

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.

Petitioner

v.

HAPTIC, INC.

Patent Owner

Case IPR2024-01475

U.S. Patent 9,996,738

PATENT OWNER'S PRELIMINARY RESPONSE

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EXHIBIT LIST

Exhibit No.	Description
2001	Expert Declaration of Jason Janét
2002	<i>Curriculum Vitae</i> of Jason Janét
2003	Patent Assignment – Sept. 30, 2020 REEL:053938 FRAME: 0842 (Change of Name: Swan Solutions, Inc. to Haptic, Inc.)
2004	Iowa State University Center for Nondestructive Evaluation, Webpage Screenshots, nde-ed.org/Physics/Waves and nde-ed.org/About/index.xhtml
2005	Fundamentals of Acoustics, Fourth Ed., Lawrence E. Kinsler et al., John Wiley & Sons, Inc., 2000
2006	The Fundamentals of Modal Testing, Application Note 243-3, 2000, available from Texas A&M University, https://rotorlab.tamu.edu
2007	Non-destructive evaluation of reinforced concrete structures, Volume 2: Non-destructive testing methods, ed. Christiane Maierhofer, et al., CRC Press, Woodhead Publishing Limited, 2010
2008	Hennig Gasket & Seals, Gasket Material to Dampen or Attenuate Vibration, available at https://www.henniggasket.com/gasket-answers/faqs/gasket-material-dampen-attenuate-vibration/
2009	MEMS Accelerometers, University of Ljubljana (Slovenia), 2008
2010	A Designer’s Guide to MEMS Sensors, Jack Ganssle, July 12, 2012 (available at https://www.digikey.com/en/articles/a-designers-guide-to-mems-sensors)
2011	Introduction to the Accelerometer, OMEGA Engineering Technical Reference (available at https://mx.omega.com/prodinfo_eng/accelerometers.html) (obtained from page indexed by Internet Archive on August 17, 2014)

Exhibit No.	Description
2012	Piezoelectric Accelerometers, Theory and Application, Metra Mess- und Frequenztechnik (2001)
2013	An Introduction to MEMS Vibration Monitoring, Mark Looney, Analog Dialogue 48-06, June 2014
2014	Dzhudzhev, B., Ivancheva, V., Kachulkova, S., & Gospodinova, E. (2013). Vibration measurement with piezoelectric transducer. In XLVIII International Scientific Conference on Information, Communication and Energy Systems and Technologies ICEST 2013, available at http://e-university.tu-sofia.bg/e-publ/files/1025_E_Gospodinova_vibracii_statija_2013.pdf
2015	Why MEMS Accelerometers Are Becoming the Designer's Best Choice for CbM Applications, Chris Murphy, Webpage Screenshots, available at https://www.analog.com/en/resources/technical-articles/why-memes-acceler-are-best-choice-for-cbm-apps.html
2016	Inertial Navigation Sensors, Honeywell Aerospace, 2015
2017	Accelerometer Mounting and Installation Techniques, Wilcoxon Sensing Technologies, August 2014
2018	Hopkins, R., Miola, J., Setterlund, R., Dow, B., Sawyer, W., "The Silicon Oscillating Accelerometer: A High-Performance MEMS Accelerometer for Precision Navigation and Strategic Guidance Applications," Proceedings of the 61st Annual Meeting of The Institute of Navigation (2005), Cambridge, MA, June 2005, pp. 1043-1052.
2019	Apple Core Motion Documentation (webpage) available at https://developer.apple.com/documentation/coremotion/getting-raw-accelerometer-events

Exhibit No.	Description
2020	Apple Core Motion Documentation (webpage), “Getting raw accelerometer events,” available at https://developer.apple.com/documentation/coremotion/getting-raw-accelerometer-events
2021	“Apple Confirms it Knew About iPhone ‘Bendgate,’” Gordon Kelly, 2018, available at https://www.forbes.com/sites/gordonkelly/2018/05/24/apple-iphone-problem-iphone-6-iphone-6-plus-bend-touchscreen/
2022	“Every iPhone That Works with iOS 14’s Back Tap Feature,” available at https://screenrant.com/apple-ios-14-back-tap-iphone-list/
2023	Order re: Defendant’s Motion to Stay Pending IPR Proceedings, <i>Haptic, Inc. v. Apple, Inc.</i> , Case No. 3:24-cv-02296-JSC, Dkt. 126 (N.D. California Nov. 20, 2024)
2024	Pretrial Order No. 1, <i>Haptic, Inc. v. Apple, Inc.</i> , Case No. 3:24-cv-02296-JSC, Dkt. 73 (N.D. California May 16, 2024)
2025	Federal Court Management Statistics, September 30, 2024 (retrieved from https://www.uscourts.gov/data-news/reports/statistical-reports/federal-court-management-statistics/federal-court-management-statistics-september-2024)
2026	Defendant Apple Inc.’s Disclosure of Invalidity Contentions, Case No. 3:24-cv-02296-JSC, (N.D. California) (served July 15, 2024)

CONVENTIONS

1. Patent Owner is referenced herein as “Haptic.” Ex. 2003.
2. All emphasis is added unless otherwise noted.
3. Phrases like “as discussed” incorporate fully the analysis of the cross-cited portion of the Petition.
4. “*Bederson*” refers to APPLE-1003.

I. Introduction

The '738 Patent introduced an improvement in gesture-based control systems for traditionally non-touch surfaces. It teaches an accelerometer-tailored mounting system that combines very specific material and structural relationships to reduce damping and enhance clarity, overcoming the prior art's functional constraints on sensor proximity to the tap location. This innovation directly fueled a historic market response to Haptic's "Knocki" product, which raised over \$1.1M in a record-breaking Kickstarter campaign.

It also enabled the success of iPhone's Back Tap feature—the first commercially successful feature to enable tap detection across the entire backside of a smartphone—which has garnered significant industry praise, public response, and copying by other industry giants. Apple introduced Back Tap in 2020, after 13 consecutive years of releasing iPhones equipped with built-in accelerometers that Apple here claims (Grounds 2A-2B) render the challenged claims obvious. Back Tap was released only after Apple explicitly expressed interest in Haptic's technology and hosted meetings with Haptic's team to learn more. Moreover, Apple introduced Back Tap roughly a year after Haptic's first shipments of Knocki. It is difficult to reconcile Apple's obviousness arguments with Apple's own commercial interest in Haptic's innovation, especially given the serious deficiencies in the Petition.

Apple fails to show that Grounds 1A-1C, underpinned by Murakoshi-Stewart, render any challenged claim obvious. Apple fundamentally misunderstands Stewart, which teaches accelerometer mounting for use in a sensor designed for guided missile navigation, not vibration detection. Stewart's sensor intentionally suspends its accelerometers to prevent system vibrations from affecting them, because it purposely oscillates the accelerometers at a calibrated, preselected frequency to measure the system's angular acceleration rate. Mounting Murakoshi's accelerometer using Stewart's mounting system—as in the proposed combination—would render it inoperable for detecting surface vibrations.

In grounds 2A-2B, Apple combines iFixit, representing the iPhone 6, with Li. But Apple's evidence fails to show that there was any reasonable expectation that using the iPhone 6's existing accelerometer would successfully implement Li's method. Apple argues that merely because *accelerometers generally* were known to detect vibrations, that *the iPhone's accelerometer* would necessarily detect gestures as required by Li—despite the fact that the existing accelerometer's location and indirect mounting on the phone's logic board directly contradicted Li's plain teachings regarding where and how its detector should be mounted to successfully detect vibrations. Apple merely assumes that the existing accelerometer would have worked, offering only conclusory evidence that evaporates upon inspection. Apple provides no credible evidence of a motivation to combine, or a reasonable

expectation of that the existing accelerometer, when used for vibration detection (not merely to sense motion) would have been reasonably expected to succeed using Apple’s proposed indirect mounting on the logic board.

Further, Apple’s failure to provide a *Sotera* stipulation, the lack of any merit (much less compelling merit), and the balance of the *Fintiv* factors make discretionary denial appropriate.

Accordingly, Haptic respectfully requests the Board deny institution.

II. Level of Ordinary Skill In The Art

Petitioner does not address the level of ordinary skill in the art, but cites in a footnote, without explanation, to thirteen paragraphs of *Bederson*, attempting to incorporate this testimony by reference. Petition, 5 n.3. Such incorporation is improper. *See* PTAB Consolidated Trial Practice Guide (Nov. 2019) (“Guide”) at 35-36; *Cisco Systems, Inc. v. C-Cation Techs., LLC*, IPR2014-00454, Paper 12 at 7-8 (PTAB Aug. 29, 2014) (informative) (“[U]sing footnotes to cite large portions of another document, without sufficient explanation of those portions, amounts to incorporation by reference.”)

Dr. Bederson provides his opinion that a POSITA “would have had a bachelor’s degree in computer science, computer engineering, or a related field” and practical “programming or engineering experience,” including “developing user interface technologies,” but that additional education could substitute for experience

or vice versa. *Bederson* ¶30. He asserts that a POSITA would understand human-computer interactions and be capable of performing “related” (but unspecified) “design tasks,” and would have “basic knowledge” of machine electronics, circuitry, and coding. *Id.* ¶31.

As shown herein, Dr. Bederson’s testimony creates significant doubts as to whether this description adequately characterizes the appropriate level of skill in the art, and whether he is qualified to provide the opinions presented. Section XI. Nevertheless, without agreeing to this description, Haptic relies on the testimony of Dr. Jason Janét, who satisfies Dr. Bederson’s proposed level of skill. Ex. 2001 ¶¶59-61. Dr. Janét is also experienced in the mounting and use of accelerometers and other sensors for detecting vibration. *Id.* ¶¶4-25, 60. Should the Board institute trial, Haptic reserves the right to propose an alternative level of ordinary skill.

III. Claim Construction

Although Apple’s claim constructions contain various errors, Haptic does not believe the Board needs to construe any term to resolve the issues presented. Haptic will address claim construction to the extent necessary if trial is instituted.

IV. Vibration Detection and Sensor Technology

This section discusses background concepts relevant to Apple’s asserted grounds and Haptic’s arguments herein.

A. Vibration

A physical impact on a surface transmits vibrations in the form of mechanical waves across multiple frequencies. When these waves travel through and between materials, they lose energy due to certain internal properties. Internal friction (the resistance to motion of the elements within the material) causes energy loss due to the material's microstructure, which absorbs the vibrations in the form of heat. Scattering, caused by internal inhomogeneities, causes deflection of vibration waves in different directions, diminishing forward energy. This energy loss is called attenuation or damping. Ex. 2001 ¶71.

Attenuation/damping can reduce a wave's energy to the point where it is no longer detectable, limiting the distance the wave can travel. The farther a wave must travel through a material, and the more discontinuities the wave encounters, the more the wave will be attenuated. This is why a room with thicker walls (or walls made of denser materials) is better able to dampen noise than a room with thinner walls. *Id.* ¶72.

At interfaces between materials, disparities in their properties also attenuate vibrational waves. This is known as impedance mismatch. The more discontinuities a wave encounters, the more it will be damped. *Id.* ¶73.

Flexible materials (e.g., rubber gaskets, noise insulation) were conventionally used to isolate or damp vibrations by absorbing and dissipating energy. This is

because of the impedance mismatch created by applying such materials, and because these materials possess high internal friction and porous or irregular structures which cause scattering. Using different flexibilities between materials—which would have been expected to introduce impedance mismatches and thus attenuate vibrations—were not known or used to actually reduce damping. *Id.* ¶74.

B. Accelerometers and Piezoelectric Transducers

Accelerometers are sensors used to measure acceleration, serving two primary purposes. One is detecting orientation or motion of an object, which can be used to infer an object's orientation or trajectory, such as in guided missile navigation or a smartphone's rotation between portrait and landscape mode. The second is to detect vibrations. Ex. 2001 ¶75.

Accelerometers rely on a proof mass—a small, movable mass suspended within the sensor. When an accelerometer experiences acceleration, the proof mass within it displaces relative to the sensor's housing, and this displacement is used to measure the applied force. However, the specific mechanism to measure this displacement varies between types of accelerometers. *Id.* ¶76.

