structural arrangement where *[a] portion of the flexible conduit* is *sandwiched* between (a) a *seal* and a *sealing surface*, or (b) the *seal* and the *enclosure*. Each of the asserted prior art references asserted by AliveCor fails to satisfy one or more of these requirements. APPLE-2009, ¶38.

*1. No Single Embodiment Within The Asserted Prior Art Satisfies The Requirements Of The **Button Assembly***

a) Ground 1—AliveCor’s Mappings To Kim Require Combining Distinct Embodiments

Kim does not teach a single embodiment that satisfies each of the requirements of the *button assembly* recited in claim 1. *See* §IV.A, *supra*. *Net Moneyin v. Verisign*, 545 F.3d 1359, 1371 (Fed. Cir. 2008) (“it is not enough that the prior art reference discloses part of the claimed invention, which an ordinary artisan might supplement to make the whole, or that it includes multiple, distinct teachings that the artisan might somehow combine to achieve the claimed invention”). AliveCor’s anticipation challenge fails as a matter of law because it combines two distinct embodiments, e.g., Kim’s Figure 10 and Figure 18

embodiments, and the Petition fails to address why a POSITA would have combined these embodiments to achieve the **button assembly** recited in claim 1. Indeed, the Petition merely assumes the button shown in Figure 10(b) is the same “combined button” shown in Figure 18, arguing that “Figure 18 shows ‘a **combined button**’” and that “Figure 10(b) shows a ‘cross-sectional view of [the] **combined button**.’” Pet., 17. But Kim is clear that Figure 10(b) shows “a cross-sectional view of *a* combined button of an electronic device according to still another embodiment”—not the embodiment of Figure 18. Ex-1004, 21:20-22. Dr. Berger also confirmed that Figure 18 shows “a different embodiment” than Figure 10. APPLE-2004, 70:8-9; *see also id.*, 96:9-13; APPLE-2009, ¶39.

AliveCor’s anticipation theory based on Kim requires each of the Figure 10 and Figure 18 embodiments, because neither embodiment—alone—satisfies every requirement of the **button assembly**. As explained in §IV.A, these requirements include (1) comprising a **biometric sensor**, (2) being **within [an] opening [formed in a sidewall]**, and (3) including a structural arrangement where **[a] portion of the flexible conduit** is **sandwiched** between (a) a **seal** and a **sealing surface**, or (b) the **seal** and the **enclosure**. Based on AliveCor’s own mapping to the **sidewall** limitations, Kim’s Figure 10 embodiment fails to satisfy requirement (2) because the “combined button” is not positioned in **within [an] opening** that is **formed in a sidewall**. Kim’s Figure 18 embodiment fails to satisfy requirement (3) because

there is no component purportedly representing *a portion of [a] flexible conduit* that is *sandwiched between* components representing (a) *the seal* and *the sealing surface* or (b) *the seal* and *the enclosure*. APPLE-2009, ¶¶40-41.

Further, to establish anticipation, the proper analysis demands that an asserted prior art reference “clearly and unequivocally” direct “those skilled in the art to the [invention] without any need for picking, choosing, and combining various disclosures not directly related to each other by the teachings of the cited reference.” *See In re Arkley*, 455 F.2d 586, 587 (C.C.P.A. 1972). The Petition identified no such teaching within Kim that would have led a POSITA to, for example, implement the components of the fingerprint button assembly of the Figure 10 embodiment into the button assembly of the Figure 18 embodiment positioned in a lateral surface of an electronic device. Indeed, as discussed in §VI.2(a)(3) and §VI.2(a)(4), *infra*, not only would a POSITA have lacked sufficient motivation to implement the proposed combination, the POSITA also would not have had a reasonable expectation of success in implementing it. *See* APPLE-2009, ¶¶60-66 (citing APPLE-2006, Abstract; APPLE-2007, Abstract, 1:14-37), 74-76.

Finally, AliveCor’s statement that “Kim further contemplates the ‘combined button’ is a button assembly within an opening formed in a sidewall” conveniently supports its theory of Kim without support based on how Kim uses the “combined

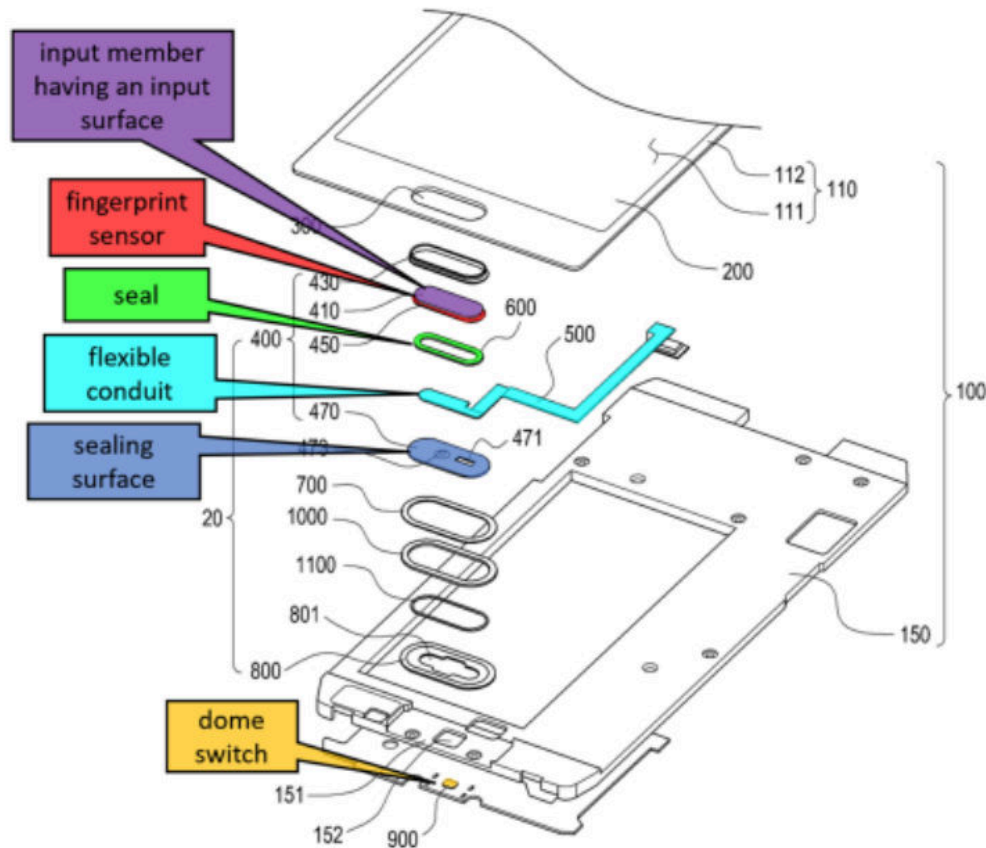
button” term. Pet., 14 (citing Ex-1004, 13:46-53, 17:10-12). To be clear, Kim describes the “combined button” as a button “implemented as a combination of a physical button and a virtual button.” Ex-1004, 2:30-34; *see* APPLE-2004, 73:6-20. This description does not equate the term to a button assembly with specific components (e.g., fingerprint sensor) with a specific positioning configuration within an electronic device (e.g., in an opening formed on a lateral surface). Kim’s Figure 6 embodiment, for example, includes an example of the “combined button” without a fingerprint sensor. Ex-1004, 16:48-54 (identifying “button 660” as the “combined button”). Thus, Kim’s usage of the “combined button” term within the descriptions of its Figure 10 and Figure 18 embodiments does not itself suggest that Kim contemplates combining the teachings of each embodiment. And it certainly would not have led a POSITA to combine their teachings to purportedly arrive at the ***button assembly***. APPLE-2009, ¶¶42-43.

b) Ground 4—Each Of AliveCor’s Two Types of Mappings to Chang Are Flawed

AliveCor’s anticipation challenge in Ground 4 also fails as a matter of law because it either relies on an embodiment in Chang that fails to satisfy all requirements of the ***button assembly*** or combines two allegedly “alternative” embodiments of Chang (“the Chang Combination”), but fails to sufficiently address how a POSITA would have arranged elements of Chang to achieve the

button assembly. See *Net Moneyin*, 545 F.3d, at 1369 (“[a] prior art reference—in order to anticipate under 35 U.S.C. § 102—must not only disclose all elements of the claim within the four corners of the document, but must also disclose those elements ‘arranged as in the claim.’”) (citing *Connell v. Sears, Roebuck Co.*, 722 F.2d 1542, 1548 (Fed. Cir. 1983)).

As to the first challenge (anticipation based on Chang without modification), AliveCor relies on the assembly of Chang’s key module shown in Figure 3. See Pet., 81-101. APPLE-2009, ¶45.



Pet., 81 (annotations in original)

But Chang's key module, when assembled, would not have provided an arrangement such that a circular portion of flexible conductive member 500 (mapped to the *flexible conduit*) is *sandwiched* between the sealing member 600 (mapped to the *seal*) and the lower plate 470 (mapped to the *sealing surface*) as required by limitation [1.f]. *See* Pet., 91-101. Instead, when assembled, conductive member 500 (mapped to *flexible conduit*) is not positioned below the sealing member 600 (mapped to *seal*). Further, the arrangement does not provide any portion of conductive member 500 that is *sandwiched* between the sealing member 600 and the lower plate 470 (mapped to the *sealing surface*). APPLE-2009, ¶46.

The assembly of the components of Chang's key module (shown in Figure 3) is confirmed by Chang's Figure 10 (below). As shown, in a cross section of the Chang's key module, a portion of conductive member 500 (highlighted in teal) is arranged co-planar with (i.e., not positioned below) the sealing member 600 (highlighted in green) and lower plate 470 (highlighted in blue). APPLE-2009, ¶47.

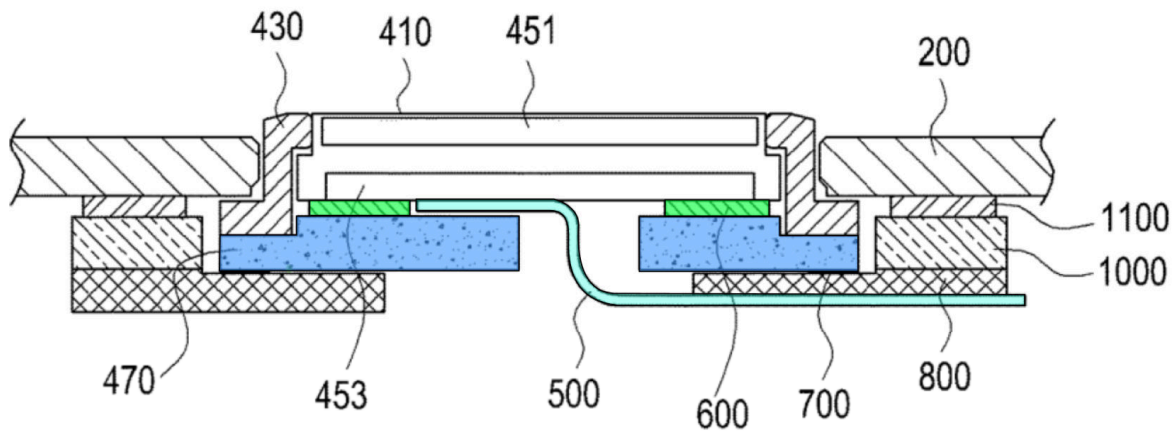
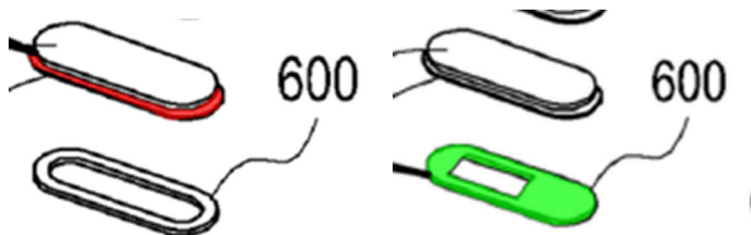


FIG. 10

Ex-1015, FIG. 10 (annotated)

As to the second anticipation challenge (based on the Chang Combination), AliveCor's combination demands altering the original annular structure of sealing member 600 (below, left) with a solid structure that includes a rectangular window (below, right). APPLE-2009, ¶48.



