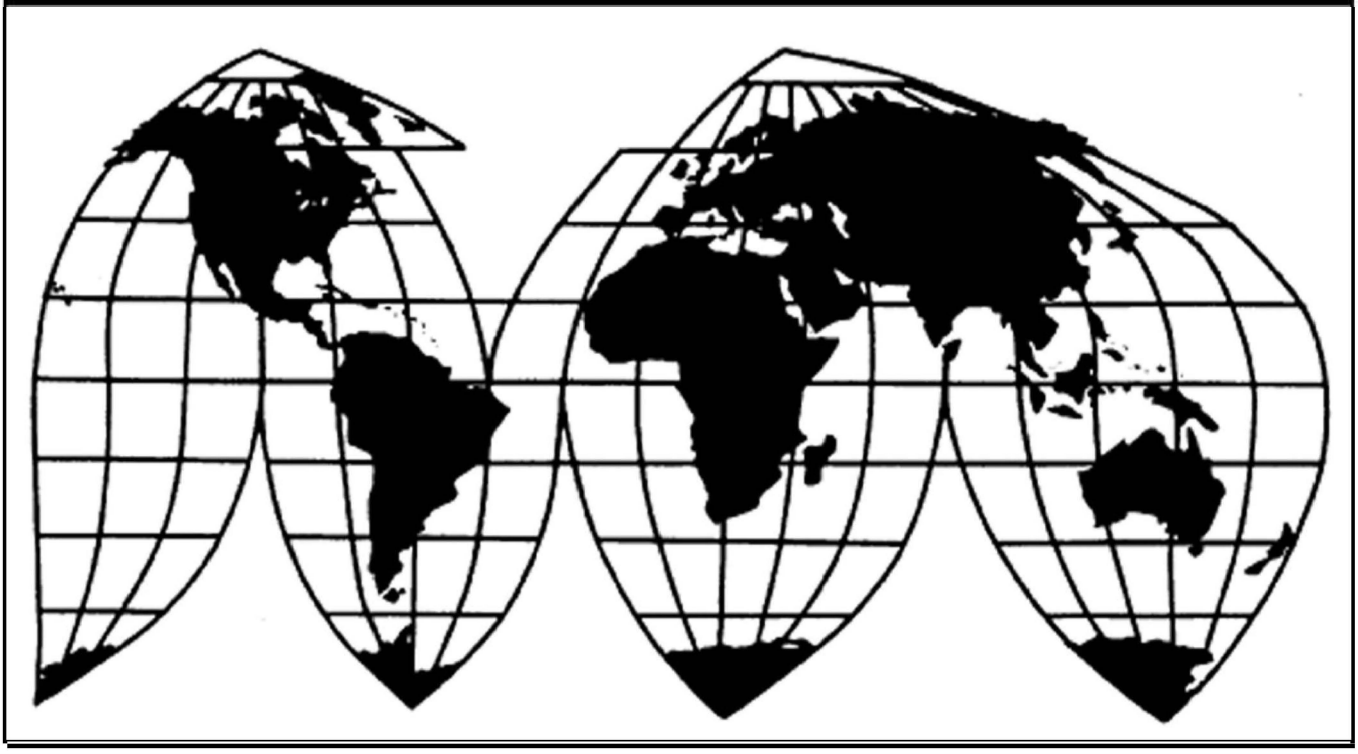
*In the Matter of*

# CERTAIN WEARABLE MONITORING DEVICES, SYSTEMS, AND COMPONENTS THEREOF

Investigation No. 337-TA-1190

**Publication 5311** **March 2022**

**U.S. International Trade Commission**



**Washington, DC 20436**

# U.S. International Trade Commission

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# U.S. International Trade Commission

Washington, DC 20436
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## *In the Matter of*

# CERTAIN WEARABLE MONITORING DEVICES, SYSTEMS, AND COMPONENTS THEREOF

Investigation No. 337-TA-1190




**Publication 5311**

**March 2022**

**UNITED STATES INTERNATIONAL TRADE COMMISSION**
**Washington, D.C.**

| | |
|---|---|
| **In the Matter of**<br><br>**CERTAIN WEARABLE MONITORING DEVICES, SYSTEMS, AND COMPONENTS THEREOF** | **Investigation No. 337-TA-1190** |

# NOTICE OF COMMISSION DETERMINATION TO REVIEW IN PART A FINAL INITIAL DETERMINATION FINDING NO VIOLATION OF SECTION 337; AFFIRMANCE OF A FINDING OF NO VIOLATION OF SECTION 337; TERMINATION OF INVESTIGATION

**AGENCY**: U.S. International Trade Commission.

**ACTION**: Notice.

**SUMMARY**: Notice is hereby given that the U.S. International Trade Commission has determined to review in part a final initial determination ("ID") of the presiding administrative law judge ("ALJ") finding no violation of section 337. On review, the Commission has determined to affirm the final ID's finding of no violation of section 337. The investigation is terminated.

**FOR FURTHER INFORMATION CONTACT**: Clint Gerdine, Esq., Office of the General Counsel, U.S. International Trade Commission, 500 E Street SW., Washington, D.C. 20436, telephone (202) 708-2310. Copies of non-confidential documents filed in connection with this investigation may be viewed on the Commission's electronic docket (EDIS) at https://edis.usitc.gov. For help accessing EDIS, please email EDIS3Help@usitc.gov. General information concerning the Commission may also be obtained by accessing its Internet server at https://www.usitc.gov. Hearing-impaired persons are advised that information on this matter can be obtained by contacting the Commission's TDD terminal, telephone 202-205-1810.

**SUPPLEMENTARY INFORMATION**: The Commission instituted this investigation on January 15, 2020, based on a complaint filed on behalf of Philips North America, LLC of Andover, Massachusetts and Koninklijke Philips N.V. of Eindhoven, Netherlands (collectively, "Complainants"). 85 FR 2440-41 (Jan. 15, 2020). The complaint, as supplemented, alleges violations of section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. 1337, based upon the importation into the United States, the sale for importation, and the sale within the United States after importation of certain wearable monitoring devices, systems, and components thereof by reason of infringement of certain claims of U.S. Patent Nos. 7,845,228 ("the '228 patent"); 9,820,698 ("the '698 patent"); 9,717,464 ("the '464 patent"); and 9,961,186 ("the '186 patent"). The Commission's notice of investigation named the following Respondents: Fitbit, Inc.

("Fitbit") of San Francisco, California; Garmin International, Inc. and Garmin USA, Inc., both of Olathe, Kansas ("the domestic Garmin Respondents"); Garmin Ltd. d/b/a Garmin Switzerland GmbH of Schaffhausen, Switzerland; Ingram Micro Inc. of Irvine, California; Maintek Computer (Suzhou) Co., Ltd. of Jiangsu Province, China; and Inventec Appliances (Pudong) of Shanghai, China (collectively, "Respondents"). The Office of Unfair Import Investigations ("OUII") is participating in the investigation. The '186 patent was previously terminated from the investigation. Order No. 25 (July 17, 2020), *unreviewed by* Comm'n Notice (Aug. 4, 2020).