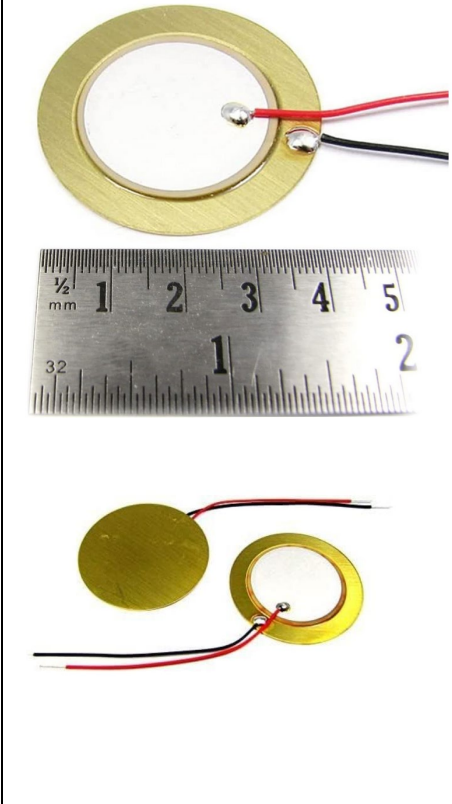
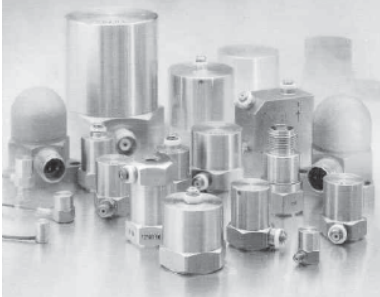
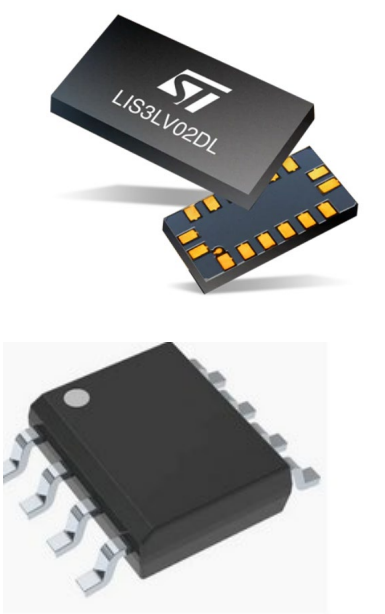
MEMS (Micro Electro-Mechanical System) accelerometers, commonly used in consumer devices, typically utilize capacitive sensing. The proof mass is typically mounted on a flexible beam fixed to the accelerometer housing. Acceleration flexes the beam and displaces the mass itself relative to the housing. This displacement is

measured through the change in capacitance between the proof mass and the accelerometer frame, which is used to determine acceleration. Because they are compact and power-efficient, they were ideal for small, battery-powered devices. *Id.* ¶77.

In piezoelectric accelerometers, acceleration causes the proof mass to exert a force on a piezoelectric material. Such materials are called transducers because they convert mechanical energy (pressure) to electric energy. The piezoelectric material converts the pressure exerted on it to a proportional electrical signal, which is used to measure acceleration. While effective, piezoelectric accelerometers have a relatively large form factor and higher power requirements than MEMS accelerometers, due in part to the requirement that they contain a substantial proof mass and due to the inclusion of the piezoelectric element. This has limited their use in mobile devices. They were commonly used in industrial applications where these constraints are less critical. *Id.* ¶78.

The piezoelectric transducer that is contained within a piezoelectric accelerometer is not itself an accelerometer. However, a transducer can be independently used to detect vibration. This is because a piezoelectric transducer deforms or bends in response to vibrational waves. This deformation results in an electrical signal proportional to the wave's force. *Id.* ¶79.

Examples of piezoelectric transducers, piezoelectric accelerometers, and MEMS accelerometers are shown below:

Piezoelectric Transducers	Piezoelectric Accelerometers	MEMS Accelerometers
	 	

Id. ¶80.

C. Accelerometer Mounting

Mounting accelerometers was known to be highly variable and goal specific. In some cases, design objectives required increasing the damping of an accelerometer's mount relative to its housing and to the underlying surface. Examples include seismic monitoring (where the mounting is designed to filter out waves not attributable to seismic activity), automotive crash testing (where damping

prevents sensor overloading), and inertial navigation systems. Ex. 2001 ¶81.

In certain applications, minimizing damping was critical to allow the accelerometer to accurately detect external vibrations. Accelerometers were often rigidly mounted to their surfaces, but not all such mountings were equally effective; the employed method must be tailored to align with the specific design goal and purpose. *Id.* ¶82.

For instance, aerospace applications would require relatively lightweight brackets or specialized adhesives to minimize added mass and prevent operations near modal frequencies. In structural monitoring applications, such as for bridges or wind turbines, accelerometer mounts must be encapsulated to protect against environmental factors like dust, water, and corrosion. In pedometers, accelerometers detected movement of the entire pedometer without the need to detect impacts on a particular surface; here, the mounting must merely be rigid enough to do so, with further optimizations to rigidity yielding no functional improvement. *Id.* ¶83.

Thus, the goal-specific mountings of accelerometers must address distinct challenges tailored to each application, and the teachings of one mounting objective do not translate to those of another. *Id.* ¶84.

V. The Claimed Invention

The invention of the '738 Patent relates to a control system that detects gestures associated with a mounting surface and generates associated commands to

a terminal device. APPLE-1001, 1:37-48. The claimed system includes a housing engaged to a mounting surface, a sensor, a server in communication with the sensor, and a terminal device in communication with the server. *Id.*, 12:2-45. The described embodiments include a housing that has an engagement means for a mounting surface, the engagement means including an attachment means that attaches the housing to the mounting surface. *Id.*, 4:42-51. The engagement means also includes a transmission portion connecting the sensor to the housing. *Id.* By virtue of its placement, the sensor forms an interactive zone aligned with the mounting surface. *Id.*, 4:52-64. The sensor is in a fixed position relative to the engagement means, which allows the sensor to detect a contact interaction with the mounting surface inside the interactive zone. *Id.* A contact interaction—e.g., impact(s)—inside the interactive zone generates data signals of the sensor through the transmission portion of the housing. *Id.*, 4:55-66; 8:48-65. The impacts are translated to the mounting surface for detection by the sensor through the mounting surface as data signals. *Id.*

As shown in annotated Figure 4 below, the housing 20 (yellow) includes an engagement means 24 for a mounting surface 22 (blue). *Id.*, 6:62-7:17. Engagement means 24 comprises an attachment means 26 (green) between the housing 20 to the mounting surface 22. *Id.* The engagement means also comprises a transmission portion 28 (red) connecting the sensor 30 (comprising sensor unit 35, purple) to the housing 20. *Id.*

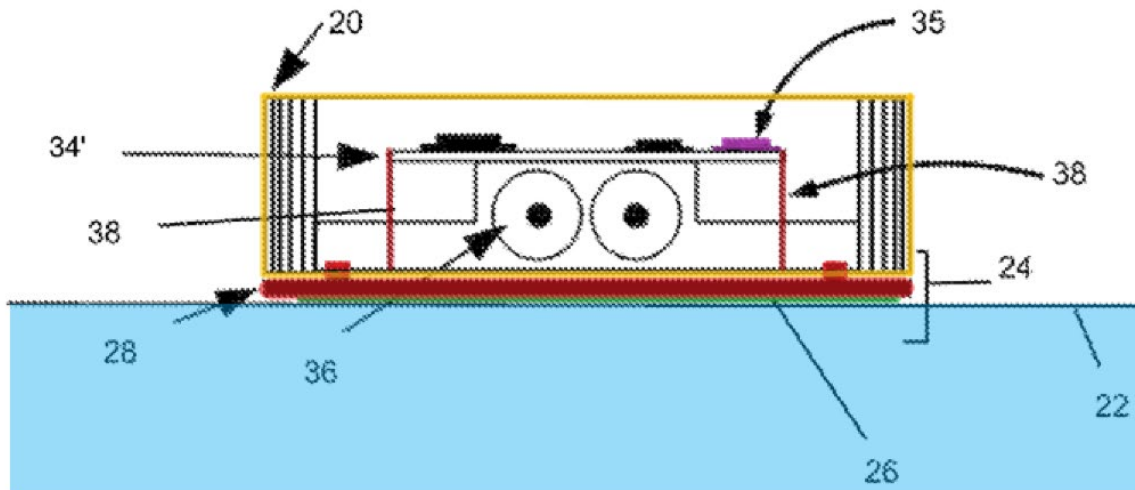


FIG. 4

The attachment means 26 can be an adhesive, mechanical fasteners, threaded screws or other components. *Id.* The transmission portion 28 can be comprised of frames and brackets 38 or a spring loaded portion (not shown) to reduce damping. *Id.* It can also be comprised of a rigid material, such as an injection molded frame. *Id.* 8:20-25. The transmission portion is comprised of a material with flexibility different than the mounting surface, so as to set a rigid position of the sensor relative to the mounting surface. *Id.*, 12:39-45, 13:50-54. The transmission portion may hold the housing 20 “closer and stronger to the mounting surface 22 so as to reduce damping sound or vibration of contact interaction.” *Id.*, 8:31-35.

The engagement means 24 attaches sensor 30 and reduces damping so that sensor 30 more accurately detects vibrations in the mounting surface. *Id.*, 8:9-20. The transmission portion 28 carries vibration from the mounting surface to the

sensor. *Id.*

As mentioned, the invention requires setting a rigid position of the sensor relative to the mounting surface. In part, this rigid positioning allows vibrations from the mounting surface to be more accurately transmitted to the sensor. *Id.*, 7:9-7:17. The rigid position of the sensor establishes the transmission of the contact interaction to the sensor. *Id.*, 7:18-34. Thus, the “stable construction of the housing 20 and the sensor 30 enable the accurate and efficient conversion of the gestures into commands for the terminal device 50.” *Id.*

The sensor is in a fixed position relative to the engagement means, so that contact interaction is transmitted through the mounting surface to the sensor. *Id.*, 7:48-8:8. This allows vibrations through the mounting surface to be “transmitted as efficiently as possible to the sensor 30 through the mounting surface 22 and the engagement means 24.” *Id.*

The engagement means of the housing is cooperative with the sensor so that “any contact interaction generates data signals of the sensor through the transmission portion 28 of the engagement means 24.” *Id.*, 8:9-13. The fixed position of the sensor relative the engagement means, and the rigid positioning of the sensor relative to the mounting surface through the housing, collectively reduce damping of the contact interaction through the transmission portion. *Id.*, 8:1-9, 8:18-20 The sensor is thus held in position to “prevent flopping and vibrating separate from the mounting

surface” so that the sensor maintains the proper relationship to the mounting surface. *Id.*, 8:44-47. The specification teaches that the sensor’s data signals are expected to have “improved clarity and accuracy” as compared to systems without the relationship of the sensor within the housing relative to the mounting surface. *Id.*, 8:35-39.

The claimed sensor is an accelerometer. *Id.*, 12:5-8, 13:39-40. Accelerometers are distinguished from other sensor types, such as piezoelectric sensors. *Id.*, 9:19-34.

As explained above, vibrations from the contact interactions that the system was intended to detect are particularly sensitive to gaps and interfaces in the transmission path that can cause damping. Section IV.A. The inventors discovered that a flexibility difference between the transmission portion and mounting surface of the claimed invention counterintuitively resulted in a more rigid relationship, resulting in a net reduction in damping, and a stronger and clearer data signal. *Id.*, 8:9-47; Ex. 2001 ¶93 (explaining that this would have been surprising to a POSITA).

VI. Ground 1A Does Not Render Any Challenged Claims Unpatentable

In Ground 1A (Murakoshi-Stewart), Apple asserts that a POSITA would have combined the references by attaching Murakoshi’s accelerometer within a casing using Stewart’s brackets and sidebeams, and would further include case mounts on the apparatus casing to fix the apparatus to the vibratory surface using fasteners.