Pet., 92 (left; annotations in original); Pet., 94 (right; annotations in original)

To support this alteration, AliveCor mischaracterizes Chang as referring to the altered structured as an “[a]lternative’ embodiment.” See Pet., 96 (citing Ex-1015,

14:24-29). *See* APPLE-2009, ¶¶49-50. According to AliveCor, Chang indicates “a POSITA would have understood that Chang also teaches a sealing member 600 that is *not* designed in an annular or ring shape.” Pet., 96 (citing Ex-1015, 14:24-29). But the cited portion of Chang (reproduced below) fails to provide any teaching or suggestion that sealing member 600 may be configured in the specific manner proposed by AliveCor:

According to an example embodiment, the first sealing member 600 may be disposed between the fingerprint recognizing member 450 and the lower plate 470 and/or between the fingerprint recognizing member 450 and the annular structure 430. Alternatively, the first sealing member 600 may be designed in an annular shape (e.g., a loop or ring shape), which corresponds to the entire shape of the key module 20 and includes an opening so as to allow the flexible conductive member 500 to extend therethrough.

Ex-1015, 14:20-28; *see id.*, FIG. 3

AliveCor seemingly implies that the word “[a]lternatively” suggests the possibility of alternative *shapes* being contemplated by Chang for sealing member 600. But instead, the word “[a]lternatively” in the cited portion refers to alternative arrangements of components (e.g., sealing member 600, recognizing member 450, lower plate 470) within Chang’s key module. APPLE-2009, ¶51.

Thus, in Ground 4, AliveCor's anticipation challenge is deficient regardless of whether AliveCor relies on Chang's disclosure without modification or on the Chang Combination. The first challenge (based on Chang without modification) is deficient because AliveCor's mapping fails to satisfy the *sandwiched* arrangement recited in limitation [1.f]. The second challenge (based on the Chang Combination) requires combining multiple embodiments within Chang, and the relied-upon disclosure (which AliveCor mischaracterizes to support its proposed combination) fails to provide any indication that a POSITA would have arrived at the Chang Combination based on the teachings within Chang. *See Net Moneyin*, 545 F.3d, at 1371; APPLE-2009, ¶52.

2. *A POSITA Would Not Have Combined The Asserted Prior Art*

a) Grounds 1/2—The Kim Combination Is Defective

In Grounds 1 and 2, AliveCor combines Kim's Figure 10 and Figure 18 embodiments ("the Kim Combination") by positioning the fingerprint sensor assembly of the Figure 10 embodiment on a lateral surface of a device of the Figure 18 embodiment. *Pet.*, 10. But AliveCor incorrectly assumes that Kim's Figure 10 button is the same button as the Figure 18 button, and fails to offer sufficient explanation of motivation to combine or reasonable expectation of success that would support using the Figure 10 button in the Figure 18

embodiment. These failings alone render the Petition deficient. APPLE-2009, ¶53.

Kim also fails to demonstrate obviousness of the **button assembly** because (1) Kim's disclosure does not support the combination, (2) a POSITA would not have been motivated to implement the combination, (3) a POSITA would not have had a reasonable expectation of success in implementing the combination, and (4) the combination fails to satisfy the requirement of *a biometric sensor positioned below the input member* recited in limitation [1.c.ii]. Further, the Kim Combination is the product of hindsight, e.g., to satisfy the requirements of *sandwiched* arrangement recited in limitation [1.f] for the **button assembly**. See §VI.A.2(a)(4), *infra*; APPLE-2009, ¶54.

(1) Kim's Disclosure Does Not Support The Kim Combination

Neither AliveCor nor Dr. Berger even address why a POSITA would have sought to combine teachings of Kim's Figure 10 and Figure 18 to arrive at the Kim Combination. AliveCor appears to presuppose the existence of the Kim Combination in addressing the requirements of claim 1, without actually identifying, for example, an advantage that would have been apparent to a POSITA and thereby motivated the combination. See Pet., 11-28. Such discussion is

similarly absent in Dr. Berger's declaration.⁴ See Ex-1003, ¶¶98-146. This type of cursory analysis is not sufficient to establish obviousness. *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (“...there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness”) (citing *In re Kahn*, 441 F. 3d 977, 988 (CA Fed. 2006)); APPLE-2009, ¶55.

Kim clearly and unambiguously discloses Figures 10 and 18 as being directed to distinct embodiments. See, e.g., Ex-1004, 17:17-22 (“FIG. 18 shows a perspective view of an electronic device and a partially enlarged view of an indicated area of the electronic device including a combined button of an electronic device **according to one embodiment**”); 21:20-22 (“FIGS. 10(a) and 10(b) show a front view and a cross-sectional view of a combined button of an electronic device

⁴ For example, Dr. Berger states that “*Kim* further contemplates that the “combined button” is a button assembly within an opening formed in a sidewall,” but fails to explain *why* a POSITA would have positioned components of the fingerprint assembly within Kim's Figure 10 embodiment into the opening formed in a sidewall. Ex-1003, ¶120. In deposition, Dr. Berger admitted that paragraph 119 of his declaration modified disclosure from Kim to satisfy the requirements of the ***button assembly*** recited in claim 1. APPLE-2004, 92:17-93:12.

according to still another embodiment.”) Ex-1004, 21:20-22. Moreover, each embodiment contemplates a different positioning of the “combined button” within a mobile device. In the Figure 18 embodiment, “the combined button is located on the **lateral surface** (or the back surface) of the electronic device 701” (*id.*, 17:23-30), while the Figure 10(b) embodiment provides “an example of the combined button **in the display 710**” (*id.*, 21:23-26). The Petition fails to address the implications of this difference in positioning entirely. APPLE-2009, ¶56.

In contrast, as explained by Apple’s expert witness, Dr. Brian W. Anthony, the difference in positioning of the “combined button” between Kim’s Figure 10 and Figure 18 embodiments would have not only meaningfully impacted the complexity of implementing fingerprint sensor assembly components, but also would have impacted several technical considerations that would have been understood by a POSITA to create issues for fingerprint detection and/or recognition accuracy. *See* APPLE-2009, ¶¶60-66 (citing APPLE-2006, Abstract; APPLE-2007, Abstract, 1:14-37), 74-76.

Indeed, as Dr. Anthony explains, “a POSITA would have understood that button 760 shown in Figure 10(b) cannot simply be taken and used as the button 764 in Figure 18.” APPLE-2009, ¶57. These buttons have different shapes and sizes, and the surface area of the device at the front (Figure 10(b)) and lateral (Figure 18) surfaces of the device is significantly different. *Id.*

The arrangement of enclosure 720 at each button is also significantly different. APPLE-2009, ¶58. Enclosure 720 in Figure 18 extends to a location adjacent the lower side of the button 764. Enclosure 720 in Figure 10(b) is oriented below and spaced apart from the button 760. *Id.* In Figure 10(b), the cover glass 725, the display panel 731, and the touch screen panel 732 surround the button 760, whereas these components merely abut an upper side of the button 764 in Figure 18. In Figure 18, the first and second protective layers 707 and 708 and the force touch panel 730 are missing or at least oriented in a completely different way, which is impactful because the sealing rubber 722 in Figure 10(b) is “adhered to the force touch panel 730.” Ex-1004, 22:17-42. The recesses 760r1 and 760r2 separated by the sealing rubber 722 are missing in Figure 18 and could not be formed in the same way as in Figure 10(b) given the different orientations of the components at the different locations. APPLE-2009, ¶58.

To summarize, as Dr. Anthony explains, “modifications would be needed in terms of the size and shape of the components of the button assembly, how you seal the button, and how you route electrical connections to the button.” APPLE-2009, ¶58. AliveCor does not account for these considerations, much less explain how a POSITA would have modified the Figure 10(b) button to make it work in the Figure 18 embodiment, and still meet all requirements of the **button assembly**. For these reasons, Kim’s disclosure does not suggest using the button 760 of

Figure 10 in the Figure 18 embodiment, and AliveCor has not demonstrated obviousness.

(2) A POSITA Would Not Have Been Motivated To Implement The Kim Combination

A POSITA would not have found the Kim Combination obvious because fingerprint detection and/or recognition in Kim's Figure 10 embodiment requires "compos[ing] fingerprint images 241a and 241b respectively obtained by the first and second fingerprint sensors into a single image 241." Ex-1004, 21:63-22:3. But nothing in Kim teaches or suggests incorporating this specific sensor configuration into the optional fingerprint sensor of the "combined device" of the Figure 18 embodiment. APPLE-2009, ¶67.

The most relevant disclosure relating to Kim's Figure 18 embodiment that contemplates a fingerprint sensor provides no further indication that the fingerprint sensor would have included specific fingerprint sensing elements of the Figure 10 embodiment (e.g., fingerprint sensors 240p1, 240p2):

Under the physical button 764a of the power button 764, a sensor (e.g., a fingerprint sensor) may be disposed. The fingerprint sensor may include an optical fingerprint sensor, a capacitive fingerprint sensor, or an ultrasonic fingerprint sensor.

Ex-1004, 19:26-30

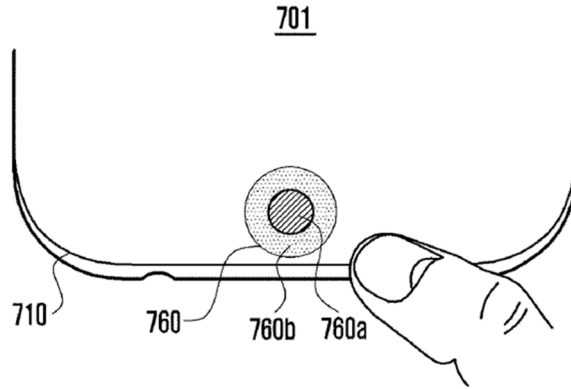
Thus, this paragraph, alone, fails to provide sufficient motivation for the Kim Combination. *See generally* Ex-1004, 21:42-22:3. And AliveCor fails to identify any other disclosure that would have led a POSITA to envisage such a configuration. *See generally* Ex-1004, 19:26-30, 21:42-22:3; APPLE-2009, ¶68.