On February 4, 2021, the ALJ issued the final ID finding no violation of section 337 as to the two patents involved in the evidentiary hearing, the '228 and '464 patents. (Regarding the '698 patent, s*ee* Order. No. 35 (discussed below)). With respect to the '228 patent, the ID finds that: (1) none of Respondents' accused products infringe asserted claim 2 of the '228 patent; (2) claim 2 of the '228 patent is invalid as anticipated under 35 U.S.C. 102 by the asserted prior art (U.S. Patent No. 6,077,236); (3) claim 2 of the '228 patent is directed to patent-ineligible subject matter under 35 U.S.C. 101; (4) claim 2 of the '228 patent is not anticipated under 35 U.S.C. 102, or rendered obvious under 35 U.S.C. 103, by any other asserted prior art; (5) claim 2 of the '228 patent is not unenforceable based on patent exhaustion; and (6) Philips has satisfied the domestic industry requirement with respect to the '228 patent.

With respect to the '464 patent, the ID finds that: (1) none of Respondents' accused products infringe asserted claims 1 and 6 of the '464 patent; (2) claims 1 and 6 of the '464 patent are directed to patent-ineligible subject matter under 35 U.S.C. 101; (3) claims 1 and 6 of the '464 patent are not anticipated under 35 U.S.C. 102 and they are not rendered obvious under 35 U.S.C. 103; and (4) claims 1 and 6 of the '464 patent are not invalid based on improper inventorship under 35 U.S.C. 115(a) or 116(a); (5) Philips has not satisfied the technical prong of the domestic industry requirement with respect to the '464 patent; and (6) Philips has satisfied the economic prong of the domestic industry requirement by showing that a domestic industry is in the process of being established.

In the Recommended Determination, the ALJ recommends that if the Commission finds a violation it should issue a limited exclusion order directed to Respondents' infringing products and a cease and desist order directed to the domestic Garmin respondents and Fitbit.

On February 16, 2021, Philips petitioned, OUII petitioned and contingently petitioned, and Respondents contingently petitioned for review of certain aspects of the final ID. On February 24, 2021, Philips, OUII, and Respondents each responded to the other parties' petitions for review.

The Commission received no public interest comments from the public in response to the Federal Register notice seeking comment on the public interest. 86 FR 9085-86 (Feb. 11, 2021). On March 8, 2021, Respondents submitted public interest comments pursuant to Commission Rule 210.50(a)(4). No other party submitted public interest comments.

The Commission has determined to review the final ID in part. Specifically, the

Commission has determined to review: (1) the ID's construction of the term "monitor" recited in claim 2 of the '228 patent; (2) the ID's finding of non-infringement for claim 2 of the '228 patent; (3) the ID's finding that Philips has satisfied the domestic industry requirement with respect to the '228 patent; (4) the ID's finding that claim 2 of the '228 patent is not unenforceable based on patent exhaustion; and (5) the ID's finding, with respect to the '464 patent, that Philips has satisfied the economic prong of the domestic industry requirement by showing that a domestic industry is in the process of being established. The Commission has determined not to review the remainder of the final ID.

On review, the Commission has determined to: (1) construe the term "monitor" recited in claim 2 of the '228 patent to mean "receive and track"; (2) affirm, with modified reasoning, the ID's finding that the accused products practice the "monitor [] the sensor signals discontinuously in time" limitation recited in claim 2; and (3) reverse the ID's finding that the accused products do not practice the "monitor the sensor signals in turn" limitation recited in claim 2. Accordingly, the Commission finds that the accused products infringe claim 2 of the '228 patent. The Commission has also determined to reverse the ID's finding that Philips' BX-100 Biosensor Device does not practice all limitations of the '228 patent, and therefore finds that Philips satisfies the technical prong of the domestic industry requirement with respect to this patent. The Commission takes no position on the ID's finding that claim 2 of the '228 patent is not unenforceable based on patent exhaustion. With respect to the '464 patent, the Commission has determined to take no position on the ID's analysis and finding regarding an industry in the process of being established, and therefore takes no position on whether Philips has met the economic prong requirement.

Accordingly, as the Commission does not disturb the ID's other findings with respect to the '228 and '464 patents, the Commission has determined to affirm the final ID's finding of no violation of section 337 with respect to these two patents.

The Commission previously determined to review two IDs the ALJ issued on October 1, 2020: (1) Order No. 34 granting Philips' motion for partial summary determination that complainants satisfied the economic prong of the domestic industry requirement as to the BX-100 Biosensor Device with respect to the '228 patent; and (2) Order No. 35 granting Respondents' motion for summary determination that Respondents' accused products do not infringe (i) asserted claims 1 and 6 of the '698 patent, and (ii) asserted claims 1 and 6 of the '464 patent with respect to the accused heart rate monitoring functionalities. Comm'n Notice (Nov. 16, 2020). On review of the first ID (Order No. 34), the Commission has determined to take no position on the ID's finding that Philips has satisfied the economic prong of the domestic industry requirement by showing that a domestic industry is in the process of being established. The Commission has determined to affirm the finding in Order No. 34 that an industry exists in the United States as to the BX-100 Biosensor Device with respect to the '228 patent. The Commission has also determined to affirm the findings in the second ID (Order No. 35) of non-infringement with respect to the '698 patent, and non-infringement with respect to the '464 patent for the heart rate monitoring functionalities in the accused Fitbit and Garmin devices. The '698 patent therefore is terminated from the investigation with a finding of no violation of

section 337.

The investigation is terminated.

The Commission vote for this determination took place on April 12, 2021.

The authority for the Commission's determination is contained in section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. 1337, and in Part 210 of the Commission's Rules of Practice and Procedure, 19 CFR part 210.

By order of the Commission.



Lisa R. Barton
Secretary to the Commission

Issued: April 12, 2021

**CERTAIN WEARABLE MONITORING DEVICES, SYSTEMS, AND COMPONENTS THEREOF** **Inv. No. 337-TA-1190**

## PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **NOTICE** has been served via EDIS upon the Commission Investigative Attorney, **John Shin, Esq.**, and the following parties as indicated, on **April 12, 2021.**

Lisa R. Barton, Secretary
U.S. International Trade Commission
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**CORRECTED**

**PUBLIC VERSION**

**UNITED STATES INTERNATIONAL TRADE COMMISSION**
**Washington, D.C.**

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|---|---|
| **In the Matter of**<br><br>**CERTAIN WEARABLE MONITORING DEVICES, SYSTEMS, AND COMPONENTS THEREOF** | **Investigation No. 337-TA-1190** |