Petition, 14-15. Apple asserts multiple motivations to combine, all of which hinge on an alleged motivation to securely fix or mount the accelerometer and housing using Stewart's brackets and case mounts, and the assertion that such mounting would have been recognized as a suitable option for Murakoshi's apparatus. *Id.*, 15-16.

However, Apple's arguments ignore that a POSITA would not have been motivated to use Stewart's mounting system (Stewart's brackets, sidebeams, case mounts, and fasteners) to achieve the claimed invention. Section VI.3.; Ex. 2001 ¶¶104-111. This is because a POSITA would have immediately recognized that Stewart's mounting system would not result in fixing the accelerometer within the housing to prevent it from moving. Ex. 2001 ¶105. Indeed, Stewart teaches that its mounting system is expressly designed to **enable** its accelerometers to move relative to its surrounding housing and support surface. *Id.* As demonstrated below, this combination would not result in the claimed invention. In fact, the proposed combination simply makes no sense from a technical perspective, as Stewart's mounting system would not enable Murakoshi's accelerometer to detect surface vibrations (as required by Murakoshi), but would instead inhibit such detection. *Id.* Stewart thus teaches away from the claimed invention. Apple's combination is not driven by any ex ante benefit, but only the desire to assert unpatentability using hindsight bias, using the claimed invention as a roadmap.

1. Murakoshi

Murakoshi describes an apparatus for controlling a user interface of a device. APPLE-1004 [0013]. The apparatus may detect vibrations of a vibratory surface caused by an interaction of an object with the surface. *Id.* Murakoshi discloses that the apparatus “may be coupled to the vibratory surface 106” and may be “fixed” “on” or “to” the surface, “above and/or below” the surface, or “embedded in the vibratory surface.” *Id.* [0021]. The apparatus includes a sensor 206, which may be “an accelerometer, a gyroscope, an ultra-sonic sensor, a microphone” or another sensor type capable of detecting vibrations. *Id.* [0025], [0029]. The sensor may be an integral part of the apparatus or external to the apparatus. *Id.* [0030].

Murakoshi does not explain how its sensor is attached to the apparatus and vibratory surface, beyond general descriptions of “fixing” and “coupling.” *Id.*; *Bederson* ¶110 (admitting that Murakoshi does not describe “how to mount the accelerometer within the apparatus or how to mount the apparatus to the surface.”). It contains no disclosure suggesting the teachings of the ’738 Patent regarding how the engagement means (including attachment means and transmission portion) functions to attach a housing to a mounting surface so that the sensor is rigidly

positioned¹ relative to the mounting surface, or that the transmission portion be comprised of a material with flexibility different than the mounting surface to enable the efficient and accurate detection and conversion of vibrations from contact interactions into data signals and determine data patterns associated with commands for a terminal device. This is important given the '738 Patent's teaching that this relationship of the sensor, relative to the mounting surface, is what enables the invention's "improved clarity and accuracy" over other designs. Ex. 1001, 8:35-39.

2. Stewart

Stewart discloses a "vibrating multisensor" having two accelerometers. APPLE-1006, Abstract. Stewart specifically "relates to an inertial instrument," more particularly "multi-axes vibrating accelerometers" "for measuring both the linear acceleration and rate of rotation of a moving body." *Id.*, 1:18-22. As shown in annotated Figures 1-3 below, Stewart attaches its accelerometers to a "three-part bracket assembly" that includes fingers (18, 20), beam (19, 21), and lower fingers (30, 32). *Id.*, 5:8-13, 5:30-33. This bracket assembly positions the accelerometers within cavity (16) inside case (14) so that they are suspended between sidebeams

¹ Haptic generally agrees with Apple's understanding of "rigidly positioned": "[t]he accelerometer does not move (i.e., is rigid) relative to the mounting surface." Petition, 98-99; Ex. 2001 ¶99 n.6.

(25-28) “to react to and to provide a ... measure of acceleration of the supporting structure.” *Id.*, 4:64-68, 5:8-9, 5:54-56. “[E]ach combined bracket-and-accelerometer assembly is sandwiched between a pair of spaced-apart flexible sidebeams that include piezoelectric elements bonded thereto **for effecting predetermined vibratory sensor motion.**” *Id.*, 5:15-20. The piezoelectric elements (70, 72, 74, 76) vibrate the accelerometers “at a preselected frequency” to extract measures of linear and Coriolis accelerations from their output signals. *Id.*, 3:27-38. Coriolis acceleration is used to measure the angular rotation rate. *Id.*, 2:3-10; Ex. 2001 ¶100.

Case 14

Acclerometer
10, 12

Cavity
16

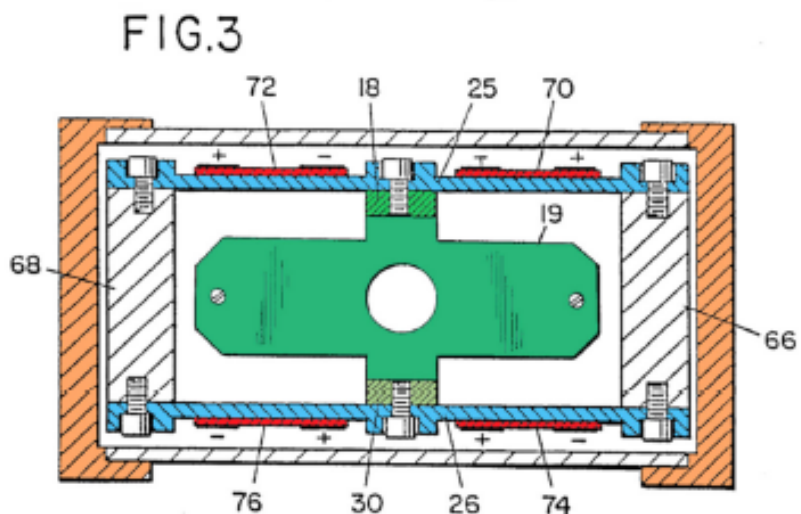
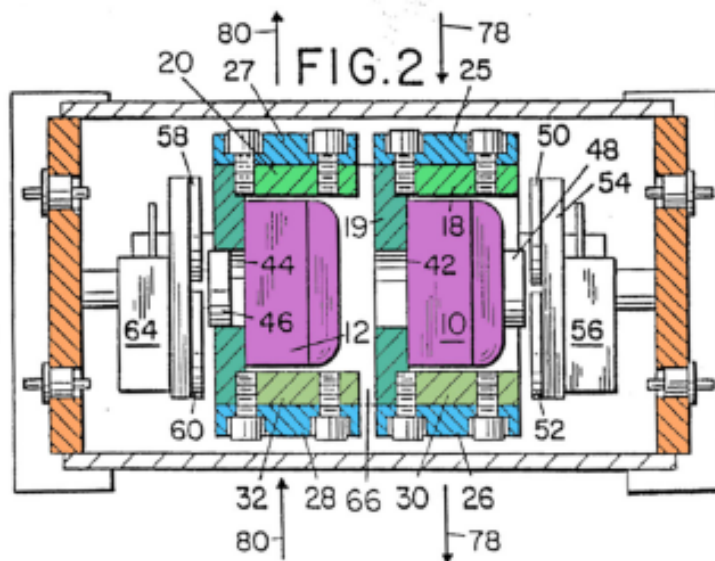
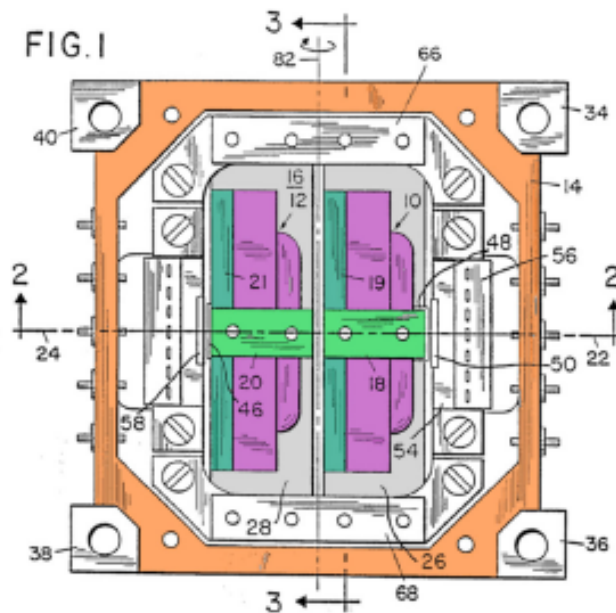
Beam
19, 21

Finger
18, 20

Lower
Finger
30,32

Sidebeam
25, 26, 27, 28

Piezoelectric
Element
70, 72, 74, 76



By applying positive and negative voltages, the piezoelectric elements deliver upward and downward forces to the sidebeams, forcing the combinations of sidewalls, brackets, and accelerometers upwards and downwards. *Id.*, 5:62-6:5. Via this “sequencing [of] the polarities of the electrical voltages, the accelerometer[s] [10, 12] are **substantially sinusoidally vibrated** in phase opposition at a preselected frequency,” and “[t]he amplitude of the sinusoidal velocity of vibration is held constant.” *Id.*, 6:5-12. This intentional vibrating of the accelerometers produces “measurable acceleration signals proportional to the component of the rate of rotation of the multisensor apparatus” so that the accelerometer output signals contain “measures of the rate of rotation of the system.” *Id.*, 6:23-31.

Stewart’s mounting system therefore “suspend[s] [the accelerometers] within the case of the multisensor to minimize any deleterious mechanical feedback between the accelerometer and the case.” *Id.*, 7:54-64. That is, the flexible mounting system **minimizes** transmission of external surface vibrations of the supporting structure to the accelerometers so that they do not affect the calibrated sinusoidal vibration at the preselected frequency. *Id.*, 5:62-6:19; Ex. 2001 ¶¶102-103.

3. A POSITA would have recognized that using Stewart’s mounting system in Murakoshi would have rendered the combination inoperable for its intended purpose.

A POSITA would have recognized that Stewart relates specifically to inertial navigation systems relevant to applications such as guided missiles. Ex. 2001 ¶¶103,

106. Stewart's teaching that its accelerometers are intentionally vibrated at a preselected frequency informs a POSITA that its accelerometers use a feedback control system that actively counteracts the inertial force acting on its suspended inertial mass members. Ex. 2001 ¶107; APPLE-1006, 3:27-38. Thus, a POSITA would have understood that Stewart's accelerometers did not detect external vibration of the support structure, but were instead isolated from external vibrations so that they could be intentionally oscillated at a preselected frequency to create a desired sinusoidal vibration, to determine the rate of rotation of the support structure. Ex. 2001 ¶105, 107; APPLE-1006, 4:64-68, 5:62-6:31.

Thus, Stewart's system was designed to **actively generate** vibrations of the accelerometers within the sensor's housing. Ex. 2001 ¶108. A POSITA would have understood that Stewart's bracket assemblies did **not** fix or rigidly position the accelerometers relative to the casing (nor relative to the surface on which the case was mounted), but instead suspended the accelerometers so they could be vibrated at the preselected frequency. *Id.* That is, the mounting system **enables** the accelerometers to move independently of their casing and mounting surface. *Id.* If the bracket assemblies rigidly positioned Stewart's accelerometers—to either the casing or mounting surface—the accelerometers would not be able to properly vibrate. *Id.*

A POSITA would have understood that, unlike the transmission portion taught

in the '738 Patent, Stewart's mounting system was not designed to enable accelerometers to detect vibrations associated with the mounting surface. Rather, its express purpose was to suspend its accelerometers to minimize external vibrations from the support (mounting) surface from affecting the preselected vibration caused by the piezoelectric elements. Ex. 2001 ¶109; APPLE-1006, 7:54-64.