Further, Kim’s descriptions of its Figure 10 embodiment confirm that the inclusion of fingerprint sensors 240p1 and 240p2 is critical to the specific type of fingerprint detection technique used by this embodiment. APPLE-2009, ¶69. Both sensors are used to collect “fingerprint images 241a and 241b,” which are then combined “into a single fingerprint image 241.” Ex-1004, 21:63-22:3. Kim further teaches that fingerprint sensor 240p2 is “disposed between the cover glass 725 and the touch screen panel 732.” Ex-1004 at 22:18-27. Moreover, the fingerprint sensor assembly employed in the Figure 10 embodiment includes a virtual button located on the device display. *See* Ex-1004, 21:42-22:3; *see also id.*, 17:53-61; APPLE-2009, ¶¶70-72. Indeed, as Dr. Anthony explains, “positioning differences of fingerprint sensor assemblies within electronic devices are non-trivial differences, because each implicate different manufacturing processes, sensor designs and constructions, touch input detection mechanisms, among other factors.” APPLE-2009, ¶73.

- (3) A POSITA Would Not Have Had A Reasonable Expectation of Success In Implementing the Kim Combination

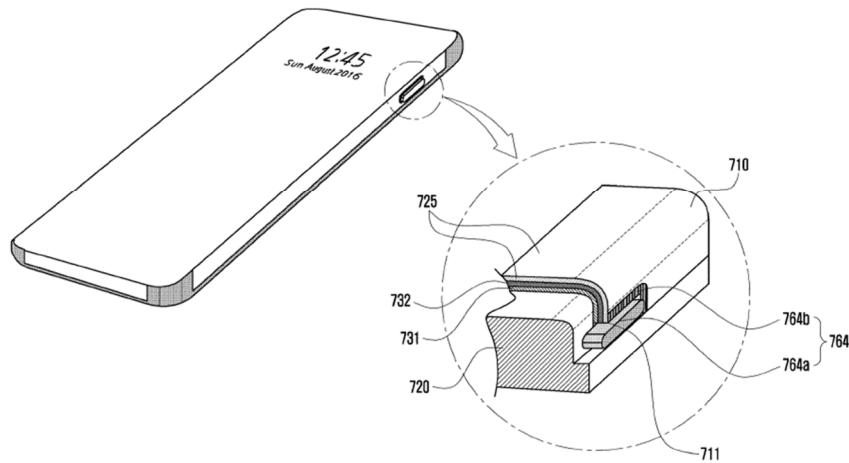
A POSITA would have also perceived various disadvantages created by the Kim Combination. APPLE-2009, ¶¶74-76. As one example, implementing the fingerprint sensor assembly of Kim's Figure 10 embodiment in the "lateral surface" of Kim's Figure 18 embodiment would have complicated the manufacturing process for the resulting mobile device. *Id.*, ¶77. Moreover, challenges associated with incorporating sophisticated fingerprint sensors on the lateral surface of a mobile device were well-known around Kim's filing date. *Id.*, ¶75 ("fingerprint sensors are often relatively large and require significant space, which makes integrating them into the slim sides of a smartphone a challenge").

The positioning of the fingerprint sensor on the lateral surface of a mobile device would have also reduced fingerprint detection accuracy by, for example, reducing the surface area available for touch input for fingerprint detection. APPLE-2009, ¶78. As shown below, the "front surface" of Figure 10(a) provides the opportunity to implement a fingerprint sensor with a larger surface area for touch input detection relative to the "lateral surface" of Figure 18. *Id.*; *see* Ex-1004, 17:23-30.



(a)

FIG. 18



Ex-1004, FIG. 10(a) (top), FIG. 18 (bottom)

In deposition, Dr. Berger testified that “capturing a certain amount of surface area may improve [fingerprint detection] accuracy,” confirming a POSITA’s preference to seek fingerprint sensor implementations that *maximize* surface area for receiving touch input. APPLE-2004, 103:17-18; APPLE-2009, ¶71. Based on this preference, and consistent with Kim’s express teachings, a POSITA would have

recognized that the more natural positioning of the fingerprint sensor assembly shown in Figures 10(a) and 10(b) would be on the “front surface” of an electronic device and would not be suitable for the lateral surface shown in Kim’s Figure 18.

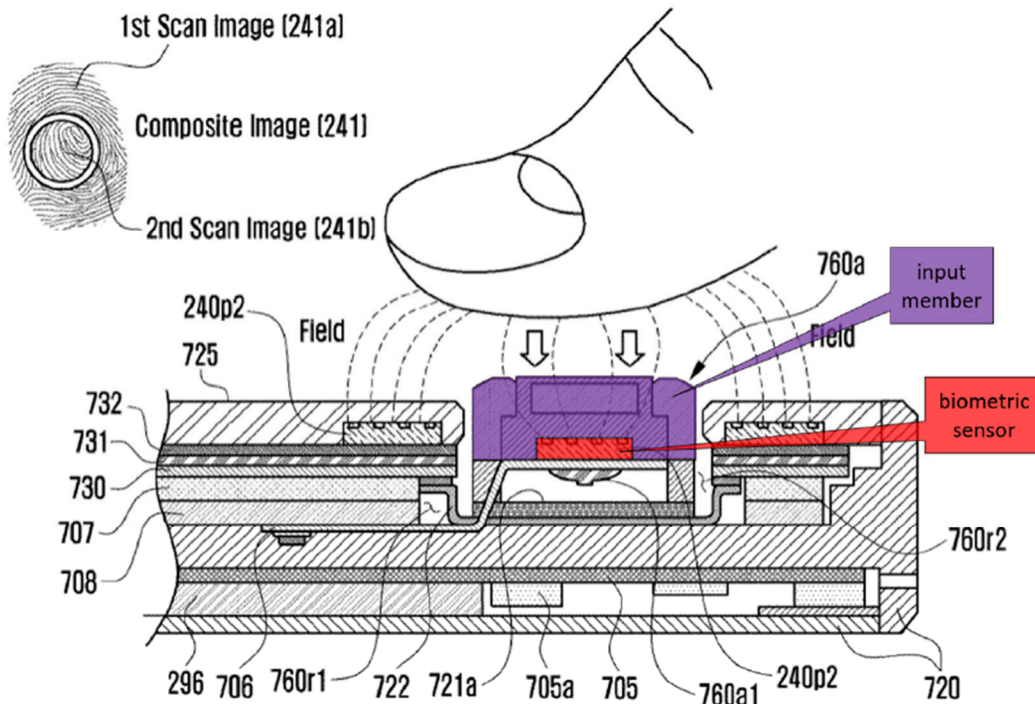
APPLE-2009, ¶80; *see also* APPLE-2004, 34:5-18, 109:5-13, 140:14-141:2.

(4) The Kim Combination Fails To Satisfy The Requirement Of A Biometric Sensor Positioned Below The Input Member Recited In Limitation [1.c.ii]

Beyond the deficiencies discussed above, Grounds 1 and 2 still fail because AliveCor’s application of the Kim Combination to limitation [1.c.ii] is substantively flawed. In mapping Kim to the *biometric sensor* recited in this limitation, AliveCor identifies only one of two fingerprint sensors (specifically fingerprint sensor 240p2⁵) within the fingerprint sensor assembly of Kim’s Figure 10(b) embodiment. APPLE-2009, ¶81.

⁵ Kim’s Figure 10(a) identifies two sets of fingerprint sensors, including an “optical fingerprint sensor 240p1” that is “disposed on the flexible PCB 706,” and a “capacitive fingerprint sensor 240p2” that is “embedded in the physical button 760a.” Ex-1004, 22:14-17. Based on this description, Figure 10(a) inaccurately labels optical fingerprint sensor 240p1 with the reference numeral “240p2.” APPLE-2009, ¶81 (fn 6).

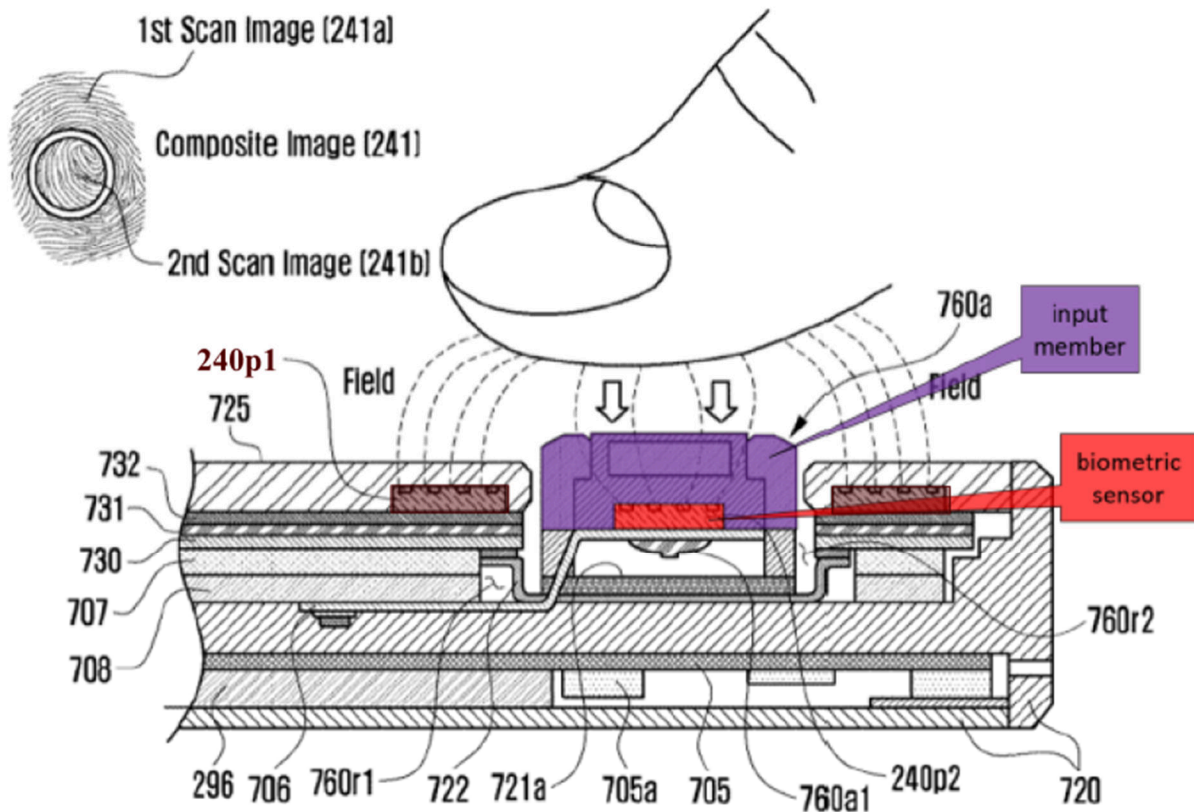
Ex-1004, Fig. 10(b); Ex-1022, Fig. 10(b)



Pet., 60 (annotations in original)

AliveCor omitted fingerprint sensor 240p1 from its mapping to the *biometric sensor* because including it would have left its mapping unable to satisfy the requirement in limitation [1.c.ii] that the *biometric sensor* be positioned below the input member. As shown below, fingerprint sensor 240p1 is not positioned below a body representing physical button 760a (which the Petition maps to the *input member*). Thus, by omitting fingerprint sensor 240p1 from its mapping, AliveCor deviated from Kim's disclosure in order to provide a superficial mapping based on the arrangement required by limitation [1.c.ii]. APPLE-2009, ¶82.