# COMMISSION OPINION

# Table of Contents

I. BACKGROUND ..... 3
A. Procedural History ..... 3
B. The '228 Patent ..... 8
C. The Accused Products ..... 12
D. The Domestic Industry Products ..... 13
II. STANDARD ON REVIEW ..... 14
III. ANALYSIS ..... 15
A. Applicable Legal Standards ..... 15
1. Claim Construction ..... 15
2. Infringement ..... 16
3. Domestic Industry ..... 17
B. Claim Construction and Infringement Regarding "Monitor the Sensor Signals in Turn" in the '228 Patent ..... 18
1. Order Nos. 26, 27, and 34 ..... 18
2. The FID ..... 21
3. The Parties' Arguments ..... 22
4. Analysis ..... 25
C. The Technical Prong of the Domestic Industry Requirement for the '228 Patent ..... 29
1. The ID ..... 29
2. The Parties' Arguments ..... 32
3. Analysis ..... 34
D. The Economic Prong of the Domestic Industry Requirement ..... 37
IV. CONCLUSION ..... 39

The Commission has determined that there has been no violation of section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337 ("section 337"), with respect to U.S. Patent Nos. 7,845,228 ("the '228 patent"), 9,717,464 ("the '464 patent"), and 9,820,698 ("the '698 patent") on review of the final initial determination ("FID") and Order Nos. 34 and 35 of the presiding administrative law judge ("ALJ"). This opinion sets forth the Commission's reasoning in support of that determination.

## I. BACKGROUND

### A. Procedural History

On January 15, 2020, the Commission instituted this investigation based on a complaint filed on behalf of Philips North America, LLC of Andover, Massachusetts and Koninklijke Philips N.V. of Eindhoven, Netherlands (collectively, "Philips"). 85 *Fed. Reg.* 2440-41 (Jan. 15, 2020). The complaint, as supplemented, alleges violations of section 337 based upon the importation into the United States, the sale for importation, and the sale within the United States after importation of certain wearable monitoring devices, systems, and components thereof by reason of infringement of certain claims of the '228 patent, the '464 patent, the '698 patent, and U.S. Patent No. 9,961,186 ("the '186 patent"). The Commission's notice of investigation named the following respondents: Fitbit, Inc. of San Francisco, California ("Fitbit"); Ingram Micro Inc. of Irvine, California; Maintek Computer (Suzhou) Co., Ltd. of Jiangsu Province, China; Inventec Appliances (Pudong) of Shanghai, China; Garmin International, Inc. and Garmin USA, Inc., both of Olathe, Kansas, and Garmin Ltd. d/b/a Garmin Switzerland GmbH of Schaffhausen, Switzerland (collectively, "Garmin") (all collectively, "Respondents"). The Office of Unfair Import Investigations ("OUII") is participating in the investigation. The '186 patent was previously terminated from the investigation. Order No. 25 (July 17, 2020),

*unreviewed by* Comm'n Notice (Aug. 4, 2020).

On July 27, 2020, the ALJ issued a *Markman* Order (Order No. 26) construing relevant patent terms in dispute. On the same day, the ALJ issued an order (Order No. 27) denying Respondents' motion for summary determination that claim 2 of the '228 patent is invalid as indefinite based on the claim term "monitor."

On October 1, 2020, the ALJ issued two initial determinations ("IDs"): (1) Order No. 34 granting Philips' motion for partial summary determination that complainants have satisfied the economic prong of the domestic industry requirement with respect to the '228 patent; and (2) Order No. 35 granting Respondents' motion for summary determination that Respondents' accused products do not infringe (i) asserted claims 1 and 6 of the '698 patent and (ii) asserted claims 1 and 6 of the '464 patent with respect to the accused heart rate monitoring functionalities.[1] The Commission reviewed both of these IDs. *See* Comm'n Notice (Nov. 16, 2020).

On February 4, 2021, the ALJ issued the FID which finds, *inter alia*, no violation of section 337 with respect the '228 patent and the '464 patent. Regarding the '228 patent, the FID finds relevant to its non-violation finding that: (1) Respondents' accused products do not infringe asserted claim 2 of the '228 patent based on the FID's construction of the term "monitor"; (2) Philips has not satisfied the technical prong of the domestic industry requirement; (3) claim 2 is invalid as anticipated under 35 U.S.C. § 102 by U.S. Patent No. 6,077,236 ("Cunningham"); and (4) claim 2 is directed to patent-ineligible subject matter under 35 U.S.C.

[1] Order No. 35 also denies Respondents' motion for summary determination of non-infringement with respect to the '228 patent.

§ 101. Regarding the '464 patent, the FID finds relevant to its non-violation finding that: (1) Respondents' accused products do not infringe asserted claims 1 and 6 of the '464 patent; (2) Philips has not satisfied the technical prong of the domestic industry requirement; and (3) asserted claims 1 and 6 are directed to patent-ineligible subject matter under 35 U.S.C. § 101. In her Recommended Determination, the ALJ recommends that, if the Commission finds a violation, it should issue a limited exclusion order directed to Respondents' infringing products and a cease and desist order directed to the domestic Garmin respondents and Fitbit.

On February 16, 2021, Philips petitioned,[2] OUII petitioned and contingently petitioned,[3] and Respondents' contingently petitioned[4] for review of the FID. On February 24, 2021, Philips,[5] OUII,[6] and Respondents[7] each filed a response to the various petitions for review.

The Commission has determined to review the FID in part. Specifically, the Commission has determined to review: (1) the FID's claim construction and non-infringement

[2] *See* Complainants' Petition for Commission Review of Initial Determination on Violation of Section 337 and Recommended Determination on Remedy and Bonding (Feb. 16, 2021) ("Philips' Pet.").

[3] *See* Petition of the Office of Unfair Import Investigations for Review-In-Part of the Final Initial Determination on Violation of Section 337 (Feb. 16, 2021).

[4] *See* Respondents' Contingent Petition for Review of the Final Initial Determination (Feb. 16, 2021).

[5] *See* Complainants' Response to Respondents' and Staff's Petitions for Commission Review of Initial Determination on Violation of Section 337 (Feb. 24, 2021).

[6] *See* Response of the Office of Unfair Import Investigations to Private Parties' Petitions for Review of the Final Initial Determination on Violation of Section 337 (Feb. 24, 2021) ("OUII's Resp.").

[7] *See* Complainants' Response to Respondents' and Staff's Petitions for Commission Review of Initial Determination on Violation of Section 337 (Feb. 24, 2021) ("Philips' Resp.").

finding for the ’228 patent with respect to the “monitor the sensor signals in turn” limitation and the “monitor [ ] the sensor signals discontinuously in time” limitation recited in unasserted independent claim 1; (2) the FID’s finding that Philips has not satisfied the technical prong of the domestic industry requirement as to the Philips BX-100 Biosensor Device with respect to the ’228 patent; and (3) the FID’s finding that Philips satisfied the economic prong of the domestic industry requirement for the ’464 patent by showing an industry in the process of being established. The Commission has also determined to review and take no position on the FID’s findings with respect to Respondents’ patent exhaustion defense as to claim 2 of the ’228 patent. The Commission has determined not to review the remainder of the FID.