This is the opposite of the claimed invention, which requires an accelerometer connected via a transmission portion that sets a “rigid position of said sensor relative to said mounting surface.” Ex. 2001 ¶109. If Stewart's mounting system were used to attach Murakoshi's accelerometer to its apparatus as Apple proposes, vibrations on Murakoshi's vibratory surface would be damped such that they would not be effectively transmitted to the accelerometer. *Id.* ¶110. That is, a POSITA would have recognized that in Murakoshi-Stewart, the accelerometer would be prevented from effectively detecting vibrations of the vibratory surface. *Id.* This would render Murakoshi-Stewart inoperable for its intended purpose. *Id.*; *Plas-Pak Indus. v. Sulzer Mixpac AG*, 600 F. App'x 755, 758 (Fed. Cir. 2015) (explaining that “combinations that ... render the prior art ‘inoperable for its intended purpose’ ... may fail to support a conclusion of obviousness”) (quoting *In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984)).

It is apparent that Stewart teaches away from the claimed invention. A reference “teaches away” when it “suggests that the line of development flowing

from the reference’s disclosure is unlikely to be productive of the result sought by the applicant.” *Santarus, Inc. v. Par Pharm., Inc.*, 694 F.3d 1344, 1354 (Fed. Cir. 2012); *see also Polaris Indus. v. Arctic Cat, Inc.*, 882 F.3d 1056, 1069 (Fed. Cir. 2018) (reference teaches away when a POSITA “would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant”). Here, a POSITA would have recognized that Stewart’s mounting system was designed to prevent transmission of vibrations from an external surface to the accelerometers, and when combined with Murakoshi, would not produce the result achieved in the claimed invention. Ex. 2001 ¶¶110-111.

4. Apple’s asserted motivations to combine lack support for rigidly positioning an accelerometer as required by the claimed invention.

As an initial matter, Apple’s obviousness arguments (for both Murakoshi-Stewart and Li-iFixit) comprise a series of mostly single-sentence bullets citing multiple paragraphs of *Bederson*. Petition, 15-16 (citing *Bederson* ¶¶114-125, which spans 9 pages); Petition, 74-77 (citing *Bederson* ¶¶340-347, which spans 7 pages). The Petition thus presents a series of conclusory statements, failing to properly explain their significance and relying solely on Dr. Bederson’s declaration to do so. This is improper incorporation by reference. *See* Guide, 35-36; *Cisco Systems*, IPR2014-00454, Paper 12 at 9 (“[T]he Petition includes citations to the Declaration

to support conclusory statements for which the Petition does not otherwise provide an argument or explanation.... This practice ... amounts to incorporation by reference.”).

For Murakoshi-Stewart, Apple first asserts a motivation to combine because “[u]sing brackets and fasteners to mount the sensor to the housing and housing to a surface” were well-known. Petition, 15. This is merely an assertion that these components were known, not a motivation to combine. *Virtek Vision Int’l ULC v. Assembly Guidance Sys.*, 97 F.4th 882, 888 (Fed. Cir. 2024) (reversing obviousness finding where the prior art disclosed the claimed limitations, explaining that “[i]t does not suffice to simply be known. A reason for combining must exist”); Ex. 2001 ¶112.

Apple next asserts that “[a] POSITA would have understood that the accelerometer would operate better if fixed within the apparatus to orient the accelerometer and ... prevent it from moving within the housing.” Petition, 15. But Stewart does not teach “fixing” its accelerometers—in fact, it teaches the opposite. Sections VI.2.-VI.3. Thus, a POSITA attempting to implement Murakoshi’s system would not have looked to Stewart’s mounting system to “fix” an accelerometer within Murakoshi’s apparatus. Section VI.3; Ex. 2001 ¶113.

Further, Petitioner’s cited evidence (*Bederson* ¶¶39-43, 117-118; Murakoshi [0029]-[0030]; Stewart Fig. 1) does not support this assertion. Petition, 15.

Murakoshi generically couples its accelerometer to the vibratory surface, but does not describe orienting an accelerometer or preventing it from moving within its housing. Section VI.1. Nothing in Stewart supports this assertion. as it explicitly teaches away. Section VI.3. Similarly, nothing cited in *Bederson*'s "Accelerometer Basics" section (§§39-43) states or suggests that the accelerometer must be prevented from moving within its housing. Ex. 2001 §§115-119 (explaining that nothing in the cited section suggests the accelerometer "would operate better if fixed within the apparatus to orient the accelerometer within the housing and prevent it from moving within the housing"). Indeed, Dr. Bederson testifies that "the accelerometer **needs to be able to move relative to the casing (and relative to the surface the casing is mounted to)** to detect the extent of the vibrations," (*Bederson* §114), which contradicts and undermines this assertion. *See* Section XI.

Bederson §117 states that "[a]ccelerometer movement independent of the vibratory surface or device or measurement would result in an improper ... measurement." But his cited support does not support any motivation to fix an accelerometer within its housing. Ex. 2001 §§121-122 (explaining that nothing in Ex. 1037 or Ex. 1041 details fixing an accelerometer within its housing).

In *Bederson* §118, Dr. Bederson opines that "[f]ixing the accelerometer within the housing would prevent the accelerometer from being loose within the housing, moving around and possibly being damaged." But "fixing" the accelerometer within

its housing such that it does not move at all is not the same thing as preventing it from “being loose” and “moving around.” Ex. 2001 ¶123. Stewart’s accelerometers were not rigidly “fixed” within their housing, yet they cannot “move around” sufficiently to subject them to damage. *Id.*; Section VI.2. Dr. Bederson’s testimony that “the accelerometer needs to be able to move relative to the casing” also contradicts this assertion. *Bederson* ¶114; Section XI.

Dr. Bederson further asserts that Murakoshi’s description of its sensor as “integral” to its apparatus “would have motivated a POSITA to investigate ways to fix the accelerometer within the device.” *Bederson* ¶118. But Murakoshi’s reference to an “integral part” indicates only that the sensor may be a component part of the apparatus, versus an external component. APPLE-1004 [0030]; Ex. 2001 ¶124. Merely because the accelerometer is part of Murakoshi’s apparatus does not suggest “fixing” the accelerometer within the apparatus. Further, a POSITA searching for how to “fix” an accelerometer would certainly not look to Stewart’s “brackets and sidebeams,” (*Bederson* ¶118), which do not do so. Section VI.2-VI.3. Accordingly, nothing Apple cites supports this alleged motivation.

Apple next asserts that a POSITA would have been motivated to “securely mount the accelerometer and housing using brackets and case mounts (per Stewart) to enable the accelerometer to detect vibrations without interference from housing components.” Petition, 15. But Stewart’s accelerometers were not rigidly positioned

relative to their mounting surface, but were instead suspended to **prevent** external vibrations from interfering with the self-generated vibration of the accelerometers using the multisensor's internal piezoelectric elements. Section VI.2.-VI.3; Ex. 2001 ¶125. The combination would therefore have prevented the accelerometer from detecting vibrations from the vibratory surface. Section VI.3; Ex. 2001 ¶125.

Apple's remaining motivations are directed at selecting between the multiple options for mounting an accelerometer, concluding that a POSITA would select Stewart's mounting system. Petition, 15-16. But as discussed, Stewart's mounting system would not only fail to rigidly position Murakoshi's accelerometer, it would suspend the accelerometer and damp vibrations from the vibratory surface, preventing detection of vibrations and rendering Murakoshi-Stewart inoperable. Section VI.3; Ex. 2001 ¶126.

5. There was No Reasonable Expectation of Success in Arriving at the Claimed Invention

Apple argues a reasonable expectation of success based on predictable results from the combination of known elements according to known methods. Petition, 16. While a POSITA might have had a reasonable expectation of successfully combining the physical components of the two references, that is not the correct legal inquiry. There must be a reasonable expectation of success in **achieving the claimed invention**. *Intelligent Bio-Systems, Inc. v. Illumina Cambridge, Ltd.*, 821 F.3d 1359, 1367 (Fed. Cir. 2016) ("The reasonable expectation of success

requirement refers to the likelihood of success in combining references to meet the limitations of the claimed invention.... The Board seemed to believe that the ‘reasonable expectation of success’ inquiry looked to whether one would reasonably expect the prior art references to operate as those references intended once combined. That is not the correct inquiry—one must have a motivation to combine accompanied by a reasonable expectation **of achieving what is claimed in the patent-at-issue.**”); *see also Depuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1326 (Fed. Cir. 2009) (“[T]he ‘predictable result’ discussed in *KSR* refers not only to the expectation that prior art elements are capable of being physically combined, but also **that the combination would have worked for its intended purpose.**”). Not only does Apple fail to even allege that there was a reasonable expectation of achieving what is claimed (as opposed to merely making the combination), a POSITA would have recognized that Murakoshi-Stewart would not do so, because the combination’s mounting system (from Stewart) would minimize transmission of vibrations in the vibratory surface to the accelerometer. Sections VI.2-VI.3. Thus, there was no reasonable expectation of success. Ex. 2001 ¶¶127-128.

6. Murakoshi-Stewart Does Not Teach or Suggest all Claim Elements

a. Murakoshi-Stewart does not teach or suggest claim elements [1b-v], [10b-iv].

Mounting Murakoshi's accelerometer using Stewart's mounting system would not hold the accelerometer "within the apparatus casing in a fixed position relative to the bracket assembly, fasteners, and case mounts (collectively, engagement means)" or "in a fixed position relative to a sensing surface" (Petition, 23). Sections VI.2-VI.3; Ex. 2001 ¶¶132-133. Rather, these components were designed to allow Stewart's accelerometers to purposely oscillate or vibrate at a preselected frequency. Ex. 2001 ¶133; APPLE-1006, 3:27-38, 5:15-20, 5:62-6:19. Stewart itself teaches that the accelerometers positioned using its mounting system were not "fixed" but only maintained a "mean or average position during vibration." APPLE-1006, 5:21-25. Murakoshi-Stewart would not hold the accelerometer in a fixed position relative to the engagement means, nor would it enable "accurate detection of vibratory signals," (Petition, 23), but would instead prevent such detection. Section VI.3; Ex. 2001 ¶133.

b. Murakoshi-Stewart does not teach or suggest claim elements [1e], [10c].

Apple maps the "transmission portion" of the engagement means to the combination's "teaching of a bracket assembly that connects the sensor to the case mounts and fasteners (attachment means) of the casing, per Stewart." Petition, 32-

33. Thus, Apple asserts that “Murakoshi-Stewart’s bracket assembly and case mounts with mechanical fasteners couple a sensor to the housing and the housing to a mounting surface.” *Id.*, 33. Apple further asserts that a POSITA “would have understood that the brackets and casing described by Stewart hold the sensor rigidly in place relative to the attachment means, and thus also hold the sensor in a rigid position relative to the vibratory surface.” *Id.*, 33-34.

As an initial matter, the claims require the transmission portion be “comprised of a material **with flexibility different than said mounting surface** so as to set a rigid position of said sensor relative to said mounting surface.” While Apple asserts that “[a] POSITA would have understood that the **composition and structure** of the bracket assembly **would be different than the vibratory surface** ... because of differences in material and/or thickness,” (Petition, 33) Apple does not even allege that the bracket assembly would have had a flexibility different than the mounting surface as required by the claims. Even if Apple assumed that the combination’s bracket assembly and mounting surface would have different flexibilities, Apple does not assert this or provide any evidence to that effect. There is no reason the materials could not have had the same flexibility, and Stewart does not mention any flexibility differences. Ex. 2001 ¶¶136-137. Accordingly, the combination fails to disclose all limitations of the independent claims, and cannot render any challenged claim unpatentable.

Further, a POSITA would have recognized that Murakoshi-Stewart's transmission portion does not "set a rigid position of said sensor relative to said mounting surface." Stewart's three-part bracket assembly (the mapped transmission portion) suspended an accelerometer such that it was able to vibrate independently of the casing and mounting surface, and acted to prevent vibrations from the support surface from being transmitted to the accelerometers. Sections VI.2-VI.3. In Murakoshi-Stewart, the bracket assembly would not "set a rigid position" of the accelerometer "relative to [the] mounting surface" as the claims require, because this was the opposite purpose for which the bracket assemblies were expressly designed. Ex. 2001 ¶138; Section VI.2-VI.3.

Because Murakoshi-Stewart does not teach or suggest this element of the independent claims, it cannot render any challenged claim unpatentable.