Ex-1004, Fig. 10(b); Ex-1022, Fig. 10(b)



Pet., 60 (further annotated to include maroon elements)

AliveCor's omission of fingerprint sensor 240p1 also runs contrary to how a POSITA would have understood functionality of the fingerprint sensor assembly of Kim's Figure 10 embodiment. APPLE-2009, ¶83. The fingerprint sensor assembly of this embodiment relies on data collected by each of fingerprint sensors 240p1 and 240p2 to generate a composite fingerprint image. Ex-1004, 2:63-22:3. As shown in Figure 10(a) above, electronic device 701 acquires a user fingerprint image "through the first fingerprint sensor corresponding to the physical button 760a and the second fingerprint sensor corresponding to the virtual button 760b in

the home button 760.” *Id.* Further, electronic device 701 “compose[s] fingerprint images 241a and 241b respectively obtained by the first and second fingerprint sensors into a single fingerprint image 241.” *Id.* Thus, removal of the fingerprint sensor 240p1 from the fingerprint sensor assembly, as AliveCor’s mapping suggests, would have rendered the Figure 10 embodiment unable to generate a fingerprint image, as described in Kim. APPLE-2009, ¶83.

b) Ground 3—The Jung-Myers Combination Is Defective

In Ground 3, AliveCor combines the teachings of Jung and Myers (“Jung-Myers Combination”) by incorporating Myers’ button assembly structures into a lateral surface of Jung’s device. *See* Pet., 47. The Jung-Myers Combination fails to demonstrate obviousness of the **button assembly**, at least because (1) a POSITA would not have sought Myers in reviewing Jung, (2) a POSITA would not have been motivated to combine their teachings, and (3) the combination fails to satisfy the requirement of a **button assembly within [an] opening [formed in a sidewall]** recited in limitations [1.a] and [1.c]. APPLE-2009, ¶84.

(1) A POSITA Would Not Have Sought Myers When Reviewing Jung

According to AliveCor, “a POSITA would have turned to *Myers*” because “Jung does not expressly disclose the structure of its ‘fingerprint sensor’[.]” Pet., 50; APPLE-2009, ¶77. But just acknowledging that a primary reference lacks requisite disclosure is not enough to establish that a POSITA would have actually

sought the disclosure of a secondary reference and also would have been motivated to combine them. *Auris Health, Inc. v. Intuitive Surgical Operations, Inc.*, 32 F.4th 1154, 1158 (Fed. Cir. 2022) (“The motivation-to-combine inquiry asks whether a skilled artisan ‘not only could have made but would have been motivated to make the combinations...of prior art to arrive at the claimed invention.’”) (citing *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015)). Nor is it enough to only show the POSITA would have a reasonable expectation of success, since obviousness requires “an apparent reason to combine the known elements in the fashion claimed by the patent at issue.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007).

Indeed, when reviewing Jung, a POSITA would not have sought out Myers’ disclosure of fingerprint sensor assemblies because Jung does not contemplate any button assembly with an incorporated fingerprint sensor (as recited for the **button assembly** in claim 1). APPLE-2009, ¶86. Where Jung does identify a button assembly (e.g., “home-key”) it does not indicate any benefit that would have been recognized by a POSITA to be provided through incorporation of any fingerprint sensor. *See, e.g.*, Ex-1005, [0007], [0090]-[0092], [0097], [0099]-[0103]. Jung’s disclosure of fingerprint sensors, instead, is limited to a single paragraph relating to a “sensor module 240.” Ex-1005, [0060]. Even here, Jung’s reference to fingerprint sensors is amongst several types of sensing elements, some of which a

POSITA would have not perceived relevant to button assemblies. APPLE-2009, ¶87 (“paragraph [0060] identifies a barometer sensor 240C and a temperature/humidity sensor 240J, which would have been understood by a POSITA to not typically be incorporated into the types of button assemblies discussed in the ’619 Patent.”). AliveCor therefore overplays Jung’s disclosure in attempting to motivate the Jung-Myers Combination by suggesting a POSITA would have sought to improve its disclosure of fingerprint sensors.

Finally, AliveCor states Myers “teaches that its **button assembly should be incorporated** in devices using biometric recognition.” Pet., 50. To the extent that AliveCor’s position is that a POSITA would have sought to improve Jung by seeking implementation details regarding a fingerprint sensor, AliveCor fails to explain the relevancy of a Myers’ button assembly since Jung does not teach button assemblies incorporating fingerprint sensors (which the Petition does not expressly contend otherwise). *See* Pet., 49-51; APPLE-2009, ¶88.

(2) A POSITA Would Not Have Been Motivated To
Combine Jung and Myers

As discussed above, while AliveCor contends a POSITA would have combined Jung and Myers to improve Jung’s device by seeking implementation details regarding the button assembly structures described in Myers, its rationale for the Jung-Myers Combination is the opposite. APPLE-2009, ¶¶89-90.

Specifically, despite contending “**Jung in view of Meyers** discloses and/or renders obvious claims 1, and 3-10 of the ’619 Patent” (Pet., 47), AliveCor later proposes “a POSITA would have been motivated to **waterproof Meyers’s ‘fingerprint sensor’ button assembly using Jung’s ‘key-waterproof structure’**” (*id.*, 51). AliveCor switches the order of the primary and secondary references, supporting not the Jung-Myers Combination but instead offering a different motivation for the opposite modification (Myers in view of Jung). This suggests hindsight bias in combining the teachings of Jung and Myers to satisfy requirements of the ***button assembly***. See, e.g., *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 36 (1966) (warning against “the temptation to reach into the prior art the teachings of the invention in issue”); *Grain Processing Corp. v. Am. Maize-Products*, 840 F.2d 902, 907 (Fed. Cir. 1988) (“Care must be taken to avoid hindsight reconstruction by using the patent in suit as a guide through the maze of prior art references, combining the right references in the right way so as to achieve the result of the claims in suit”).

Indeed, in his deposition, Dr. Berger only identified motivations for modifying Myers in view of Jung. See APPLE-2004, 124:10-125:8. He then tied these motivations to paragraph 242 of his declaration, confirming that his declaration testimony is the product of impermissible hindsight. *Id.*, 125:11-126:11. But these statements leave the combination AliveCor offered the Board

completely unsupported.

AliveCor's depiction of the Jung-Myers Combination confirms its proposal to modify Myer's button assembly (Figure 1 of Myers) to incorporate Jung's key-waterproofing structures (Figure 10 of Jung):

Ex. 1005, Fig. 10; Ex. 1007, Fig. 1

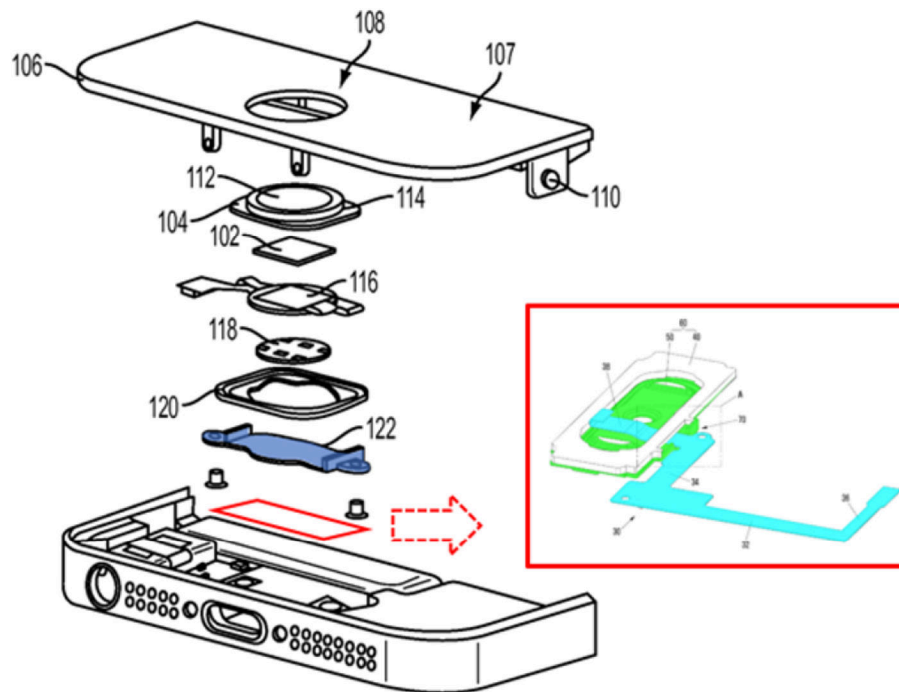


FIG. 1

Pet., 64 (annotations in original)

The only reason to modify Myer's button assembly in the manner shown above is to achieve satisfaction of the *sandwiched* arrangement recited in limitation [1.f].

In any event, a POSITA would not have been motivated to use Myers as a primary reference and combine it with Jung, at least because Myers already proposes a

“gasket 1025, such as a silicone gasket” that “may form a seal” and can “prevent dirt, sweat, water and the like from entering the interior of the electronic device.” APPLE-1007, [0130]. A POSITA thus would not have perceived any benefit from incorporating Jung’s key-waterproofing structures into Myers’ button assembly. Ex-1007, [0130]; APPLE-2009, ¶91.

Further, like the limitations of Kim discussed above, Dr. Anthony explains that “[a] POSITA would have also perceived various disadvantages involved in implementing the Jung-Myers Combination,” which would have prevented the POSITA from having a reasonable expectation of success in implementing the Jung-Myers Combination. *See* APPLE-2009, ¶¶92-95. Specifically, “[l]ike Kim, Myers teaches that its button assembly is positioned on a front surface of an electronic device (e.g., device 100).” *Id.*, ¶93 (citing APPLE-1007, [0041]-[0054]). Further, “[i]mplementing Myer’s button assembly in a lateral surface of device 100 would have complicated the manufacturing process for the resulting mobile device, e.g., by requiring use of non-planar structures.” *Id.*

The only reason to modify Myer’s button assembly in the manner shown above is to achieve satisfaction of the *sandwiched* arrangement recited in limitation [1.f]. In any event, a POSITA would not have been motivated to use Myers as a primary reference and combine it with Jung, at least because Myers already proposes a “gasket 1025, such as a silicone gasket” that “may form a seal”

and can “prevent dirt, sweat, water and the like from entering the interior of the electronic device.”. APPLE-1007, [0130]. A POSITA thus would not have perceived any benefit from incorporating Jung’s key-waterproofing structures into its button assembly. Ex-1007, [0130]; APPLE-2009, ¶91. Further, Dr. Anthony explains that “[a] POSITA would have also perceived various disadvantages involved in implementing the Jung-Myers Combination,” which would have prevented the POSITA from having a reasonable expectation of success in implementing the Jung-Myers Combination. *See* APPLE-2009, ¶¶92-95.

Additionally, AliveCor fails to explain why, even if a POSITA were to combine the Jung and Myers references (a POSITA would not for the reasons discussed above), the POSITA would have arrived at a configuration where the flexible printed circuit board 30 of Jung is sandwiched between Jung’s silicon rubber 50 and Myers’ button support plate 122. APPLE-2009, ¶96. In Myers, the “fingerprint recognition circuit is disposed above and coupled to a flexible element 116.” Ex-1007, [0049]. Accordingly, Myers already discloses a flexible element 116 to provide electrical connection to its button and a POSITA would have found use of Jung’s flexible printed circuit board 30 unnecessary. APPLE-2009, ¶96.