With respect to Order Nos. 34 and 35, the Commission has determined to take no position with respect to Order No. 34’s analysis and finding regarding an industry in the process of being established with respect to the ’228 patent, to affirm the finding in Order No. 34 that an industry exists in the United States as to the BX-100 Biosensor Device with respect to the ’228 patent, and to affirm the findings in Order No. 35 of non-infringement with respect to the ’698 patent,[8] and non-infringement with respect to the ’464 patent for the heart rate monitoring functionalities in the accused Fitbit and Garmin devices. As Order No. 35 grants Respondents’ motion for summary determination that the accused products do not infringe the asserted claims 1 and 6 of the ’698 patent, the ’698 patent therefore is terminated from the investigation with a

[8] Vice Chair Stayin does not join the Commission’s decision to affirm Order No. 35 with respect to the ’698 patent. In the Vice Chair’s view, the prosecution history of the ’698 patent is not sufficient to conclude that combining non-body motion data with accelerometer-based data to compute an actigraphy signal is outside the scope of the claim. The Vice Chair would thus find there is a factual question as to whether the accused products meet the “computing an actigraphy signal” limitation of claim 1 of the ’698 patent, precluding summary determination of non-infringement.

finding of no violation of section 337.

Having reviewed the record in this investigation, including the FID, the parties' briefing before the ALJ, and the parties' petitions for review and responses thereto, on review, the Commission has determined to: (1) construe the term "monitor" recited in claim 2 of the '228 patent to mean "receive and track"; (2) affirm, with the modified reasoning discussed *infra*, the FID's finding that the accused products practice the "monitor [] the sensor signals discontinuously in time" limitation recited in claim 2; and (3) reverse, as discussed *infra*, the FID's finding that the accused products do not practice the "monitor the sensor signals in turn" limitation recited in claim 2. Accordingly, the Commission finds that the accused products infringe claim 2 of the '228 patent. The Commission has also determined to reverse the FID's finding that Philips' BX-100 Biosensor Device does not practice all limitations of the '228 patent, and therefore finds that Philips satisfies the technical prong of the domestic industry requirement with respect to this patent. However, as the Commission does not disturb the FID's findings that claim 2 of the '228 patent is invalid as anticipated under 35 U.S.C. § 102 and is directed to patent-ineligible subject matter under 35 U.S.C. § 101, the Commission affirms the FID's finding of no violation of section 337 with respect to the '228 patent. With respect to the '464 patent, the Commission has determined to take no position on the FID's analysis and finding regarding an industry in the process of being established, and therefore takes no position on whether Philips has met the economic prong requirement. As the Commission does not disturb the FID's other findings with respect to the '464 patent, the Commission affirms the FID's finding of no violation of section 337 with respect to the '464 patent.

### B. The ’228 Patent

The ’228 patent (JX-1), entitled “Activity Monitor,” was issued on December 7, 2010, and has eleven claims, of which claim 2 is asserted against Respondents. *See* JX-1 at cover, 3:17-4:31.

The ’228 patent is directed to an activity monitor “that reduces the amount of power consumed during a monitoring operation.” JX-1, Abstract. The monitoring of human movement is commonly performed by accelerometers that measure the accelerations covering the amplitude and frequency ranges of human body acceleration. *Id.* at 1:20-22. The specification describes a “known” system of human activity monitoring that has the drawback of requiring “continuous monitoring of the accelerometer signals” which leads to “relatively high power consumption.” *Id.* at 1:38-40. Due to the high-power consumption required, large and expensive batteries are needed to monitor physical human activity for a practical period. *Id.* at 1:40-43.

According to the patent, the solution is an activity monitor “operable to monitor and process the sensor signals discontinuously.” *Id.* at 1:53-54. Referring to Figure 1 (below), the activity monitor **1** comprises a measurement unit **11** including a plurality of motion sensors operable to produce respective sensor signals indicative of motion experienced thereby, a processor **12** operable to receive the sensor signals from the measurement unit and to process the sensor signals in accordance with a predetermined method, and a memory unit **13**. *Id*. at 1:46-54; 1:62-2:4; FIG. 1. The processor **12** may be connected to an external host system **2**, which can be a personal computer (PC) or another appropriate system. *Id.* at 2:5-7.

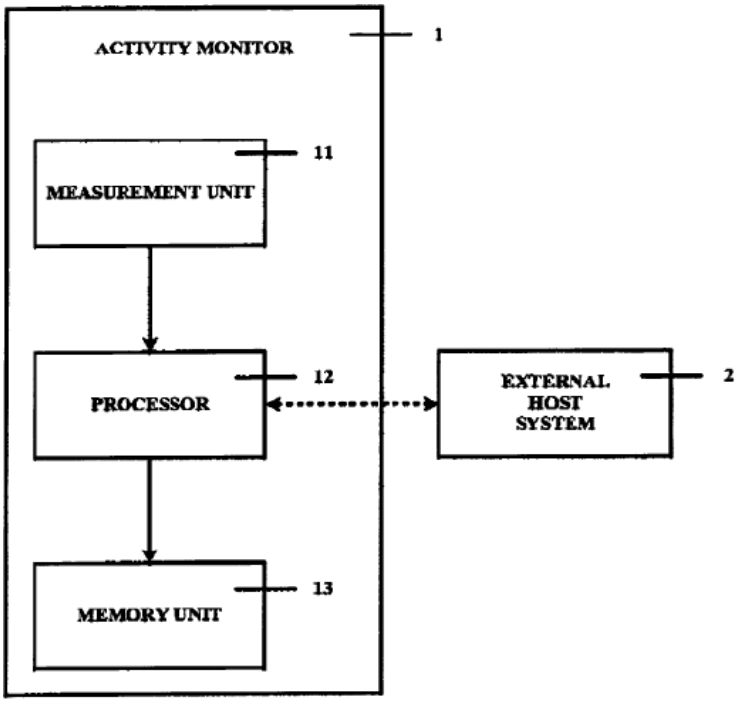



**FIG. 1**

*Id.* at FIG. 1. The activity monitor **1** is attached to a human to monitor physical activity for a certain time period. *Id.* at 2:10-15. "The measurement unit [**11**] comprises three accelerometers, which are arranged in [three] orthogonal [measurement] directions." *Id*. at 2:16-17. The accelerometers output data signals, which are indicative of the respective accelerations experienced by the accelerometers. *Id.* at 2:17-20. On an individual, these measurement directions are formed "antero-posterior" (both front and back), "medio-lateral" (side to side), and "vertical" (up and down), and are denoted as x, y and z, respectively. *Id.* at 2:22-24. Figure 2 (shown below) illustrates the orthogonal output of the three accelerometers of measurement unit **11**.