VII. Ground 1B Does Not Render any Challenged Claim Unpatentable

Ground 1B consists of the Murakoshi-Stewart apparatus of Ground 1A in combination with Sachs. Petition, 38-39. For the reasons described for Ground 1A, Ground 1B cannot render any challenged claim unpatentable. Section VI.

VIII. Ground 1C Does Not Render any Challenged Claim Unpatentable

Ground 1C is the combination of the "Murakoshi-Stewart-Sachs apparatus" of Ground 1B in combination with Orr. Petition, 45. Apple's analysis does not substantively differ from its analysis of Ground 1B (which incorporated Ground 1A),

except in the application of Apple’s preferred claim construction for certain elements (the “output module” [1c-iv], the “routing module” [1c-v], the “processing module” [1c-vi], and “said output module transmitting said command to said receiving module” [1d-v]). Petition, 47-65.

Apple also provides a separate analysis for elements [1e] and [10c] pursuant to its constructions. Petition, 49, 61-64. However, Apple asserts that Ground 1C renders this element obvious for the same reasons set forth in Ground 1A—namely, “based on Stewart’s teachings of (1) case mounts for use with mechanical fasteners and (2) a bracket assembly.” *Id.*, 49. That is, Apple asserts that “the brackets, support flexures, and casing, per Stewart, hold the sensor rigidly in place relative to the attachment means, and thus also hold the Murakoshi-Stewart-Sachs-Orr sensor in a rigid position relative to the vibratory surface.” Petition, 63. Thus, Ground 1C relies on the same accelerometer mounting system described in Stewart as Ground 1A. As explained, Stewart’s bracket assembly would not hold the combination’s accelerometer rigidly in place relative to its housing, or to the identified attachment means (case mounts), or the mounting surface (vibratory surface). Sections VI.2-VI.3.

One difference in Ground 1C is Apple’s assertion that “a POSITA would have understood that the bracket assembly’s composition and structure would have different specifications (e.g., material, thickness, flexibility) than Murakoshi’s

vibratory surface.” Petition, 63. This differs from Apple’s assertion for Ground 1A, which stated only that a POSITA would have understood the bracket assembly’s composition and structure would be different than the vibratory surface because of differences “in material and/or thickness.” *Id.*, 33. However, Apple’s support for this statement comprises only (a) citations to Murakoshi (which do not discuss Stewart’s bracket structure); and (b) a conclusory assertion in *Bederson. Id.*, 63. There, Dr. Bederson merely cites to Murakoshi for its discussion of the different iterations of the vibratory surface and their composition. *Bederson* ¶303. He does not provide any support for his assertion that a POSITA would have understood that the flexibility of Stewart’s bracket assembly would have been different than that of Murakoshi’s vibratory surface. Ex. 2001 ¶¶143-144. It is therefore is entitled to no weight.

Even if accepted, this assertion does not change the combination’s reliance on Stewart’s mounting system. Thus, for the reasons described for Ground 1A, Ground 1C cannot render any challenged claim unpatentable. Section VI.

IX. Ground 2A Does Not Render any Challenged Claim Unpatentable

Ground 2A (“Li-iFixit”) implements “Li’s gesture detection methodology” “in an iPhone using internal components of an iPhone identified in iFixit.” Petition, 73-74. The combination “includes an accelerometer mounted on the logic board, which is held in place in the iPhone body by screws, and is used to sense vibrations per Li.” *Id.*, 74. As explained below, Apple’s analysis is clearly premised on

hindsight reconstruction of the claimed invention. Apple’s motivations to combine and reasonable expectation of success arguments ignore Li’s clear teachings regarding its sensor and its mounting, and are supported only by the unproven assumption that the iPhone’s existing accelerometer, mounted on the logic board, was capable of sensing the vibrations necessary to carry out Li’s method.

1. Li and iFixit

Apple ostensibly² uses iFixit merely to identify the iPhone components of Li-iFixit, including the position of its existing accelerometer on the logic board and how the logic board was arranged within the phone. Petition, 71-73.

Li teaches recognizing gestures on a “supplemental” device surface—e.g., the back of a phone or aftermarket case—using a “gesture detector.” APPLE-1008, Abstract, [0020], [0035], [0041]. Detector 42 is included in the body 26 of a device 20 (smartphone 22), or on a protective case, to detect physical gestures (e.g., taps) made on an outer surface. *Id.*, [0019]-[0020], [0041]; Figs. 1-2, 20A.

Li states that “[w]hile the gesture detector 42 may be any device” it “is preferably a piezoelectric transducer 70.” APPLE-1008 [0023]. A POSITA would

² Despite asserting iFixit (APPLE-1010) as a basis for Grounds 2A-2B (Petition, iii, 9), Apple never once cites to it in its analyses thereof. For this reason alone, Apple fails to prove either ground renders any claim unpatentable.

not have understood Li to mean literally “any device,” but only sensors capable of carrying out Li’s disclosed method. Ex. 2001 ¶149. Li’s preferred detector is capable of detecting mechanical and acoustic waves and contactless interactions by means of electrical charges on or in the body of the device. *Id.* [0024]-[0025].

Li explains that “[b]ecause the gesture detector 42 responds to physical gestures, the gesture detector 42 may be installed at any position or location on or in the body 26.” APPLE-1008 [0027]. Gestures made on the supplemental surface area cause vibrations to “propagate through the body 26 as mechanical and/or acoustical waves.” *Id.* [0030]. The detector therefore enables detection of gestures “over any portion of the body 26”—that is, gestures made on the supplemental surface area cause vibrations in the body, and therefore the gesture detector is mounted on or in the body so that it can sense the mechanical waves propagating through the body. *Id.* [0021]; Ex. 2001 ¶150.

The detector is therefore placed “proximate the supplemental gesture surface area,” which may be on the body’s outer surface or (preferably) adhered to an inner surface for added protection from damage. *Id.* [0035], Fig. 16. Although Li states that “detector 42 may be disposed anywhere within the electronic device 20,” (*id.*), a POSITA would have understood that it could not be mounted literally anywhere, but only where it would reliably detect the vibration waves propagated through the body from the gesture surface. Ex. 2001 ¶¶152-153. Otherwise, Li’s admonition to

avoid those areas that “may attenuate transmission of waves ... thus reducing or nullifying the output signal” would not be necessary. APPLE-1008 [0027] (explaining that “[a] designer may thus prefer to locate the gesture detector 42 in some region of the body 26 that adequately propagates waves or conducts charge”). This is also clear from Li’s teaching that, when a protective case is used, the case “may also deaden or insulate the backside 40 from the user’s gesture inputs,” and in such instances the detector is instead added to the case’s surface so that the sensor will “still sense vibration.” *Id.* [0040]-[0041]; Fig. 20A. Thus, a POSITA would have understood that Li’s detector would only reliably function when installed where it could detect the vibration waves propagating through the body from the designated gesture surface. Ex. 2001 ¶153; APPLE-1008 [0028].

Accordingly, when the supplemental gesture surface area is the backside, mounting in a central region there enables detection over the area. *Id.* [0027], Fig. 8. When device configuration (such as a “discontinuous gap” around an access door or battery compartment) may attenuate transmission of vibration waves, the detector is disposed away from the source of the issue, near an end region (e.g., away from the gap). *Id.*; Fig. 9. When the supplemental gesture surface area is on the device’s front, the detector is disposed proximate the front of the device. *Id.* [0028]. The detector may “thus be installed at any location of the body 26 to detect the vibration 72 caused by gesture inputs”—that is, any location where it would reliably detect vibrations

from the specific gesture surface. *Id.*; Ex. 2001 ¶154.

Li specifically references installing its detector in an iPhone. APPLE-1008 [0033], Fig. 15. The body 26 may have multiple components such as bottom portion 120 and mating central portion 122. *Id.* The body “houses a circuit board 124” and “may have any number of mating components that protect the internal circuit board 124.” *Id.* [0034]. Therefore, the circuit board is not considered part of the body in Li, but the body surrounds and protects the circuit board. Figure 15 “illustrates the gesture detector 42 integrated into the assembly, proximate the bottom portion 120 of the body 26.” *Id.* [0033]. The detector is not mounted on the circuit board, but has “an interface to the circuit board 124, such as a metallic strip or contact pad that conducts signals to/from the circuit board 124” or a “physical cable that plugs into a socket in the circuit board 124.” *Id.* This same interface is used when the detector is externally mounted on a protective case. *Id.* [0041]. A POSITA would have understood that Li does not suggest installing the detector on the circuit board, because this location is not proximate the supplemental surface such that the detector could adequately detect vibrations from that surface propagating through the body. Ex. 2001 ¶¶155-156.

Li explains that the detector must be directly adhered (mounted) to the body using any of various methods. These include an adhesive, although Li cautions that “the adhesive may be chosen to minimize attenuation as the vibration” “travels

through the adhesive.” APPLE-1008 [0035]. Li also suggests that the detector may “be mechanically adhered, such as by fastener or weld.” *Id.* In all cases, however, Li teaches a POSITA that the detector should be directly mounted on the body in order to minimize attenuation of the vibration signal. Ex. 2001 ¶157. Based on Li’s disclosure, a POSITA would have recognized that direct mounting to the body was required to carry out Li’s method, as an indirect attachment on the logic board would attenuate the vibrations propagating through the body, reducing or nullifying the output signal produced by the detector. Ex. 2001 ¶¶156-157; APPLE-1008 [0027], [0030]; Sections IX.2.a.-IX.2.b.

2. There was no motivation to combine or reasonable expectation of success in using the iPhone’s existing accelerometer to successfully perform Li’s method.

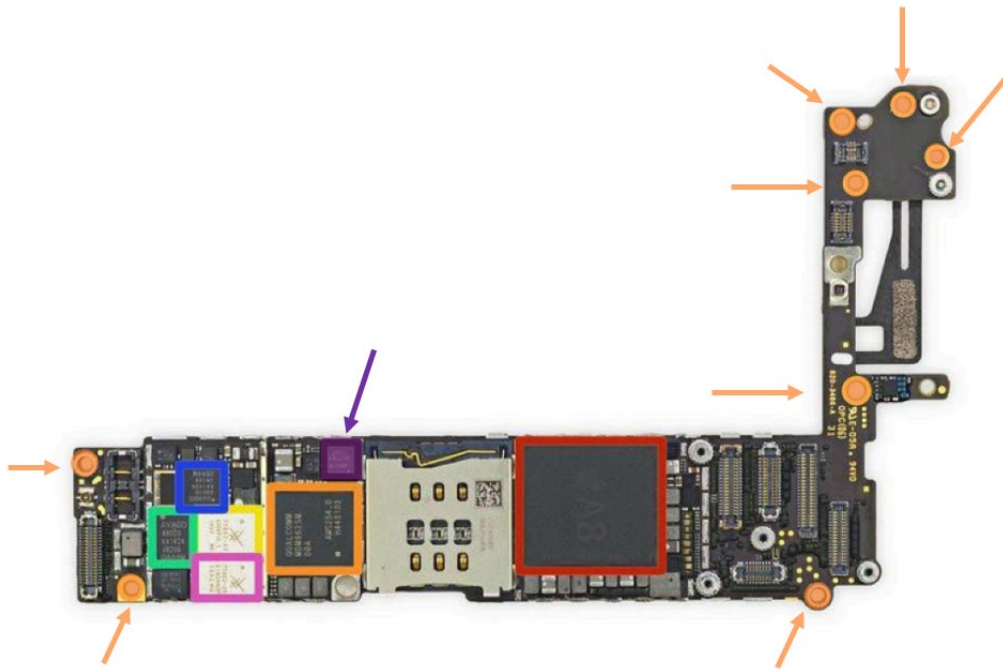
Li-iFixit is premised on Apple’s simplistic analysis that because Li’s detector could sense vibrations from gestures made on a phone’s outer surface, a POSITA would have reasonably expected the iPhone 6’s existing accelerometer to do so as well, because it could allegedly detect vibrations. Petition, 73-77. However, the issue is not whether a POSITA would have understood the iPhone’s existing accelerometer could detect vibrations in the abstract. While even that is not shown (Ex. 2001 ¶160), the issue is whether a POSITA would have reasonably expected the existing accelerometer—positioned and mounted on the iPhone’s circuit/logic board—would reliably detect vibrations made on the phone’s back to the extent

necessary to perform Li's gesture detection method. Apple has provided no evidence that such an expectation was justified, excepting Dr. Bederson's conclusory and unsupported opinions. Section IX.3. This is unsurprising, as a POSITA considering Li's teachings could not have reasonably expected such a result, for the reasons explained below. Ex. 2001 ¶¶159-172.

a. A POSITA would have understood that Li's gesture detector could not be positioned on the iPhone's logic board.