And, even if a POSITA would have considered using Jung’s flexible printed circuit board 30 to connect to Myers’ button, the POSITA would have understood that Jung’s flexible printed circuit board 30 would need to be arranged to connect

to Myers' button at the same location as the flexible element 116. APPLE-2009, ¶97. That location, as shown in Myers' Fig. 1, is clearly **above**, not below, Myers' button support plate 122. Thus, even if a POSITA would have considered using Jung's flexible printed circuit board 30 to connect to Myers' button, the POSITA would have routed Jung's flexible printed circuit board 30 above Myers' button support plate 122 to the location where Myers' flexible element 116 connects to the button. *Id.* A POSITA would not have sandwiched it between Jung's silicon rubber 50 and Myers' button support plate 122, a component to which the flexible printed circuit board 30 would not connect. *Id.*

Moreover, Myers' button support plate 122 holds in place the tactile dome switch 118 and the switch gasket 120. Ex-1007, [0052]. Jung similarly describes "a dome switch (not shown)." Ex-1005, [0100]. In Jung, "the silicon rubber 50 may be pressed by the pressure to thereby apply the pressure to a dome switch (not shown)." *Id.* Through this description, Jung confirms that the dome switch rests **under** the silicon rubber 50. Accordingly, if a POSITA would have considered adding Myers' button support plate 122 to Jung, the POSITA would have used Myers' button support plate 122 to support Jung's dome switch, resulting in Myers' button support plate 122 being located under the silicon rubber 50. APPLE-2009, ¶98. With this configuration, Jung's flexible printed circuit board 30 would not be sandwiched between Myers' button support plate 122 and Jung's

silicon rubber 50.

For these reasons, AliveCor has not shown that a POSITA would have arrived at a configuration where the flexible printed circuit board 30 of Jung is sandwiched between Jung's silicon rubber 50 and Myers' button support plate 122.

(3) The Jung-Myers Combination Fails To Satisfy The Requirement Of *A Button Assembly Within [An] Opening [Formed In A Sidewall]* Recited In Limitations [1.a] and [1.c]

Beyond the deficiencies discussed above, Ground 3 still fails because AliveCor's application of the Jung-Myers Combination to limitations [1.a] and [1.c] is substantively flawed. The Petition fails to establish that the button assembly provided by the combination would have been positioned in an *opening [formed in a sidewall]*. APPLE-2009, ¶99.

AliveCor provides a conclusory statement that "Jung renders obvious that the enclosure has an opening formed in a sidewall, stating 'other keys for performing various functions rather than the home-key may be applied to the key-waterproof structure of the present disclosure.'" Pet., 55-56 (citing Ex-1005, [0123]). But even the cited portion of Jung (Ex-1005, [0123]) fails to disclose, teach, or suggest any particular location of a "home-key." AliveCor also cites to conclusory testimony from Dr. Berger that "a POSITA would have understood that the key-waterproof structure can be applied to one or more keys and/or buttons,

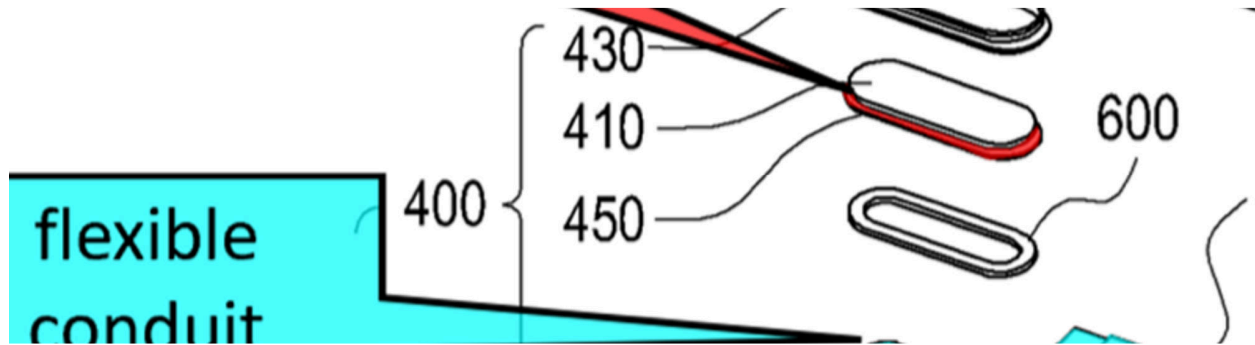
including keys located in the sidewall of the electronic device.” Pet., 56 (citing Ex-1003, ¶¶252-253); APPLE-2009, ¶¶100-101. But that testimony is uncorroborated and fails to address the numerous issues discussed above with respect to Kim of moving a button assembly from a front surface of an electronic device to a sidewall of the electronic device.

c) Ground 4—The Chang Combination Is Defective

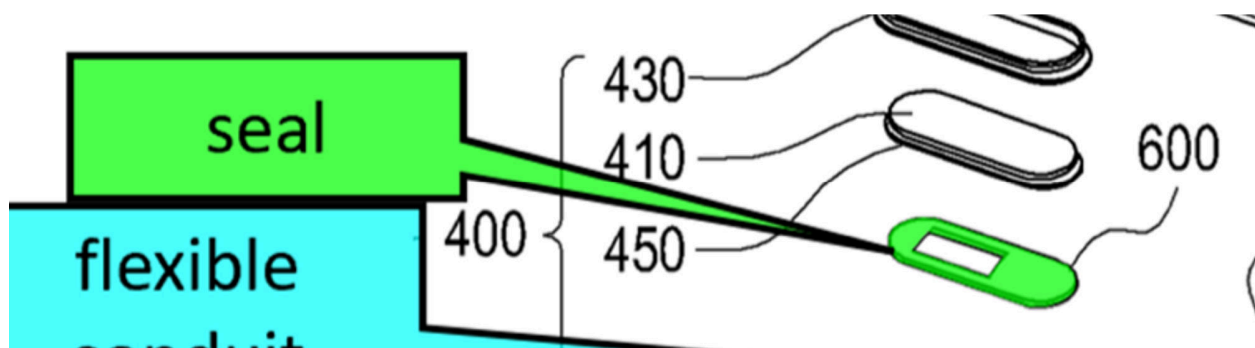
In Ground 4, AliveCor combines “alternative” embodiments purportedly described in Chang (“the Chang Combination”) by altering a structure of sealing member 600 within Chang’s key module. *See* Pet., 96. The Chang Combination fails to demonstrate obviousness of the **button assembly**, at least because (1) Chang does not support AliveCor’s structural alteration to sealing member 600, (2) a POSITA would not have had a reasonable expectation of success in implementing the combination, and (3) the combination fails to satisfy the sandwiched arrangement recited in limitation [1.f]. APPLE-2009, ¶102.

(1) **Chang Does Not Support AliveCor’s Structural Alteration To Sealing Member 600**

As discussed in §VI.A.1(b), *supra*, the Chang Combination is based on a structural alteration by AliveCor to sealing member 600—one that relies on a mischaracterization of Chang’s disclosure. *See* Pet., 96; APPLE-2009, ¶103. As shown below, the structural alteration involves changing the annular shape of sealing member 600 to instead include a rectangular window:



Pet., 92 (excerpted to show original annular structure of sealing member 600 in Chang's Figure 3)



Pet., 94 (excerpted to show AliveCor's alteration of sealing member 600)

AliveCor misleadingly refers to Chang's "[a]lternative embodiments" as an indication that "a POSITA would have understood that Chang also teaches a sealing member 600 that is *not* designed in an annular or ring shape." Pet., 96 (citing Ex-1015, 14:24-29); APPLE-2009, ¶104. But when read in its entirety, the cited portion fails to identify any alternative embodiments regarding the shape of sealing member 600:

According to an example embodiment, the first sealing member 600 may be disposed between the fingerprint

recognizing member 450 and the lower plate 470 and/or between the fingerprint recognizing member 450 and the annular structure 430. **Alternatively**, the first sealing member 600 may be designed in an annular shape (e.g., a loop or ring shape), which corresponds to the entire shape of the key module 20 and includes an opening so as to allow the flexible conductive member 500 to extend therethrough.

Ex-1015, 14:20-28; *see id.*, FIG. 3

AliveCor seemingly implies that the word “[a]lternatively” suggests the possibility of alternative *shapes* being contemplated by Chang for sealing member 600. But instead, Chang uses the word “[a]lternatively” to reference alternative arrangements of components (e.g., sealing member 600, recognizing member 450, lower plate 470) within Chang’s key module. APPLE-2009, ¶105.

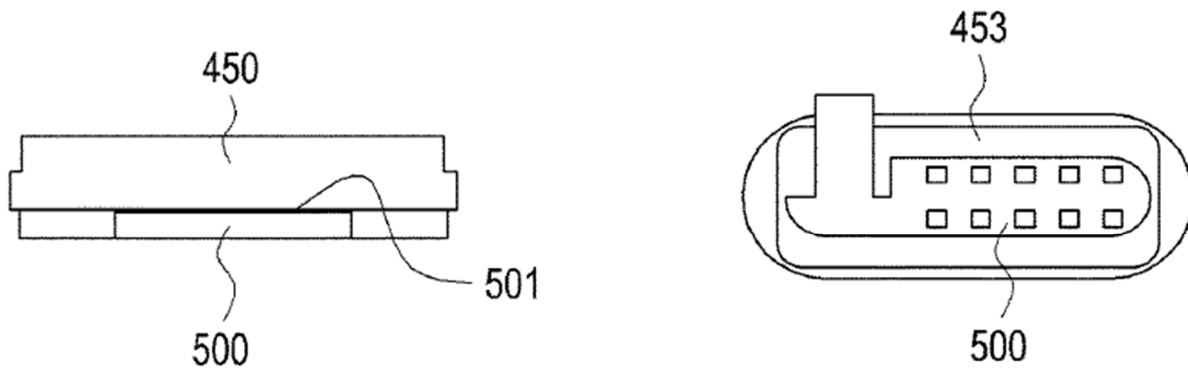
AliveCor then posits “a POSITA would have understood that sealing member 600 would be constructed...such that the planar faces are adjacent to both the lower plate 470 and fingerprint recognizing member 450, and the opening is in the shape of the ‘contact points formed on the lower portion [of the fingerprint recognizing member 450] to be electrically contacted with another printed circuit board’ such as flexible conductive member 500.” Pet., 96 (citing Ex-1015, 10:13-21); APPLE-2009, ¶106. Here again, AliveCor’s position fails to find any support in Chang because the cited portion (Ex-1015, 10:13-21, reproduced below) does

not make any reference to the sealing member 600 or its structure:

According to an example embodiment, the circuit region 453 may be disposed below the fingerprint recognizing pad 451. Conductive routes connected at least some of the plurality of conductive lines of the fingerprint recognizing pad 451 may be included. For example, the circuit region 453 may be a printed circuit board (PCB), and may include a plurality of contact points formed on the lower portion thereof to be electrically contacted with another printed circuit board.