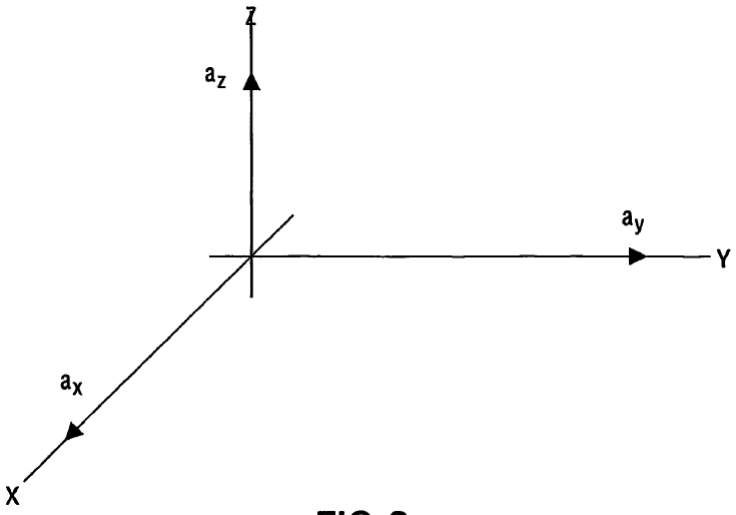



FIG.2

*Id.* at FIG. 2. The outputs are termed $a_x$, $a_y$, and $a_z$, respectively, in accordance with the present invention. *Id.* at 2:39-41.

Because a person seldom changes the kind of activity that is being performed every few seconds, it is not necessary to do monitoring continuously. *Id.* at 2:54-56. Accordingly, the activity monitor reduces power consumption by using "discontinuous monitoring activity," whereby "the processor goes into a standby (or sleep) mode after a few seconds of monitoring." *Id*. at 2:60-63. As illustrated in Figure 3 (shown below), the activity monitor operates such that the processor **12** remains in the standby mode (step A) for a predefined period of time, and then inputs the measurement unit outputs into the processor **12** and processes those signals (step B), storing the results (step C) in the memory unit **13** before returning to the standby mode. *Id.* at 2:41-46.

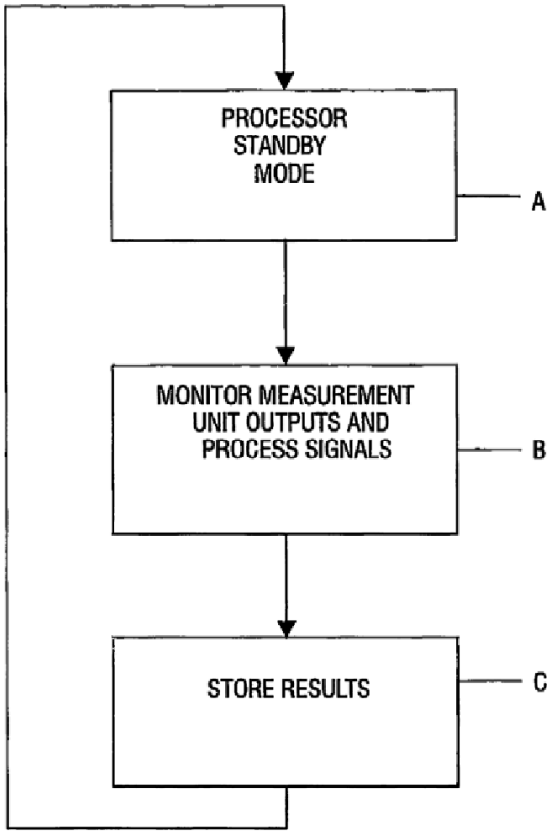



FIG.3

*Id.* at FIG. 3. This standby mode can be controlled by software that detects changes in the user's behavior to adopt a standby mode on, standby mode off strategy for the activity monitor. *Id*. at 2:63-67. The patent notes that further power reduction can be achieved "by switching off the monitoring unit itself, such that the accelerometers or motion sensors are only active for a discontinuous amount of time." *Id.* at 3:3-6.

Philips asserts claim 2 against Respondents. FID at 25. Independent claim 1 of the '228 patent recites:

1. An activity monitor comprising:

> a measurement unit including a plurality of motion sensors operable to produce respective sensor signals indicative of motion experienced thereby; and
>
> a processor operable to receive the sensor signals from the measurement unit and to process the sensor signals in accordance with a predetermined method,
>
> characterized in that the activity monitor is operable to *monitor* and process *the sensor signals discontinuously in time* and the processor is operable *to monitor the sensor signals in turn*.

*Id*. at 3:17-27 (emphasis added). Asserted claim 2 depends from claim 1 and recites:

2. An activity monitor as claimed in claim 1, wherein the measurement unit is operable to output the sensor signals discontinuously in time.

JX-1 at 3:28-30.

### C. The Accused Products

The accused products are activity trackers made by Fitbit and Garmin. FID at 3. The accused Fitbit devices are the Charge 3, Inspire, Inspire HR, and Ace 2 trackers as well as the Versa 2, Versa Lite Edition, and Ionic smartwatches. *Id.* at 3-4 (citing Philips' Initial Post-Hearing Br. ("PIB") at 14; Respondents' Initial Post-Hearing Br. ("RIB") at 31; CX-409C (Stipulation Relating to Importation and Inventory), ¶ 4). The accused Garmin devices are activity trackers and smartwatches, including certain of Garmin's Forerunner, Vivomove, Vivosport, Vivoactive, Vivofit, Approach, Fenix, Instinc, Legacy, MARQ, Descent, D2, Quatix, and Tactix products. *Id.* at 4 (citing PIB at 19-20; CX-425C (Garmin's Interrogatory Responses), Interrogatory Nos. 88, 89, 90, 91).

There is no dispute that the accused Fitbit devices and accused Garmin devices each contain a chip package (the "accused chip packages"), which includes a tri-axial accelerometer, a processor, and a FIFO (first-in, first-out) buffer. Order No. 34 at 8; *see also* RX-561C (Paradiso Rebuttal Witness Statement (RWS)) at QQ. 33–36, 57–58; JX-177.0008 (Data Sheet) (FIG. 1-1);

RX-573C (Rajagopal RWS at QQ. 12–15. It is further undisputed that each of the accused products contains a host processor separate from the accused chip packages. *Id*.; *see also* JX-28C.0009 (Hardware Architecture Diagram); CX-12C (Young Direct Witness Statement ("DWS")) at QQ. 17, 29, 43, 136, 138; CDX-2C.0008 (citing CX-145C.0005 (Circuit Diagram)); JX-107.0008 (Data Sheet) (FIG. 1-1); RX-561C (Paradiso RWS) at QQ. 58-59, 61-62; RX-573 (Rajagopal WS) at Q. 5; RX-563C (Choi WS) at Q. 11. In the accused Garmin devices, the host processors are contained in a component called a "SensorHub." *Id*.; *see also* RX-563C at Q. 11.