A POSITA would have understood that Li taught that its gesture detector must be positioned proximate to the desired supplemental gesture surface area. "Proximate" as used in Li means on or in the body of the phone (or protective case), and at least on the same side of the phone/case as the supplemental gesture surface area. Ex. 2001 ¶162. Even then, the detector would only be expected to properly function when placed on or in the body where gaps, other components, or material interfaces would not be expected to attenuate the vibration waves. *Id.*; Section IX.1. A POSITA would have recognized that placement on the logic board would not place the detector proximate any of the outer surfaces of the body (the supplemental gesture surface area), because the detector would be isolated from the body by internal gaps/discontinuities. Ex. 2001 ¶162. As shown below, vibrations that propagate through the body from gestures made on the outer surface would be attenuated because they would be required to travel both through the body, through

the screws holding the logic board to the body (orange arrows), across the board (through the intervening components and material thereon) to the location of the existing accelerometer (purple arrow). *Id.*



Ex. 2001 ¶162. Alternatively, they would be required to travel directly through the air gap (a material interface with a significant impedance mismatch) and EMI shields separating the body from the accelerometer on the logic board. *Id.* ¶163.

But Li teaches that the vibrations would be attenuated due to the discontinuities between the body and the detector, consistent with a POSITA's expectation that multiple impedance mismatches would damp the vibration waves generated from gestures made on the body's outer surface. *Id.* ¶164; Section IX.1. The compounding effects of the multiple material interfaces and the additional distance the vibration waves would be required to traverse generate a wide range of

uncertainty with regard to the attenuation, making it difficult (if not impossible), and certainly beyond the skill of a POSITA, to predict that such a location would successfully perform Li's method. *Id.* ¶156. Both the distance and material interfaces and gaps separating the back surface from the circuit board would have been expected to attenuate the vibration waves by the time they reached a detector placed on the logic board. *Id.* ¶164.

This explains why Li integrates its detector in the iPhone "proximate the bottom portion 120 of the body 26." APPLE-1008 [0033]. In this location, a POSITA would have recognized that Li taught the sensor would reliably detect the vibration waves propagating through the body, as such waves will not have attenuated due to distance, material interfaces, or gaps. Ex. 2001 ¶165. Li itself recognizes this. Section IX.1.; APPLE-1008 [0027], [0030], [0040].

b. A POSITA would have understood that the detector must be directly mounted in or on the body surface to successfully implement Li's method.

In addition to a location proximate the targeted supplemental gesture surface area, a POSITA would have understood from Li's disclosure that its method could only be implemented by a detector directly mounted in or on the body. Ex. 2001 ¶166. Even when directly mounted, Li recognized that the attachment method must minimize attenuation. APPLE-1008 [0035]. Thus, a POSITA in view of Li could not have reasonably predicted that mounting the sensor on the logic board, which is then

attached to the body with screws, would enable reliable detection of vibrations on the body's gesture surface. Ex. 2001 ¶¶156, 166. A POSITA would have recognized that this would only indirectly connect the detector to the body, increasing the distance the vibration waves would be required to travel through the body to the differing material of the screws, and from the screws to the different material of the logic board, across the logic board, and finally to the sensor. *Id.* ¶167. A POSITA would have expected such mounting to cause attenuation sufficient to inhibit reliable transmission of vibrations to the detector due to the distance, material interfaces, and gaps the waves would be required to traverse, as Li specifically recognized. *Id.* Accordingly, there was no reasonable expectation that a detector mounted on the logic board would have been able to successfully detect vibrations generated by contacts on the outer surface of the device. *Id.*

c. Li's disclosure teaches away from using the existing accelerometer.

Li's disclosure, explicitly adding its gesture detector to the iPhone, strongly suggests that the existing accelerometer positioned on the logic board was deemed incapable of performing Li's gesture detection method. Simply put, there would be no reason to use Li's detector if the existing accelerometer were capable of performing the detector's function. A POSITA, upon reviewing Li, would have been led to believe that the existing accelerometer on the logic board could not reliably perform Li's method, because Li required an additional sensor for its detector and

for the reasons discussed. Section IX.2.a-IX.2.b; Ex. 2001 ¶168.

Nothing in Li (or iFixit) would have led a POSITA to believe that the particular engagement means required by the claims would reliably detect gestures on the back surface of a device. The claims require a very particular arrangement—a sensor disposed within a housing (element [1b-i]), the housing having an engagement means for mounting on a mounting surface (element [1a]), where the engagement means includes an attachment means between the housing and mounting surface and a transmission portion connecting the sensor to the attachment means, comprised of a material with flexibility different than the mounting surface so as to set a rigid position of the sensor relative to the mounting surface (element [1e]). Li never suggests such an arrangement, and indeed teaches that proximate, direct mounting was required to avoid attenuation that would prevent detection of the vibration waves its detector relied on. Ex. 2001 ¶169. Li thus teaches away from the path taken by the '738 Patent. *Polaris Indus.*, 882 F.3d at 1069.

Moreover, although Li does not explicitly criticize using the iPhone's existing accelerometer, its statements regarding the preferred embodiment for its detector (a piezoelectric transducer, not an accelerometer), the addition of its detector in addition to the existing accelerometer, and Li's statements regarding detector location and mounting requirements, are relevant to motivation to combine. *Id.* (“[E]ven if a reference is not found to teach away, its statements regarding

preferences are relevant to a finding regarding whether a skilled artisan would be motivated to combine that reference with another reference.”). For the reasons discussed, a POSITA would not have been motivated to use the existing accelerometer to carry out Li’s method. Sections IX.1.-IX.2b.; Ex. 2001 ¶170.

Li’s disclosure only makes sense in the context of a need to introduce an additional component (the piezoelectric transducer) to a smartphone to solve problems that the existing accelerometer on the logic board could not. If Apple were correct, Li teaches adding a component to the iPhone to perform the exact same functionality of the existing accelerometer—akin to adding a separate GPS unit despite the phone’s existing internal GPS. This is clearly unreasonable.

d. Apple’s Inability to Implement its Infringing Back Tap Feature on the iPhone 6 Demonstrates No Reasonable Expectation of Success

As discussed below, Apple identifies nothing in the prior art that suggests a POSITA would have expected the iPhone’s existing accelerometer on the logic board could reliably detect vibrations from gestures made on the back surface. Indeed, Apple’s own materials never suggested that the existing accelerometer could be used in this way. Ex. 2001 ¶171 (discussing Exs. 2019-2020). Rather, Apple only disclosed that the accelerometer could be used for detecting orientation and motion. *Id.*; Ex. 2019, 1; Ex. 2020, 3-4.

That this was the understanding of a POSITA prior to the ’738 Patent is shown

by Apple’s inability to use such a feature on the iPhone 6. This very model was the subject of “Bendgate.” APPLE-1021 at 1 (explaining that the “iPhone 6s is marginally larger than the iPhone 6 due to its use thicker [sic] 7000 Series [aluminum] enclosure, preventing a recurrence of the ‘bendgate’ controversy from last year”). “Bendgate” refers to the fact that the body of the iPhone 6 could be easily bent “just from the pressure of being stored in a trouser pocket” and Apple’s denial (and subsequent acknowledgement) that this presented any issues. Ex. 2021, 1-2. Indeed, the iPhone 6 was specifically excluded from receiving Apple’s infringing back tap feature. Ex. 2022, 2-3; Ex. 2001 ¶172. The flexibility of the iPhone 6 body would have prevented rigidly positioning the accelerometer relative to the mounting surface (the flexible body). Ex. 2001 ¶172. This failure shows there was no reasonable expectation of success. *See, e.g., Regents of the Univ. of Cal. v. Broad Inst., Inc.*, 903 F.3d 1286, 1294-1295 (Fed. Cir. 2018) (affirming PTAB finding of no reasonable expectation of success based in part on failure of others and explaining that it is proper to consider “examples in the prior art of the success or failure of similar systems”).

3. Apple’s Arguments are Deficient and Lack Evidentiary Support

Apple asserts multiple motivations to combine Li and iFixit with a reasonable expectation of success. Petition, 74-77. When scrutinized, Apple’s reasoning and supporting evidence are clearly deficient. Certain of Apple’s motivations to combine

are merely motivations to implement Li on an iPhone—but Li already does so, requiring a sensor other than the existing accelerometer. These motivations provide no basis to depart from Li’s teachings by using the existing accelerometer. Apple’s analysis is infected with hindsight reasoning based on the roadmap provided by the claimed invention (and Haptic’s preliminary infringement contentions). *See Cheese Sys. v. Tetra Pak Cheese & Powder Sys.*, 725 F.3d 1341, 1352 (Fed. Cir. 2013) (“Among the difficult challenges of applying the doctrine of obviousness is avoidance of even a hint of hindsight. Obviousness cannot be based on the hindsight combination of components selectively culled from the prior art to fit the parameters of the patented invention.”) (internal quotation marks omitted).

Similarly, Apple’s evidence supporting a reasonable expectation of success comprises—in its entirety—conclusory statements from Dr. Bederson based only on a POSITA’s understanding that accelerometers were known to detect vibrations in the abstract. That is not the issue—the issue is whether there was a reasonable expectation of success in combining the prior art teaching to achieve all of the limitations of the claimed invention. *Intelligent Bio-Systems*, 821 F.3d at 1367. Specifically, the issue is whether there was a reasonable expectation of success in using the iPhone’s existing accelerometer, mounted on the iPhone’s logic board, to implement Li’s method. As shown below, nothing in the record supports this, other than unsupported conclusions from Petitioner’s expert.

a. Apple's First and Second Motivations

Apple maintains that a POSITA would have been motivated to “look to the components and systems within the iPhone to implement a gesture detection and control system, per Li” because “Li illustrates the system using an iPhone” and because iFixit would help a POSITA to understand the iPhone components. *Id.*, 74-75. Neither of these are motivations to use the iPhone’s existing accelerometer to implement Li’s teachings. Li’s entire disclosure is about the addition of a separate gesture detector—preferably, a piezoelectric transducer³—to a mobile device. To implement its invention, Li adds gesture detector 42 to the iPhone, “proximate the bottom portion 120 of the body 26” and “preferably adhered to an inner surface of the bottom portion 120 of the body 26”. APPLE-1008 [0033], [0035], Fig. 15.

However, as Apple acknowledges, the iPhone already possessed an accelerometer, which would have been known to Li’s inventors. Petition, 75; Ex. 2001 ¶175. Despite this, Li never even implies that its teachings could be implemented using the existing accelerometer, a suggestion which would be contrary to Li’s entire disclosure. Section IX.2.c. These alleged motivations are not motivations to combine the references as Apple advances, but at best suggest to a

³ Dr. Bederson incorrectly asserts that Li’s piezoelectric transducer would have been understood to be an accelerometer. *Bederson* ¶342; *see* Section XI.