Ex-1015, 10:13-21

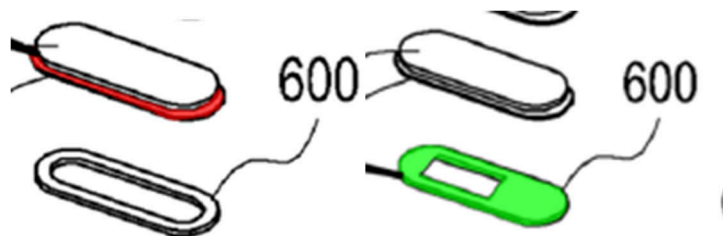
AliveCor also cites various other portions of Chang, none of which seem specifically relevant to the structure of sealing member 600. *See* Pet., 96-97 (citing Ex-1015, 10:32-42, 10:59-11:3, 11:36-42). Further, because none of these cited portions reference a “sealing member,” the Petition fails to establish how the “design characteristics” discussed by AliveCor are even relevant to the altered structure that it proposes for the sealing structure 600 depicted in Chang’s Figure 3. Likewise, AliveCor’s reference to Chang’s Figure 7A (reproduced below) similarly fails to provide support for the alteration because it does not specifically depict sealing structure 600. APPLE-2009, ¶107.



Ex-1015, Fig. 7A

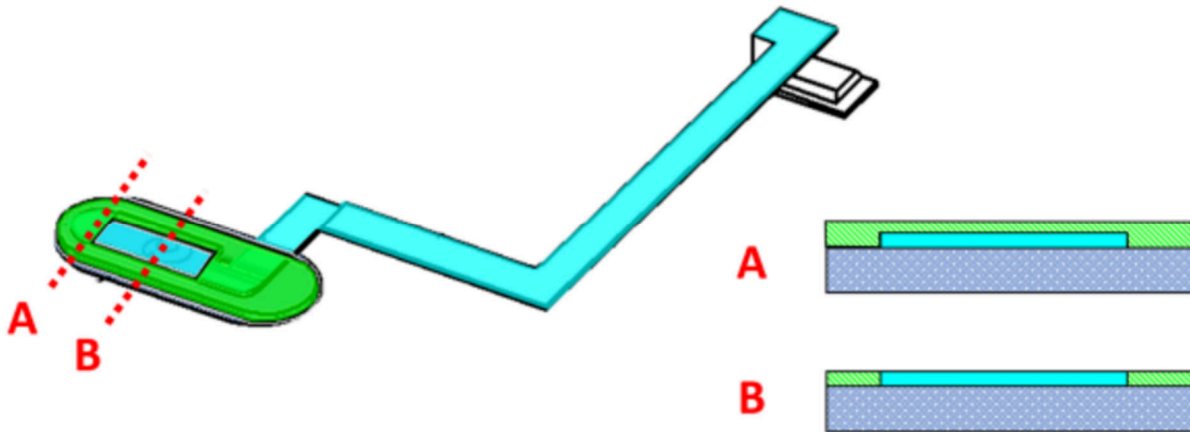
- (2) A POSITA Would Not Have Had A Reasonable Expectation of Success In Implementing The Chang Combination

As discussed above, the Chang Combination involves alterations to the shape and structure of sealing member 600, e.g., from an annular shape (as depicted in Chang's Figure 3) to a solid structure with a rectangular window. The original structure of Chang's sealing member 600 is shown on the left side below, while AliveCor's altered structure of sealing member 600 is shown on the right side below. APPLE-2009, ¶¶111-112.



Pet., 92 (left; annotations in original); Pet., 94 (right; annotations in original)

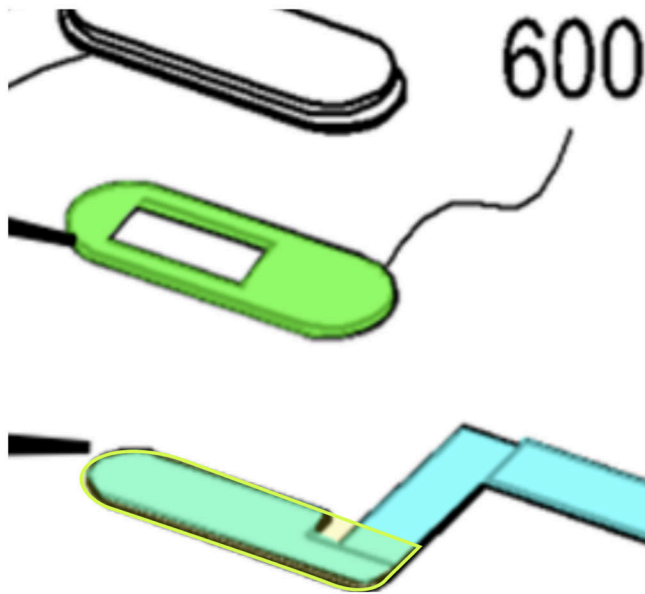
AliveCor then proposes a “condensed configuration” of how, in its view, the altered sealing member 600 and flexible conductive member 500 would have been assembled within the Chang Combination. Pet., 99; APPLE-2009, ¶113.



Pet., 99 (annotations in original)

A POSITA would not have reasonably expected to succeed in implementing the “condensed configuration” shown above due to several technical hurdles that would have rendered Chang inoperable. APPLE-2009, ¶114. Nor would a POSITA have been motivated to pursue the Chang Combination. *Id.*, ¶¶108-110.

For example, based on the cross sections depicted for the “condensed configuration” shown above, AliveCor’s position seems to be that, in the Chang Combination, the entirety of a circular portion of the conductive member 500 is fit within the rectangular window of the altered sealing member 600. APPLE-2009, ¶115. This circular portion of the conductive member 500 is highlighted and outlined in yellow below:



Pet., 98 (excerpt of annotated figure; highlights added)

AliveCor is wrong in suggesting (through the portrayal of the “condensed configuration” in the Petition) that the circular portion of the conductive member 500 could have fit within the rectangular window of the altered sealing member 600. APPLE-2009, ¶116. As a threshold issue, the fit of the circular portion of the conductive member 500 in the rectangular window of the altered sealing member 600 within the Chang Combination is itself vague because AliveCor’s contentions do not make clear whether it proposes fitting only a part of the circular portion of

the conductive member 500 within the rectangular window, or if instead, it proposes fitting the entire part of the circular portion.⁶

Regardless, as shown above, the size of the circular portion of conductive member 500 is larger than the size of the rectangular window within the Chang Combination. Thus, for a portion of the circular portion of conductive member 500 to fit within the rectangular window, the circular portion of conductive member 500 would need to be further modified to include a raised part that is sized such that it would then be mated with the boundaries of the rectangular window. But AliveCor provided no such modification of the circular portion of the conductive member 500 within the Petition. *See* Pet., 94-101. Instead, as the above-referenced figure confirms, AliveCor proposes *no change* to the surface of the circular portion of the conductive member 500 in the Chang Combination. APPLE-2009, ¶117. It also proposes no change to the shape of the circular portion, as confirmed by the annotated figures included in the Petition.

⁶ AliveCor also fails to address the printed circuit board (PCB) portion of the conductive member 500, which extends past the boundaries of the altered sealing member 600. The Petition provides no analysis on how this PCB portion would have been arranged in the Chang Combination.

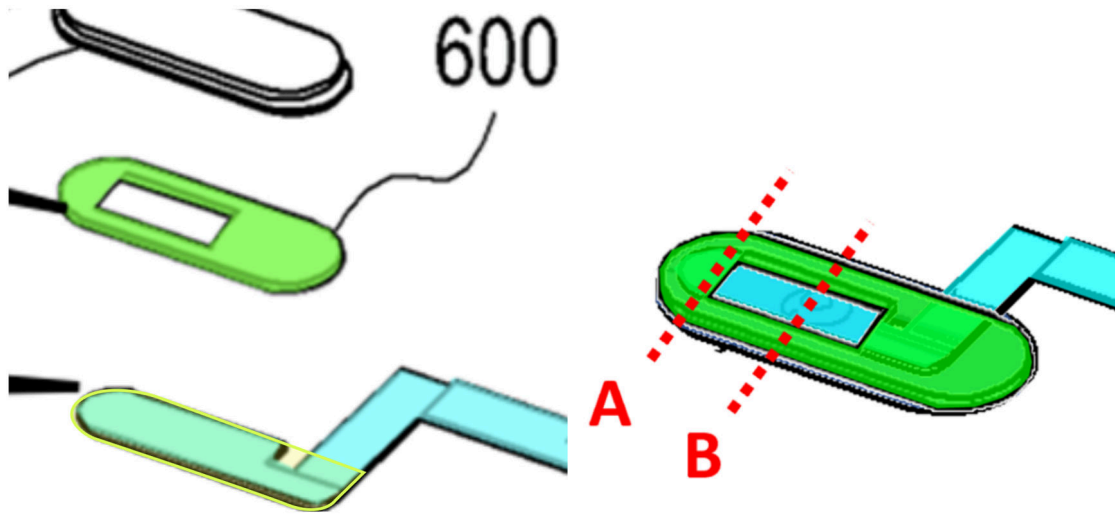
Further, for the entire part of the conductive member 500 to fit within the space/volume defined by the rectangular window of the altered structure of sealing member 600 (shown in the cross-sections “A” and “B” identified in the figure above) without any change to its top surface, the conductive member 500 would need to be flowable or bulk deformable. APPLE-2009, ¶118.

However, Chang does not teach that any portion of the conductive member 500 is flowable or bulk deformable. APPLE-2009, ¶119. A POSITA also would not have understood conductive member 500 to be flowable or bulk deformable because Chang describes that flexible conductive member 500 may include “a Flexible Printed Circuit Board (FPCB).” Ex-1015, 12:42-49. As explained by Dr. Anthony, “[a] FPCB is typically understood as a component that provides electrical connections in electronic devices, which is designed to bend or flex without breaking.” APPLE-2009, ¶119. Further, “[w]hile an FPCB can adapt to various shapes within a device, structures incorporating an FPCB would not be understood to possess the characteristics of a fluid or flowable substance, as its flexibility is limited to mechanical bending (rather than bulk deformation).” *Id.* Thus, for at least this reason, a POSITA would not have readily understood how to implement an assembly representing the “condensed configuration” of the Chang Combination. *Id.*

Moreover, setting aside the Petition's lack of detail regarding the precise fit of the circular portion of the conductive member 500 within the rectangular window of the altered sealing member, AliveCor's portrayal of the component arrangement of components (including AliveCor's altered sealing member 600) within the Chang Combination (via AliveCor's figure of the "condensed configuration" depicted in page 99 of the Petition) is also wrong. APPLE-2009, ¶120.

As explained above, in the Chang Combination, AliveCor does not propose any alteration to the top surface or shape of a circular portion of the conductive member 500. But if no such alterations are being proposed in the "condensed configuration," then AliveCor still fails to explain how it expects the circular portion of conductive member 500 to fit within the rectangular window of the altered sealing member 600. *See* Pet., 94-101; APPLE-2009, ¶121.