The operation of the host processors to obtain sensor data from the [redacted] in the accused chip packages is also undisputed. *Id.* at 10. In the accused chip packages, [redacted] "watermark." *Id*. [redacted] watermark level [redacted] transmitted to the host processor in a burst of data [redacted] *Id*. This burst of data is then processed by the host processor. *Id*. There is no dispute that the sensor data transmitted from the [redacted] to the host processor is transmitted serially, in sequentially ordered sets of x, y, and z samples. *Id.* at 13.

**D. The Domestic Industry Products**

For the technical prong of the domestic industry requirement with respect to the '228 patent, Philips asserts its Lifeline Device and Biosensor Device (BX-100). Each device includes an accelerometer package (LIS3DH for the Lifeline, LIS2DW12 for the Biosensor), where each of the packages contains three accelerometers, a processor, and a FIFO buffer. FID at 35 (citing

CX-12C (Young Direct WS (DWS)) at QQ. 78, 84-89, 133; CX-93 (LIS3DH datasheet); JX-106 (LIS2DW12 datasheet)). It is undisputed that these accelerometer packages contain a plurality of motion sensors that produce sensor signals, as required by the claim language. *Id.* Each device also includes a host processor that receives and processes the sensor signals from the accelerometer package. *Id.* at 36 (citing CX-12C (Young DWS) at QQ. 141, 143; JX-109C (Philips Lifeline block diagram); CX-202C (G10 Algorithm Architecture)); *see also* CX-203C (G10 Biosensor Firmware Architecture).

## II. STANDARD ON REVIEW

The Commission may review an ID either upon petition by one of the parties or on its own motion. *See* 19 C.F.R. §§ 210.43 & 210.44. The Commission shall grant a petition for review, in whole or in part, where it appears:

> (i) that a finding or conclusion of material fact is clearly erroneous;
>
> (ii) that a legal conclusion is erroneous, without governing precedent, rule or law, or constitutes an abuse of discretion; or
>
> (iii) that the determination is one affecting Commission policy.

19 C.F.R. § 210.43(b)(1) & (d)(2).

The Commission's review encompasses the issues for which at least one participating Commissioner has voted for review. *See* 19 C.F.R. § 210.43(d)(3). Any issue that is not raised in a petition for review is deemed to have been abandoned by the petitioning party and may be disregarded by the Commission, unless the Commission chooses to review the issue on its own initiative. *See* 19 C.F.R. § 210.43(b)(2).

With respect to the issues under review, "the Commission may affirm, reverse, modify, set aside or remand for further proceedings, in whole or in part, the initial determination of the

administrative law judge." 19 C.F.R. § 210.45(c). The Commission also "may take no position on specific issues or portions of the initial determination," and "may make any finding or conclusions that in its judgment are proper based on the record in the proceeding." *Id.*

## III. ANALYSIS

For the reasons set forth below, the Commission has determined to modify in part and reverse in part certain portions of the FID's analysis with respect to infringement and the technical prong of the domestic industry requirement as to the '228 patent. Specifically, the Commission modifies the FID's construction of the term "monitor" recited in unasserted independent claim 1 of the '228 patent and, under this modified construction, reverses the FID's finding of non-infringement and modifies the FID's analysis in finding that the technical prong of the domestic industry requirement was not met with respect to the BX-100 Biosensor Device. With respect to the '464 patent, the Commission has determined to take no position on the FID's analysis and finding regarding an industy in the process of being established, and therefore take no position on whether Philips has satisfied the economic prong requirement for this patent. The Commission has also determined to take no position on Order No. 34's analysis and finding regarding an industry in the process of being established with respect to the '228 patent.

The Commission affirms and adopts the findings, conclusions, and supporting analysis in the FID and Orders No. 34 and 35 that are not inconsistent with the Commission's opinion.

### A. Applicable Legal Standards

#### 1. Claim Construction

Claim construction "begin[s] with and remain[s] centered on the language of the claims themselves." *Storage Tech. Corp. v. Cisco Sys., Inc.*, 329 F.3d 823, 830 (Fed. Cir. 2003); *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (*en banc*). The language used in a

claim bears a "heavy presumption" that it has the ordinary and customary meaning that would be attributed to the words used by persons skilled in the relevant art. *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002); *Phillips*, 415 F.3d at 1312-13. Moreover, the language is read in the context of the entire patent, including the specification. *Id.* at 1313-14; *see also Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996) ("[T]he specification is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term."). To help inform the court of the ordinary meaning of the words, a court may consult the intrinsic evidence, including the claims themselves, the specification, and the prosecution history, as well as extrinsic evidence, such as dictionaries and treatises and inventor and expert testimony. *Phillips*, 415 F.3d at 1314.

**2. Infringement**

"An infringement analysis entails two steps. The first step is determining the meaning and scope of the patent claims asserted to be infringed. The second step is comparing the properly construed claims to the device accused of infringing." *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 976 (Fed. Cir. 1995) (*en banc*), *aff'd*, 517 U.S. 370 (1996) (citation omitted). Direct infringement requires the patentee to prove that the accused device meets each and every limitation of the asserted claim(s). *Frank's Casing Crew & Rental Tools, Inc. v. Weatherford Int'l, Inc.*, 389 F.3d 1370, 1378 (Fed. Cir. 2004). Further, "[o]ne who does not infringe an independent claim cannot infringe a claim dependent on (and thus containing all the limitations of) that claim." *Wahpeton Canvas Co., Inc. v. Frontier, Inc.,* 870 F.2d 1546, 1552 n.9 (Fed. Cir. 1989) (citation omitted).

### 3. Domestic Industry

In an investigation based on a claim of patent infringement, section 337 requires that an industry in the United States, relating to the articles protected by the patent, exist or be in the process of being established. 19 U.S.C. § 1337(a)(2). Under Commission precedent, the domestic industry requirement has been divided into (i) an "economic prong" (which requires certain activities and investments with respect to the protected articles) and (ii) a "technical prong" (which requires that the activities relate to articles protected by the patent). *Certain Video Game Systems and Controllers* ("*Video Games*"), Inv. No. 337-TA-743, Comm'n Op. at 6-7 (Apr. 14, 2011). "The economic prong and technical prong showings *must be made for the same product or products*." *Certain Polyimide Films*, Inv. No. 337-TA-772, FID at 273, 2012 WL 2131128 at *172 (May 10, 2012) ("*Polyimide Films*") (emphasis added) (finding economic prong not met where complainant failed to allocate its investments to the DI products for each asserted patent), *unreviewed in relevant part by* Comm'n Notice (Aug. 1, 2012).

The technical prong of the domestic industry requirement is satisfied when the complainant in a patent-based section 337 investigation establishes that it is practicing or exploiting the patent at issue. *See* 19 U.S.C. 1337(a)(2), (3); *Certain Microsphere Adhesives, Process for Making Same and Products Containing Same, Including Self-Stick Repositionable Notes*, Inv. No. 337-TA-366, Comm'n Op. at 8, 1996 WL 1056095 (Jan. 16, 1996) ("*Microsphere Adhesives*"). "The test for satisfying the 'technical prong' of the industry requirement is essentially [the] same as that for infringement, *i.e.*, a comparison of domestic products to the asserted claims." *Alloc, Inc. v. ITC*, 342 F.3d 1361, 1375 (Fed. Cir. 2003); *see also Polyimide Films,* 2012 WL 13171648 at *10 (Nov. 21, 2012) (citing *Alloc*, 342 F.3d at 1375). It is sufficient to show that the domestic products practice any claim of that patent, not

necessarily an asserted claim of that patent. *Microsphere Adhesives*, Comm'n Op. at 7-16.