POSITA to implement Li’s method as Li instructs—via an additional sensor, not by using the iPhone’s existing accelerometer. Ex. 2001 ¶¶174-175.

b. Apple’s Remaining Motivations

Apple’s remaining motivations (bullets 3-6, Petition, 75-76) all circularly presume Apple’s underlying conclusion that a POSITA would have expected the iPhone’s existing accelerometer on the logic board could reliably detect vibrations on a supplemental surface. Not only is this assumption unproven (Sections IX.3.b.i-IX.3.b.iii. below), Apple fails to address the proper question: whether a POSITA would have been motivated to combine the prior art **to arrive at the claimed invention**. *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015) (“[O]bviousness concerns whether a skilled artisan not only *could have made* but *would have been motivated to make* the combinations or modifications of prior art to arrive at the claimed invention.”) (italics in original). The question is not whether there was simply a motivation to combine, but whether there was a motivation to combine Li and iFixit so that the resulting system would include a housing with a separate attachment to a mounting surface, with a transmission portion connecting the accelerometer to the attachment. Nothing in Apple’s analysis supports such a motivation.

i. Apple’s Third and Sixth Motivations

Apple’s third motivation is that a “POSITA would have understood that [the

iPhone’s existing accelerometer] would have been capable of ‘sens[ing] the vibration’ and ‘generat[ing] the output signal...in response to the vibration’ to achieve [Li’s] gesture detection and control methods.” Petition, 75. Apple’s cited evidence (APPLE-1011; APPLE-1008; *Bederson*) does not support its conclusion. A POSITA might have understood that the existing accelerometer could, in the abstract, detect vibrations (although even this is not shown for the iPhone 6 accelerometer). But even if true, nothing supports the conclusion that a POSITA would have been motivated to use the existing accelerometer on the logic board, rather than directly mounted on or in the body as taught by Li. A POSITA would have had no reason to expect the existing accelerometer would have been able to successfully detect the gestures on the back surface of the iPhone in the same way as Li’s transducer, given the different placements and mountings of the sensors. Section IX.2.a-IX.2.b.

APPLE-1011 merely notes that the iPhone 6 contains an “InvenSense MP67B 6-axis Gyroscope and Accelerometer Combo” on the logic board. APPLE-1011, 6-7. The cited portion of Li describes the gesture detector 42 as “preferably a piezoelectric transducer” that senses vibrations. APPLE-1008 [0023]. This supports the conclusion that Li’s preferred sensor (a piezoelectric transducer) could detect vibrations when positioned and mounted as taught by Li, but says nothing about the existing accelerometer on the logic board. Neither reference supports a finding that

a POSITA would have expected the existing accelerometer, not directly mounted on the body, was capable of adequately detecting vibrations propagating through the body from gestures on the outside surface with the necessary accuracy to carry out Li's method. Ex. 2001 ¶¶177-179. Indeed, Li's teaching to use a separate, directly mounted sensor, given that the iPhone already had an accelerometer, strongly suggests that the existing accelerometer could not do so. Section IX.2.c. Nothing cited by Apple rebuts this suggestion.

The next citation (*Bederson* ¶342) merely parrots the Petition, adding a citation (APPLE-1041, 27). But that page is merely a discussion of piezoelectric *accelerometers*, and contains no suggestion that the iPhone's existing accelerometer (which was not a piezoelectric accelerometer), when positioned on the logic board, was capable of sensing vibrations from gestures on the outside surface. Ex. 2001 ¶180. Dr. Bederson bases his opinion on the fact that Li describes a piezoelectric sensor for detecting vibrations, that "[a] POSITA would have been aware that accelerometers are conventionally used to detect vibrations," and (wrongly) "would have understood the piezoelectric transducer of Li to be an accelerometer because it senses vibrations (accelerations)." *Bederson* ¶342. No POSITA could have reasonably understood Li's transducer to be an accelerometer. Ex. 2001 ¶181. No POSITA would have believed that a piezoelectric accelerometer could be used in an iPhone given their large form factor and power requirements. Section IV.B.; Ex.

2001 ¶181. This simplistic logic is fundamentally flawed, relying solely on the (alleged) abstract capability of the existing accelerometer to detect vibrations. As should be apparent, the mere fact that accelerometers generally were known to detect vibrations generally does not provide any reason to believe the existing accelerometer would predictably work in this configuration. Unlike Li's detector, the existing accelerometer was not directly mounted to the body proximate the back surface. A POSITA would have considered Li's disclosure requiring placement where vibration signals will not be attenuated due to "discontinuous gap[s]" and only where the body would be ensured to "adequately propagate waves," (APPLE-1008 [0027], [0035]) as precluding the existing accelerometer from consideration for carrying out Li's method. Ex. 2001 ¶182; Section IX.1-IX.2.b.

Apple's second citation to *Bederson* is the "Accelerometer Basics" section (¶¶39-43). Nothing there suggests that the existing accelerometer would have been considered capable of adequately sensing the vibrations caused by gestures on the phone's back surface when mounted on the iPhone's logic board. Ex. 2001 ¶183.

Apple's sixth motivation merely repackages the third: "[a] POSITA would have understood that using the [existing accelerometer]" "to implement a gesture detection system" "does not require any additional component to be added to the device to detect vibrations." Petition, 76. Dr. Bederson's cited opinion that "[u]sing the existing accelerometer ... would have been a simpler solution than positioning

an additional sensor,” (*Bederson* ¶346), again presumes without support⁴ that a POSITA would have reasonably expected the existing accelerometer could actually carry out Li’s method. Ex. 2001 ¶¶184-185.

Overall, nothing in Apple’s third or sixth motivations supports the contention that a POSITA would have been motivated to use the iPhone’s existing accelerometer to carry out Li’s method. Apple has not explained why a POSITA, with full knowledge of Li’s teachings and iFixit, would have been motivated to use the existing accelerometer when Li required an additional sensor in the same device. The existing accelerometer was further removed from the supplemental surface area than Li’s sensor, and only indirectly mounted to that surface via its placement on the logic board. Ex. 2001 ¶186. Given Li’s explicit teachings, a POSITA would not have reasonably considered the existing accelerometer a viable alternative. *Id.*; Section IX.2.

ii. Apple’s Fourth Motivation

Apple asserts that a POSITA would have understood that “using an iPhone’s existing accelerometer and other hardware ... would minimize the phone’s thickness as compared to adding additional components to the phone.” Petition, 75; *Bederson*

⁴ Nothing in Li [0033] or Fig. 15, or APPLE-1011, cited here by Dr. Bederson, support this conclusion. Ex. 2001 ¶185.

¶343. First, nothing in Li suggests that inclusion of its additional sensor will affect the iPhone’s form factor. APPLE-1008 [0033]-[0034], Fig. 15; Ex. 2001 ¶188. Second, this supports the conclusion that Li teaches away from the combination—given the alleged lack of space, Li’s teaching to add another sensor despite these space constraints strongly suggests that the existing accelerometer was not capable of carrying out Li’s method. Ex. 2001 ¶188; Section IX.2.c.

Further, there is no motivation to combine in the manner claimed. *Belden*, 805 F.3d at 1073. While Li taught direct mounting in or on the body proximate to the gesture surface area, and that the chosen location should take into account attenuation caused by distance and material interfaces, the existing accelerometer was indirectly mounted via its the logic board, interior to the body and separated from the gesture surface by intermediate components and materials. Sections IX.1-IX.2.b.

iii. Apple’s Fifth Motivation

Apple’s fifth motivation is the conclusory assertion that “[a] POSITA would have understood that using the existing accelerometer in the iPhone **to detect vibrations achieves Li’s requirements for the gesture detection method ... to detect taps and gestures on a back surface.**” Petition, 76. Tellingly, Dr. Bederson’s cited opinions—that “[a] POSITA would have understood ... that existing sensors within a smartphone ... **may also be used to detect vibrations** for use in Li’s gesture

detection method,” (*Bederson* ¶344) and that “[a] POSITA would have ... understood that the existing accelerometer ... would operate **to detect vibrations** just as Li teaches,” (*id.* ¶345) do not actually state that the existing accelerometer would have been expected to work when positioned on the logic board, but only that the accelerometer could detect vibrations in the abstract. Ex. 2001 ¶190. Again, this is insufficient—the issues are whether there was a motivation to combine and reasonable expectation of success given the different position and mounting when compared to that disclosed in Li.

Dr. Bederson’s next opinion—that the existing accelerometer “would have met the requirements for positioning of the sensor that Li describes, and thus would have been able to sense vibrations on the body of the phone ... per Li” (*Bederson* ¶345)—is wholly conclusory and merely assumes the critical point at issue. It is supported only by a citation to Li—which unsurprisingly says nothing of the kind given that Li never suggests using the existing accelerometer. *See* APPLE-1008 [0033]; Ex. 2001 ¶191.

Dr. Bederson apparently understands Li to require merely that the detector “be located close to the back of the iPhone” and that this is met by the existing accelerometer. *Bederson* ¶344. He ignores Li’s teachings regarding positioning of its detector proximate to the specific gesture surface—attached directly to the body at the front or back (depending on which is the supplemental surface)—as well as

Li’s guidance that the vibrations propagate through the body and may be attenuated by discontinuities or gaps. Section IX.1. Especially given Li’s strong suggestion that the existing accelerometer was unsuitable, ignoring these aspects of Li is unjustified. Ex. 2001 ¶192.

Again, nothing in the record suggests that a POSITA had a motivation to combine in the manner claimed. Li did not teach the use of a housing for its transducer, nor a transmission portion between the detector and (non-existent) attachment means, nor an engagement means between the missing housing and mounting surface, nor the specific relationships of the materials’ flexibility properties. A POSITA would have expected that adding a housing and a transmission portion (i.e., positioning an accelerometer on the logic board) would have interfered with the detector’s performance by preventing the sensor from detecting vibrations, as Li suggests. Ex. 2001 ¶192. A POSITA had no reason to combine these elements—absent hindsight bias.

c. Apple’s Reasonable Expectation of Success Argument

Apple’s final “motivation” is its reasonable expectation of success argument. Petition 76-77. The question here is whether a POSITA would have reasonably expected each element to perform a similar function combined as it does separately (thereby generating predictable results). Apple’s evidence is the assertion that iFixit describes the locations of components within an iPhone, which already includes an

accelerometer. Petition, 76. Again, merely because the iPhone possessed an accelerometer does not suggest that a POSITA would have expected the combination to yield a workable implementation of Li's system. Ex. 2001 ¶195. Dr. Bederson's supporting opinions are premised on his mistaken understanding that Li suggests using the existing accelerometer. *Bederson* ¶347 (asserting that a POSITA would have had a reasonable expectation of success "in implementing Li's gesture detection method **using the accelerometer of an iPhone per iFixit based on Li's suggestion to do so**").

As discussed, Li never suggests using the existing accelerometer but instead strongly suggests that the existing accelerometer could not carry out its method, requiring the additional detector. Apple's evidence never suggests that the existing accelerometer mounted on the logic board would have been expected to successfully perform the required function of Li's detector. Dr. Bederson's supporting opinion relies on the "typical accelerometer function of detecting vibrations," but never explains why a POSITA would have reasonably expected the existing accelerometer on the logic board would suitably detect vibrations generated from gestures on the outer surface. Ex. 2001 ¶¶196-197 (analyzing *Bederson* ¶347). Indeed, Dr. Bederson's conclusory assumption that the existing accelerometer was capable of adequately sensing these signals forms the basis of his opinion that the combination would have "predictably yielded the claimed invention." *Id.*

Apple's evidence does not suggest that the indirect accelerometer mounting required by the claims would have reasonably been expected to detect vibrations as required to implement Li's method. Given Li's requirement of an additional gesture detector, directly mounted to the body and positioned in or on the body proximate the gesture surface area, it was incumbent on Apple and Dr. Bederson to adequately explain *why* a POSITA would have believed there was a reasonable expectation of successfully using a different sensor, not positioned in or on the body, but separated from the gesture surface area, and not directly mounted to the body. This is especially true here, as such an expectation was contrary to the understanding of a POSITA prior to the invention described in the '738 Patent. *See* Section IX.2.a-IX.2.b. Instead, Apple and its expert merely assume away this critical missing link in their arguments and opinion. Without such explanation, Apple has failed to prove a reasonable expectation of success. As such, Li-iFixit cannot render any challenged claim unpatentable.

X. Ground 2B Does Not Render any Challenged Claim Unpatentable

Ground 2B consists of the Li-iFixit apparatus of Ground 2A in combination with Sachs, apparently relying on the same analysis for the independent claims. Petition, 103. Thus, Ground 2B fails to render any claim unpatentable for the same reasons set forth for Ground 2A. *See* Section IX.