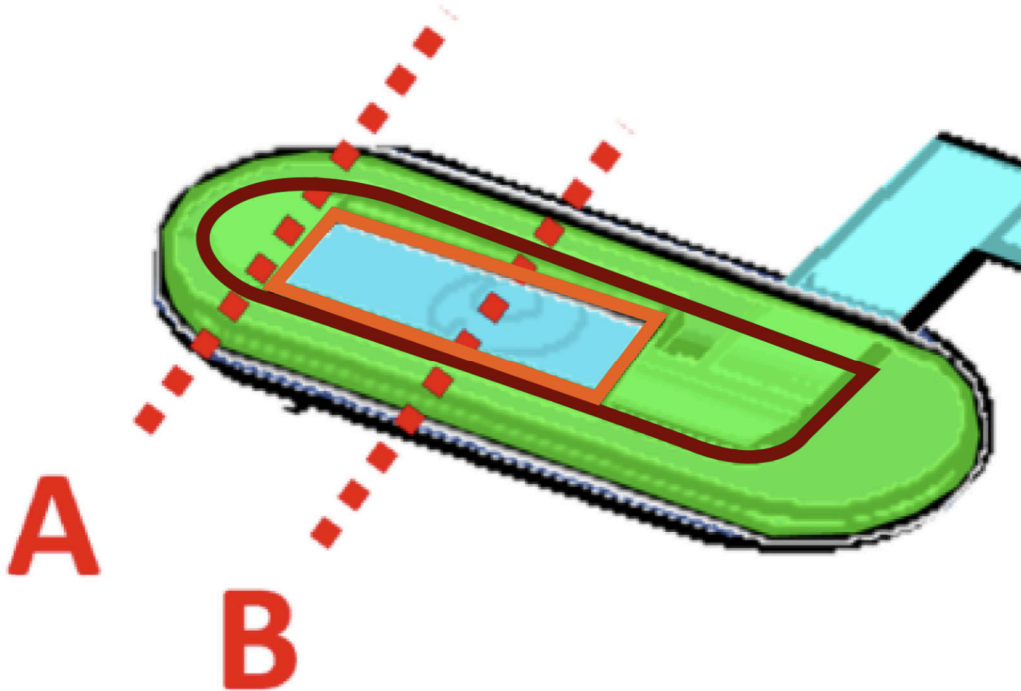
Indeed, AliveCor's various portrayals of the Chang Combination seem to contradict themselves. Specifically, while a figure on page 98 of the Petition seems to suggest that the size of the circular portion of conductive member 500 is not being changed, a later-presented figure on page 99 inexplicably changes the size the circular portion of conductive member 500 (when portraying the "condensed configuration") to be smaller than the boundaries of the altered sealing member. APPLE-2009, ¶122.



Pet., 98 (left; excerpt of annotated figure; highlights added); Pet., 99 (right; except of annotated figure)

As shown in the excerpted figure of the “condensed configuration” above (right), AliveCor appears to have modified the size of the circular portion of the conductive member 500 when positioning the circular portion underneath the altered sealing member 600. And, based on this figure, when the Chang Combination is assembled, the circular portion of the conductive member 500 is required to be positioned below the sealing member 600 because the area defined by its boundaries (outlined below in brown below) is larger than the area provided

by the rectangular window (outlined below in orange). APPLE-2009, ¶123.



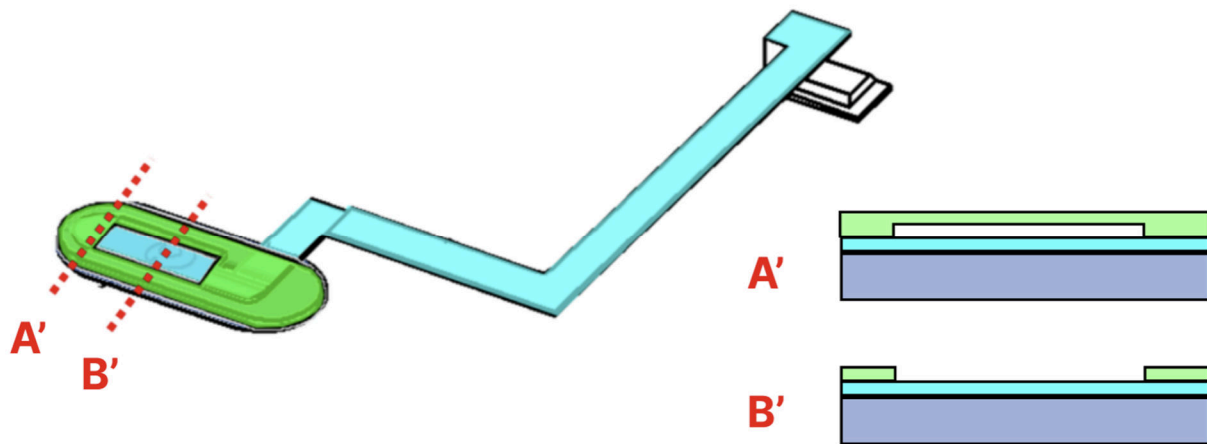
Pet., 99 (excerpt of annotated figure; further annotated to include brown and orange outlines)

Based on the above, a POSITA would have recognized that cross sections of the “condensed configuration” shown in page 99 of the Petition are incorrect. Specifically, when assembled, the Chang Combination would not have provided a configuration where “the flexible conduit (teal) is sandwiched between the seal (green) and the sealing surface (blue).” Pet., 99; APPLE-2009, ¶124.

Instead, based on AliveCor’s portrayal of the “condensed configuration” on page 99 of the Petition, the components of the Chang Combination would have

actually been assembled as shown in the figure below (“Corrected Chang Combination”).⁷ APPLE-2009, ¶125.

⁷ As explained in §VI.A.2(c)(1), *supra*, Chang’s disclosure does not support the Chang Combination (advanced by AliveCor in its obviousness ground based on Chang) because AliveCor mischaracterizes Chang’s disclosure in proposing the combination. *See* Pet., 96. Thus, the portrayal of the Corrected Chang Combination in this Response is intended only to respond to AliveCor’s portrayal of the “condensed configuration” of the Chang Combination on page 99 of the Petition. Portrayal of the Corrected Chang Combination should also not be construed as a concession of any appropriate configuration of the Chang Combination. Rather, as explained below, the Chang Combination is not an appropriate configuration of Chang’s teachings because it would have rendered the overall disclosure inoperable. APPLE-2009, ¶125 (fn 8).



Pet., 99 (modified to depict adjusted cross sections “A” and B”)

As shown above, in section cuts A’ and B’ of the Corrected Chang Combination, the altered sealing member 600 would have been stacked on top of the conductive member 500 because of size differences between the rectangular window of the altered structure of the sealing member 600 and the portion of the conductive member adjacent to the sealing member 500. APPLE-2009, ¶126.

Finally, a POSITA also would not have implemented the assembly of the Chang Combination⁸ depicted above because this would have prevented electrical

⁸ The Chang Combination is technically wrong for reasons discussed above. To the extent that a POSITA would have attempted to implement the “condensed configuration” portrayed on Page 99 of the Petition, the POSITA would have actually identified the Corrected Chang Combination based on the analysis in the Petition. *See* Pet., 94-101.

connection to the **conductive** member 500. APPLE-2009, ¶127. As Dr. Anthony explains, “[t]his is because, as shown in section cuts A’ and B’ above, the body of the altered structure of the sealing member 600 would have prevented such a connection.” *Id.* Further, such a configuration would have been understood to be “problematic and/or rendered the Chang Combination inoperable” based on Chang’s disclosure. *Id.* (citing Ex-1015, 8:31-41, 10:1-21). Thus, a POSITA would not have had a reasonable expectation of success in implementing the Chang Combination.

(3) The Chang Combination Fails to Satisfy The
Sandwiched Arrangement Recited in Limitation
[1.f]

Beyond the deficiencies discussed above, Ground 4 still fails because AliveCor’s application of Chang to limitation [1.f] is substantively flawed. The Petition fails to establish that Chang’s button assembly would have been assembled such that a circular portion of flexible conductive member 500 (mapped to the ***flexible conduit***) is ***sandwiched*** between the sealing member 600 (mapped to the ***seal***) and the lower plate 470 (mapped to the ***sealing surface***) as required by limitation [1.f]. *See* Pet., 91-101. And this mapping remains deficient regardless of whether it includes the original sealing member 600 (depicted in Chang’s Figure 3), or AliveCor’s altered sealing member 600. APPLE-2009, ¶128. As discussed below, the arrangement of components in Chang’s button assembly fails to satisfy

the *sandwiched* arrangement of limitation [1.f].

As to the sealing member 600 depicted in Chang's Figure 3, Chang's key module fails to satisfy limitation [1.f] because, when assembled, conductive member 500 (mapped to *flexible conduit*) is not positioned below the sealing member 600 (mapped to *seal*), and therefore, is not *sandwiched* between the sealing member 600 and the lower plate 470 (mapped to the *sealing surface*). This arrangement does not provide any portion of conductive member 500 that is *sandwiched* between the sealing member 600 and the lower plate 470 (mapped to the sealing surface). APPLE-2009, ¶129.

The assembly of Chang's key module discussed above is confirmed by Figure 10 (below). As shown, in a cross section of the Chang's key module, a portion of conductive member 500 (highlighted in teal) is arranged co-planar with (i.e., not positioned below) the sealing member 600 (highlighted in green) and lower plate 470 (highlighted in blue). APPLE-2009, ¶130.

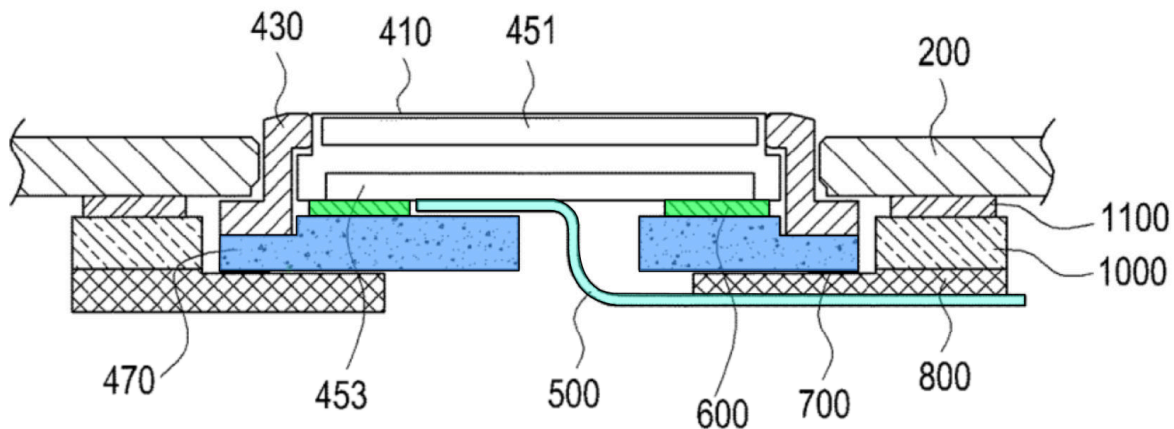


FIG. 10

Ex-1015, FIG. 10 (annotated)

B. Grounds 2 And 4 Also Fail Because The Asserted Prior Art Does Not Render Obvious A Seal That Is *Overmolded* As Required By Claim 4

All of AliveCor's grounds against claim 4 are deficient because the Petition fails to provide a proper analysis in mapping teachings of the asserted prior art to the claimed requirement that the *seal* (recited in limitation [1.d] of claim 1) is *overmolded around the portion of the flexible conduit* (recited in limitation [1.f] of claim 1). APPLE-2009, ¶131.