The economic prong is satisfied if a complainant in a patent-based investigation establishes that a domestic industry exists based on significant investments in plant and equipment or labor or capital or substantial investments in the exploitation of the patent, including engineering, research and development, or licensing. *See* 19 U.S.C. § 1337(a)(2), (3). The economic prong can also be satisfied if the complainant shows that a domestic industry is in the process of being established by demonstrating that it is "'taking the necessary tangible steps to establish such an industry in the United States'" and there is a "'significant likelihood that the industry requirement will be satisfied in the future.'" *Certain Non-Volatile Memory Devices and Prods. Containing the Same* ("*Non-Volatile Memory*"), Inv. No. 337-TA-1046, Comm'n Op. at 29 (Oct. 9, 2018) (quoting *Certain Stringed Musical Instruments and Components Thereof* ("*Certain Stringed Musical Instruments*"), Inv. No. 337-TA-586, 2009 WL 5134139, Comm'n Op. at *10 (May 16, 2008)).

### B. Claim Construction and Infringement Regarding "Monitor the Sensor Signals in Turn" in the '228 Patent

#### 1. Order Nos. 26, 27, and 34

In the *Markman* Order (Order No. 26), the ALJ construed the limitation "monitor the sensor signals in turn" recited in independent claim 1 of the '228 patent to mean "sequentially ordered non-overlapping monitoring of the sensor signals by the processor, *e.g.*, a time-division monitoring of each of the x, y, or z axis data signals sequentially without overlap." Order No. 26, at 18 (Jul. 27, 2020).

Concurrent with the *Markman* Order, the ALJ issued Order No. 27, which denied Respondents' motion for summary determination that asserted claim 2 of the '228 patent is

invalid due to indefiniteness. *See* Order No. 27 (Jul. 27, 2020). Respondents submitted that the term "monitor" recited in the third limitation of claim 1 is indefinite as ambiguous in view of the limitation "a processor operable to receive the sensor signals" recited in the second limitation of claim 1. *Id*. at 4. Specifically, Respondents argued that the third limitation recited two "monitor" requirements, "that 'the activity monitor is operable to *monitor* and process the sensor signals discontinuously in time' and that the 'processor is operable to *monitor* the sensor signals in turn.'" *Id*. (emphasis added); JX-1 at 3:24-27. Respondents asserted that the limitations "monitor" and "receive," both of which the processor must be able to accomplish, must have different meanings. *Id*. (citing *Amgen Inc. v. Sandoz Inc.*, 923 F.3d 1023, 1031 (Fed. Cir. 2019) ("different claim terms are presumed to have different meanings").

Respondents further argued that the claims are ambiguous as to whether the "measurement unit" or the "processor" performs the claimed monitoring function. *Id*. Respondents submitted that claim 1 recites that "the activity monitor is operable to monitor and process the sensor signals discontinuously in time," while dependent claim 3 specifies that "the processor is operable to monitor the sensor signals discontinuously in time." *Id.* at 4-5; JX-1 at 3:31-33. Respondents, citing the doctrine of claim differentiation, argued that claim 1 must be broader than claim 3,[9] and accordingly, claim 1 must allow for another component of the activity monitor, such as the measurement unit, to monitor the sensor signals. *Id.* at 5. Respondents also argued that there is no disclosure in the claims or specification that explains how both the

[9] Claim 3 provides: "An activity monitor as claimed in claim 1, wherein the processor is operable to monitor the sensor signals discontinuously in time."

measurement unit and the processor could be capable of monitoring, which is further evidence of the ambiguity of this term. *Id*.

Regarding the relationship between the terms "monitor" and "receive" in the claims, Order No. 27 finds that the term "receive" is not used in the specification. *Id.* at 6. However, the Order finds that the claimed "receive" step corresponds to the "input" step in the specification; the specification discloses that "the processor remains in a standby mode (step A) for a predefined period of time then inputs the measurement unit outputs." *Id.* (citing JX-1 at 2:42-44). Order No. 27 finds that the verb "monitor" is also not used in the specification, although the specification does use the term "monitoring" when describing the overall process: "Thus, the monitoring of the measurement unit outputs is performed in a discontinuous manner over time." *Id*. (citing JX-1 at 2:47-48). Order No. 27 finds that: (1) this "description of 'monitoring' in the specification is broad enough to include the 'input' or 'receive' step, while potentially including more undisclosed steps"; and (2) "[r]eading the 'receive' step to be part of the 'monitor' function would not violate the presumption that these terms have different meanings—a broader term can have a different meaning from a narrower term." *Id.* Order No. 27 also finds that although the terms "receive" and "monitor" appear in different limitations of claim 1, there is no requirement that the meaning of these terms be mutually exclusive. *Id.*

Order No. 27 finds that the verb "monitor" describes a step that includes receiving sensor signals, but occurs before those signals are processed, in accordance with the language of claim 1 of the '228 patent. *Id.* at 7. Order No. 27 also cites several dictionary definitions for the term "monitor" that were identified by the parties and undisputed as applying here. *Id.* at 9-10. These definitions included "to watch, keep track of, or check," "to keep track of systematically

with a view to collecting information," "to test or sample, especially on a regular or ongoing basis," or "to check or evaluate [something on a constant or regular basis]." *Id.* Order No. 27, relying on these dictionary definitions and expert opinions, finds that the extrinsic evidence points to a construction of "monitor" that describes a function of the processor to receive and track the sensor signals. *Id.* at 10. Ultimately, Order No. 27 denies Respondents' motion, finding that the intrinsic record provides reasonable certainty as to the scope of the term "monitor," although the Order does not specifically construe this term. *Id.* at 11.

Subsequently, in the portion of Order No. 34 denying in part Philips' motion for summary determination of non-infringement with respect to the '228 patent, the Order states that the plain and ordinary meaning of "monitor" is "to watch, keep track of, or check," and that the "monitoring" step in claim 1 was indeed construed in Order No. 27 as a function of the processor to receive and track the sensor signals. Order No. 34 at 12 (citing Order No. 27 at 9-10). Order No. 34 also finds that the "in turn" portion of the limitation "monitor the sensor signals in turn" is met by Respondents' accused products. *Id.* at 13-14. Specifically, Order No. 34 finds that there is no dispute that the sensor data in the accused products is transmitted serially from the accused chip packages to the host processors, in sequentially ordered sets of x, y, and z samples. *Id.* Order No. 34, however, does not grant summary determination of infringement because there were still disputed issues of material fact with respect to other claim limitations. *Id.* at 13-14.