XI. Dr. Bederson's Testimony Contains Multiple Factual Errors and Contradictions Undermining his Credibility and Objectivity

Dr. Bederson makes multiple contradictory and incorrect statements throughout his declaration. This testimony calls into question his ability to testify as to the knowledge of a POSITA, as well as his objectivity and credibility in general.

First, Dr. Bederson asserts that “at a high level, accelerometers operate by measuring the displacement of a mass relative to its stationary housing.” *Bederson* ¶39. He then asserts that a POSITA would have understood that Li’s piezoelectric transducer was “an accelerometer because it senses vibrations (accelerations).” *Id.* ¶342. But a POSITA certainly understood that piezoelectric transducers do not contain a proof mass (which is a separate component of an actual piezoelectric accelerometer). Section IV.B.; *see also Bederson* ¶41 (explaining that piezoelectric accelerometers contain both a proof mass and a separate piezoelectric element that “acts as a transducer”). A POSITA also knew that piezoelectric accelerometers would not be used in the iPhone due to their large form factor and power requirements. Section IV.B. Dr. Bederson’s conclusion that Li’s transducer was an accelerometer forms the basis for his opinion that a POSITA would have been motivated to implement Li’s teachings using the iPhone’s existing accelerometer. *Bederson* ¶342. This fundamental error casts doubt on the reliability and credibility of Dr. Bederson’s conclusions.

In explaining Stewart, Dr. Bederson states that “[f]or accurate measurement

of vibration with the accelerometer, a common fastener ... would have been ... inserted through the case mount hole and into the desired surface. This ensures that **the surface vibrations also vibrate the accelerometer in the case or housing**” *Bederson* ¶113. This understanding is the basis for the opinion that it was obvious to use brackets and case mounts with Murakoshi’s accelerometer. *Id.* But this assertion demonstrates a fundamental misunderstanding of Stewart. As explained, Stewart’s mounting system flexibly suspended its accelerometers to **prevent** surface vibrations from interfering with the vibration induced in the accelerometers by Stewart’s piezoelectric elements. Sections VI.2-VI.3.

Next, Dr. Bederson asserts that a POSITA would have understood that accelerometers “need to be firmly attached within a casing” “to operate effectively, because vibrations external to the casing need to be passed through the case to the accelerometer, and the accelerometer **needs to be able to move relative to the casing (and relative to the surface the casing is mounted to)** to detect the extent of the vibrations.” *Bederson* ¶114. He then contradicts himself, testifying that “a POSITA would have understood that Murakoshi’s accelerometer **must be fixed within the apparatus**” “**to prevent the accelerometer from moving around within the housing.**” *Id.* ¶117. Further, if his first statement is correct—an accelerometer must be able to move relative to the mounting surface—his subsequent opinion of obviousness (“it would have been obvious to a POSITA that

it is **necessary to hold a sensor in a fixed position relative to a sensing surface** to provide a fixed reference point for accurate detection”) is clearly invalid. *Id.* ¶142.

Dr. Bederson further asserts that “[a] POSITA would have understood from Stewart’s disclosure that structures like brackets and sidebeams hold an accelerometer within a casing **so that vibrations can be efficiently passed to the accelerometer** for measuring/detecting **instead of being attenuated by mechanical play between the casing and sensor.**” *Bederson* ¶119. This is completely backwards, as a POSITA would have recognized that Stewart’s brackets and sidebeams **prevented** external vibrations from affecting the accelerometer, so they would not affect the “predetermined vibratory sensor motion” effected by Stewart’s piezoelectric elements. Sections VI.2-VI.3. As Dr. Bederson completely mischaracterizes Stewart, the Board should reject his opinions.

Next, in supporting Apple’s assertion of a reasonable expectation of successfully combining Murakoshi and Stewart, Dr. Bederson asserts that “a POSITA would have appreciated that both Murakoshi and Stewart describe an apparatus that includes an accelerometer for detecting vibrations” and “both references are related to detection of vibrations using an accelerometer.” *Bederson* ¶124. These statements are misleading. While Stewart’s accelerometers detected vibrations, those vibrations were **not** from the external surface. Sections VI.2-VI.3. Stewart’s brackets would not “hold[] [Murakoshi’s] accelerometer in place while

allowing the accelerometer to detect vibrations,” (*Bederson* ¶124), but would prevent the accelerometers from detecting them. Sections VI.2-VI.3. Because this is the exact opposite of the purpose for which a POSITA would have mounted Murakoshi’s accelerometer, Dr. Bederson’s resulting opinion is wholly unreliable.

Dr. Bederson makes similar errors in analyzing the claim elements. For element [1e], he opines that the combination’s “brackets and case mounts with fasteners also perform the additional functions of the claimed engagement means” including rigidly positioning the sensor relative to the mounting surface. *Bederson* ¶173. Again, this is the exact opposite purpose of Stewart’s mounting system. Sections VI.2-VI.3. This further undermines Dr. Bederson’s unsupported conclusion that “a POSITA would have recognized that ... a difference in the flexibility of the components, would allow for **advantageous transmission of vibrations** from the mounting surface to ... the sensor.” *Bederson* ¶175.

Dr. Bederson continues to mischaracterize Stewart, asserting that “the vibrations of the surface ... are passed to the accelerometer through the structures that couple the accelerometer to the surface, including the brackets...” *Bederson* ¶180. This is wrong as previously explained. Section VI.2-VI.3. His resulting opinion that a POSITA would have understood vibrations from a user’s tapping on the vibratory surface would be transmitted to the accelerometer through the bracket assembly is completely opposite the conclusion a POSITA would have reached. *Id.*

XII. The Board Should Exercise its Discretion Not to Institute Under § 314(a) Pursuant to *Fintiv*

The Board should deny institution under § 314(a). Trial would be an inefficient use of Board resources in light of the advanced state of parallel district court litigation. *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 at 2 (PTAB Mar. 20, 2020) (*precedential*). The balance of factors set forth in *Fintiv* weigh heavily in favor of discretionary denial.

1. The Court denied Apple’s motion to stay.

The court denied Apple’s motion for stay on November 20, 2024. Ex. 2023, 1. The court first determined that the stage of the litigation weighed against a stay. *See* Factor 3 below. The court also found that the prejudice to Haptic weighed against a stay, noting that the final written decision here is “seven months after the trial date,” and that Haptic presented compelling evidence of incalculable harm in the marketplace if a stay were granted. Ex. 2023, 5-6. The court considered it compelling that Haptic is much smaller than Apple and that Apple’s infringement threatened Haptic’s flagship product. *Id.*, 6. Although the court denied the motion without prejudice, the court’s decision appears unlikely to change given that institution would only impact one of the three factors the court analyzed. *See id.*, 3-6. Because the evidence indicates that no stay will be granted even if the Board institutes trial, this factor weighs in favor of denial.

2. Trial will likely occur before the final written decision.

Trial in the parallel litigation is set for September 29, 2025—over six months before the deadline for a final written decision here (April 10, 2026). Ex. 2023, 2; Ex. 2024, 2. In addition to the scheduled trial date, which “is not *by itself* a good indicator of whether the district court trial will occur before the statutory deadline,” the Interim Procedure directs the PTAB to consider the median time-to-trial in the district, the judge’s caseload, and the speed and availability of other case dispositions. APPLE-1102, 8-9. Here, the suit was filed on November 3, 2023. Ex. 2023, 2. The latest median time-to-trial of 47.9 months puts trial in October 2027—more than two years after the current scheduled date. Ex. 2025, 66. However, given the amount of work already done in the litigation by both the parties and district court, it seems highly unlikely that completing discovery and all pre-trial activity will take an additional two years. *See* Ex. 2024.

Due to her relatively recent commission (March 30, 2022),⁵ statistics for the district court judge’s caseload and speed in patent cases are unavailable. Apple’s evidence (APPLE-1106) shows six non-patent cases. In those cases (four civil rights cases and two class actions), one had zero delay, one had a 21-day delay, and one had a 91-day delay, with an average delay of 192 days. APPLE-1106. Even assuming

⁵ <https://cand.uscourts.gov/judges/corley-jacqueline-scott-jsc/>

the average delay here—which is not justified given the differences between causes of action—the final written decision and the trial would occur at the same time. Therefore, discretionary denial is appropriate given that this proceeding will not be an efficient or effective alternative to the litigation and will be an ineffective use of the Board’s resources. *General Plastic Industrial Co., Ltd. v. Canon Kabushiki Kaisha*, Case IPR2016-01357, Paper 19 at 16-17 (Sept. 6, 2017) (*precedential* as to § IIB.4.i.); *NHK Spring Co. v. Intri-Plex Technologies, Inc.*, IPR2018-00752, Paper 8 at 19-20 (Sept. 12, 2018) (*precedential*); *Fintiv*, IPR2020-00019, Paper 15 at 15-17.

Further, the court’s denial of stay (explicitly referencing the trial date) demonstrates that the judge believes the current setting will hold. Ex. 2023, 1-2. Therefore, depending on the weight assigned to each data point, this factor either weighs in favor of denial or is neutral.

3. The court and parties have invested heavily in the litigation.

As the district court noted when it denied a stay, “the parties had undertaken significant work on the case,” including “[a] substantial amount of fact discovery” over eleven months, including infringement, invalidity, and damages contentions, expert reports, interrogatories, requests for production, over 555,000 pages of document production, and claim construction briefing. Ex. 2023, 3-4. The *Markman* hearing occurred on schedule on December 6. *Id.*, 2; Ex. 2024, 1. By the institution

deadline, the parties will have completed fact discovery and exchanged opening expert reports. Ex. 2024, 1. Thus, by the institution deadline, the parties and court will have invested significant resources. This factor weighs heavily in favor of denial.

4. Apple asserts the same invalidity grounds.

Apple relies on the same prior art to challenge the same claims here and in the litigation, asserting Stewart, Sachs, Murakoshi, Orr, Li, and iFixit (representative of the iPhone 6), including in the same combinations. Ex. 2026 at 32, 33, 35, 45, 62, 63. Given Apple’s failure to stipulate that it will not pursue the same grounds in litigation, and that Apple’s asserted grounds are the same in both proceedings, this factor heavily favors denial. APPLE-1102, 7.

5. Apple is the Petitioner and Defendant.

As Apple is both Petitioner and the defendant, this factor favors denial.

6. The lack of a compelling challenge favors denial.

Factor six reflects the merits. APPLE-1102, 4. As shown herein, Apple’s challenges are exceptionally weak and do not even meet the institution threshold. Even if assumed sufficient, they do not present a compelling challenge. Therefore, institution is inconsistent with “an objective of the AIA ... to provide an effective and **efficient** alternative to district court litigation.” *General Plastic*, Case IPR2016-01357, Paper 19 at 16-17. In similar circumstances, where the litigation involves the

same patent, parties, construction standard, prior art references, and arguments, and the district court will analyze and resolve the issues before the final written decision, the Board has exercised its discretion to deny institution to prevent an inefficient use of Board resources. *See NHK Spring Co.*, IPR2018-00752, Paper 8 at 19-20; *Fintiv*, IPR2020-00019, Paper 15 at 15-17.

XIII. Conclusion

Because the Petition fails to show a reasonable likelihood of proving any challenged claim unpatentable, and because the *Fintiv* factors favor discretionary denial, Haptic respectfully requests the Board deny institution.

Dated: January 10, 2025

Respectfully submitted,

/James H. Hall/
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CERTIFICATE OF COMPLIANCE

The undersigned certifies that this document complies with the type-volume limitations set forth in 37 C.F.R. § 42.24 *et seq.* This document, excluding those portions excluded under § 42.24(a)(1), contains 13,948 words as calculated by the program used in creating it.

/s/ James H. Hall
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Haptic, Inc.

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §§ 42.6(e)(4), the undersigned certifies that on January 10, 2025, a copy of the foregoing document (*Patent Owner's Preliminary Response*, including all Exhibits), was served via electronic mail on all attorneys of record at the email addresses provided for electronic service listed in Petitioner's mandatory notices, as set forth below:

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