1. Kim Does Not Render Obvious A Seal That Is Overmolded

AliveCor admits that Kim lacks any teachings regarding how components of its button assemblies are formed; indeed, the Petition fails to cite to Kim in mapping claim 4. See Pet., 40-41; see also APPLE-2004, 111:10-11 ("Kim itself

does not explicitly state how that seal is manufactured”). AliveCor instead relies exclusively on Dr. Berger’s testimony characterizing a POSITA’s knowledge of overmolding, e.g., a manufacturing process where a substrate is covered with a layer of material, as one example of a manufacturing means of effecting the assembly of components. *See* Ex-1003, ¶¶203-209; APPLE-2009, ¶132.

As discussed below, Dr. Berger suggests overmolding is useful to enable a “liquid-tight seal” but omits discussion of other manufacturing methods that may enable a “liquid-tight seal” and fails to cite to any support for statements regarding overmolding. AliveCor’s positions with respect to unpatentability of claim 4 based on Kim are therefore based on general and conclusory expert testimony. *TQ Delta, LLC v. Cisco Sys.* 942 F.3d 1352, 1358 (Fed. Cir. 2019) (“Conclusory expert testimony does not qualify as substantial evidence.”); *Koito Mfg. Co. v. Turn-Key-Tech, LLC*, 381 F.3d 1142, 1152 (Fed. Cir. 2004) (“General and conclusory testimony...does not suffice as substantial evidence of invalidity.”).

Specifically, Dr. Berger speculates that “a person of ordinary skill in the art would understand that the seal of Kim **could be** overmolded around the portion of the flexible conduit in order to enhance the quality of the seal” (*id.*, ¶209) because “overmolding, unlike mechanical fasteners such as screws, bolts, snap fit components, etc., provides for a liquid-tight seal, which is essential for waterproofing delicate electronic components” (*id.*, ¶207). But these statements

assume a POSITA would have selected overmolding as a manufacturing means of effecting the assembly of components of Kim’s “combined button” assemblies merely because overmolding was understood to “provide[] for a liquid-tight seal, which is essential for waterproofing delicate electronic components.” *Id.*, ¶207; APPLE-2009, ¶133.

Moreover, Dr. Berger’s statements are uncorroborated because Dr. Berger fails to cite to any support regarding the use of overmolding in the assembly of components disclosed in Kim. APPLE-2009, ¶134. Dr. Berger also does not properly address why a POSITA would have specifically chosen overmolding—amongst several well-known manufacturing means of effecting the assembly of components—in implementing the button assembly structures described in Kim. *See* Pet., 40-41. He even admits “one skilled in the art would recognize **many different methods**” that are not overmolding, such as use of “screw[s], bolts, snap fit components, adhesives, press fits, co-molded components” or “ultrasonically welded components, rotational fits, wedge fits, and other manufacturing means of effecting the assembly of components.” Ex-1003, ¶207.

While Dr. Berger identifies examples of certain mechanical fasteners, such as “screws, bolts, snap fit components, etc.” as methods that may not provide a “liquid-tight seal,” he omits discussion of methods other than overmolding that may otherwise enable a “liquid-tight seal.” *Id.*; APPLE-2009, ¶135. Of course,

this omission is unsurprising since Dr. Berger admitted in deposition that he “[hasn’t] personally been involved in overmolding.” APPLE-2004, 58:16-59:2.

Contrary to Dr. Berger’s testimony, a POSITA would not have understood overmolding to necessarily be the only manufacturing method that enables a “liquid-tight seal.” APPLE-2009, ¶136 (“[a] POSITA would have also recognized that there are several common techniques used to achieve water resistance in electronic devices that do not involve use of overmolding”); *see id.*, ¶137-39.

As one example, Myers (which is asserted by AliveCor in this proceeding) describes a “silicone gasket” that may form “a seal between the trim 805 and a housing of the electronic device” such that “[t]he gasket may **prevent** dirt, sweat, **water** and the like from **entering the interior of the electronic device.**” Ex-1007, [0130]. And despite teaching a sealed structure that prevents water from entering the interior of the electronic device (i.e., liquid-tight seal), Myers does not teach that construction of the gasket involves overmolding. APPLE-2009, ¶135.

Indeed, AliveCor points to no prior art disclosure of overmolding in Kim and fails to explain how Kim’s rubber seal could be constructed as shown through overmolding. As Dr. Anthony explains, “[a] POSITA would not have understood the rubber seal 722 to be overmolded with the flexible PCB 706 in place.” APPLE-2009, ¶140. Further, “[a]t the left and right sides of the rubber seal 722, the edges are raised and form a recess 760r1 that sits between the rubber seal 722

and the flexible PCB 706.” *Id.* If the rubber seal 722 was formed by overmolding as AliveCor defines it, the edges of the rubber seal 722 would not be raised with the recess 760r1 present. *Id.* Instead, the rubber seal 722 would conform to and take the shape of the structure over which it is overmolded and thus would reside against the flexible PCB 706 for the entire length (i.e., without the recess). *Id.* For these reasons, overmolding the rubber seal 722 would not result in the structure shown in FIG. 10(b) and a POSITA would not have found it obvious to construct Kim’s rubber seal 722 with overmolding, particularly because AliveCor provides no prior art disclosure of overmolding in its ground.

2. *The Jung-Myers Combination Does Not Render Obvious A **Seal** That Is **Overmolded***

In mapping to claim 4, AliveCor cites to a single paragraph of Jung (paragraph [0122]) in support of its hindsight conclusion that components of the assemblies provided by the Jung-Myers Combination are formed using overmolding. *See* Pet., 71. AliveCor relies on other expert testimony characterizing a POSITA’s knowledge of overmolding as one example of a manufacturing means of effecting the assembly of components. *See* Ex-1003, ¶¶309-312. This testimony is nearly identical to the testimony offered for Ground 2 (Kim) and suffers from similar evidentiary deficiencies as those discussed in the previous section. *See* Pet., 71; Ex-1003, ¶¶309-312; *see also* *TQ Delta, LLC*, 942

F.3d at 1358; *Koito Mfg. Co.*, 381 F.3d at 1152; APPLE-2009, ¶141.

Dr. Berger’s testimony also fails to establish that the processes in the cited paragraph of Jung accurately represent overmolding. The following disclosure cited by Dr. Berger confirms that AliveCor mapped a process performed after a sealing process to address claim 4’s requirement for a *seal* to be *overmolded*:

...the electronic device adopting the key-waterproof structure and a method of waterproofing a key, according to various embodiments of the present disclosure, may be made of two processes, such as *a process of forming the silicon-not-attached portion for assembling the flexible printed circuit board in the insert-injected product after the circuit board bracket and the silicon rubber are sealed through the insert injection, and a process of bonding only the silicon-not-attached portion for waterproofing after assembling the flexible printed circuit board through the silicon-not-attached portion.*

Ex-1003, ¶307 (citing Ex-1005, [0122]) (italicized emphasis in original, underlined emphasis added)

Dr. Berger then concludes that “[a] person of ordinary skill in the art would understand that the ‘process of forming the silicon-not-attached portion for assembling the flexible printed circuit board in the insert-injected product’ described by Jung is overmolding.” *Id.*, ¶308; APPLE-2009, ¶142.

But in the relied-upon portion of Jung, the process of forming the silicon-not-attached portion (mapped to the *seal* that is *overmolded*) is one that is performed “after the circuit board bracket and the silicon rubber are sealed through the insert injection.” Ex-1005, [0122]. And, given later testimony that “overmolding refers to a technique in which [] [*sic*] one material is molded over a substrate, often by injection” (Ex-1003, ¶309) a POSITA would not have understood Jung’s process of forming the silicon-not-attached portion—an assembly process that is performed *after* sealing through insert injection—to represent the type of overmolding recited in claim 4. APPLE-2009, ¶143. Dr. Berger ultimately confirmed in deposition that Jung’s process of forming the silicon-not-attached portion is not one that involves injection, and thus, is not a process through which a *seal* is *overmolded*, as recited in claim 4:

...I believe what Jung is saying is that you can have that you can have that printed circuit board, you can have part of the assembly above that, obviously you are not going to, you are not going to inject into, inject a product that no restraint on it.

APPLE-2004, 130:22-131:8

APPLE-2009, ¶144.

As Dr. Anthony explains, “the insertion injection discussion in Jung relates to how the flexible circuit board 30, bracket 40, and silicon rubber 50 attach, not

how the silicon rubber 50 (seal) is formed and whether it is overmolded on the flexible circuit board 30.” APPLE-2009, ¶145. As shown in Fig. 5, Jung’s flexible circuit board 30, bracket 40, and silicon rubber 50 are all separate structures that are later assembled together. *Id.* Attaching separately molded/formed components is not overmolding. *Id.* Also, Jung’s flexible circuit board 30 and silicon rubber 50 do not have an injection based connection. *Id.* As discussed above, Jung’s bracket 40 and silicon rubber 50 are sealed with an opening 70 where the flexible circuit board 30 is later inserted. *Id.* For these reasons, Jung does not describe that its silicon rubber 50 (seal) is formed by overmolding, much less that it is overmolded around the portion of the flexible conduit that sits on top of it.

VII. CONCLUSION

For the foregoing reasons, Patent Owner Apple respectfully requests a final written decision confirming patentability of the Challenged Claims.

Respectfully submitted,

Date: April 24, 2024

/Jeremy J. Monaldo/

W. Karl Renner, Reg. No. 41,265
Jeremy Monaldo, Reg. No. 58,680
Ryan Chowdhury, Reg. No. 74,466
Fish & Richardson P.C.
60 South Sixth Street, Suite 3200
Minneapolis, MN 55402
Tel: 202-783-5070
Fax: 877-769-7945

Attorneys for Patent Owner

CERTIFICATION UNDER 37 CFR § 42.24(d)

Under the provisions of 37 CFR § 42.24(d), the undersigned hereby certifies that the word count for the foregoing Patent Owner's Response to Petition totals 12,097, which is less than the 14,000 allowed under 37 CFR § 42.24(b)(1).

Respectfully submitted,

Date: April 24, 2024

/Jeremy J. Monaldo/

W. Karl Renner, Reg. No. 41,265
Jeremy Monaldo, Reg. No. 58,680
Ryan Chowdhury, Reg. No. 74,466
Fish & Richardson P.C.
60 South Sixth Street, Suite 3200
Minneapolis, MN 55402
Tel: 202-783-5070
Fax: 877-769-7945

Attorneys for Patent Owner

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e)(4), the undersigned certifies that on April 24, 2024, a complete and entire copy of this Patent Owner's Response to Petition were provided via email, to the Petitioner by serving the email correspondence addresses of record as follows:

Christopher TL Douglas, Reg. No. 56,950
Scott M. Stevens, Reg. No. 54,762
Philip Ducker, *Pro Hac Vice*
J. Ravindra Fernando, Reg. No. 73,762
Thomas F. Finch, *Pro Hac Vice*
Erin Beaton, Reg. No. 79,218

ALSTON & BIRD LLP
Vantage South End
1120 South Tryon Street, Suite 300
Charlotte, NC 28203-6818
Phone: 704.444.1000
Fax: 704.444.1111

E-mail: apple-alivecor-ndcal@alston.com

/Crena Pacheco/

Crena Pacheco
Fish & Richardson P.C.
60 South Sixth Street, Suite 3200
Minneapolis, MN 55402
pacheco@fr.com