**2. The FID**

In determining whether the accused products meet the limitation "monitor the sensor signals in turn," the FID finds that the critical issue here is the meaning of "monitor" and whether this limitation requires the processor in the accused products to both request and receive

the sensor signals "in turn." FID at 34. Based on the previous findings from Order No. 27, the FID concludes that the intrinsic and extrinsic evidence supports a construction for "monitor" that includes both requesting and receiving the sensor signals. *Id.* (citing Order No. 27 at 7, 9-10).

Similarly, in determining whether the accused products meet the claim limitation "monitor [] the sensor signals discontinuously in time," the FID finds that "the claimed 'monitoring' of 'sensor signals' in the accused products comprises the request for sensor data and the subsequent transmission [of] the requested data from the accelerometer package to the processor." FID at 31.

The FID further finds that, when the request for sensor signals is recognized as part of the monitoring step, the accused products do not meet the "monitor the sensor signals in turn" limitation. *Id.* at 34. Specifically, the FID finds that each request for sensor data in the accused products is a [redacted] separate x, y, and z data. *Id.* Accordingly, the FID finds that the processor is not operable to monitor the sensor signals "in turn," and therefore Respondents' accused products do not infringe claim 1 and, consequently, do not infringe asserted dependent claim 2. *Id.* The FID finds that all other asserted claim limitations are met by the accused products, including the "monitor [] the sensor signals discontinuously in time" limitation. *Id.* at 25-32, 34-35.

**3. The Parties' Arguments**

Philips contends that, based on Order Nos. 26, 27, and 34, "it was settled by the ALJ that the 'monitor' limitation in claim 2 (dependent on claim 1) of the '228 patent describes a function performed by the processor to receive and track sensor signals before they are processed." Philips' Pet. at 38 (emphasis in original). Philips argues that, nevertheless, the FID adds a new requirement to the construction of "monitoring" – that the processor must individually request

each and every sample of data (*i.e.*, request x, receive x; request y, receive y; request z, receive z; and so on). *Id.*

Philips argues that this new claim construction is not supported by the intrinsic record and was legal error. *Id.* at 39. Specifically, Philips submits that there is no support in the '228 patent for importing a requirement of iterative "requesting" into "monitoring," and that such a requirement is not consistent with the plain meaning of "monitoring." *Id.* Philips argues that, rather, a request can be made for sensor signals without tracking (*i.e.*, "monitoring") each sample, just as a processor may receive and track sensor signals without making a separate request for each sample. *Id.* Philips submits that the two concepts are distinct from one another, and the FID provides no basis to include "requesting" as part of "monitoring," or to deviate from the plain meaning of "monitoring" or the construction of "monitoring" previously adopted in Order Nos. 27 and 34. *Id.* Philips contends that nothing in the ALJ's earlier analysis supports the conclusion that "monitoring" separately requires requesting and receiving, and neither the word "requesting" nor the concept of requesting data appear in any of the definitions of "monitoring" provided in the FID or considered during claim construction. *Id.* at 40.

Finally, Philips submits that, beyond the plain meaning of the term, nothing in the specification of the '228 patent or the prosecution history supports importing a "requesting" requirement into "monitoring." *Id.* Philips asserts that the specification of the '228 patent provides that "the processor **12** is operable to process the data signals output from the measurement unit, and is able to store the data signals, or the results of the processing in the memory unit **13**." *Id.* (citing JX-1 at 1:67-2:3). The specification further provides that "the

activity monitor operates such that the processor remains in a standby mode (step A) for a predefined period of time then inputs the measurement unit outputs and processes those signals (step B), storing the results (step C) in the memory unit **13**, before returning to the standby mode. Thus, the monitoring of the measurement unit outputs is performed in a discontinuous manner over time." *Id.* at 40-41 (citing JX-1 at 2:41-48). Philips thus submits that not once does the specification of the '228 patent mention the requesting of data by the processor from the measurement unit to establish monitoring, and nothing in the disclosure supports the conclusion that "monitoring" by a processor must include "requesting" each of the sensor signals. *Id.* at 41.

Based on the foregoing, Philips submits that the FID commits legal error by improperly importing a "requesting" requirement into the previously established construction of "monitoring" as meaning "receive and track" in accordance with its plain and ordinary meaning. *Id.* at 44. Philips therefore contends that, consistent with Order No. 34, the accused products infringe under the proper construction of "monitor" because it is undisputed that the sensor data in these products is transmitted serially from the accused chip packages to the host processors, in sequentially ordered sets of x, y, and z samples, thus satisfying the "monitor the sensor signals in turn" limitation. *Id.* at 43-44.

OUII and Respondents submit that there is no legal error in the FID's construction of "monitor the sensor signals in turn" limitation or its finding of non-infringement for the '228 patent. OUII's Resp. at 4-8; Respondents' Resp. at 16-19. OUII admits that it previously took the position that the "monitor the sensor signals in turn" limitation was met by the accused products, but believes there is no reversible error of fact or law in the FID's non-infringement finding. OUII's Resp. at 5; *see also* OUII's Initial Post-Hearing Br. ("SIB") at 49-50 (Nov. 16,

2020). OUII submits that the FID properly explains that, under the broad plain meaning of "monitor" that was adopted during claim construction, making a request is a part of how a processor performs the "monitoring" step. *Id.* at 7 (citing FID at 34). Respondents argue, *inter alia*, that under the various dictionary definitions that Philips itself advocated, such as "to watch, keep track of, *or check*," the term "check" includes making a request and therefore is a part of how a processor performs the "monitoring" step. Respondents' Resp. at 16 (citing FID at 34).

**4. Analysis**

The Commission finds that the FID improperly imports a "request" requirement into the claimed "monitor" step for claim 2 of the '228 patent.[10] From a review of the intrinsic record, there is nothing that requires "requesting" to be a part of "monitoring." Rather, the entirety of the intrinsic record is directed solely to a processor that can monitor human physical activity by receiving, tracking, and processing the sensor signals from the measurement unit discontinuously, but there is no teaching that the "monitoring" step includes making a separate request for each of those signals in turn. *See, e.g.*, JX-1 at FIG. 1, FIG. 3, 1:62-2:9, 2:39-3:6. The ALJ previously explained that the plain and ordinary meaning of "monitor" is "to receive and track," consistent with that intrinsic record. *See* Order No. 27, at 5-10; Order No. 34, at 12 ("The 'monitoring' step in claim 1 was construed as a function of the processor to receive and

[10] Vice Chair Stayin would affirm the FID's analysis of the "monitor" limitation of claim 1. In the Vice Chair's view, the plain and ordinary meaning of "monitor" includes "checking" or "sampling," inherent in which is a request for data. *See* Order No. 27 at 9-10; Order No. 34 at 10. The Vice Chair would thus find that Philips failed to show that the accused products infringe claim 2 of the '228 patent for the reasons set forth in the FID. Nonetheless, the Vice Chair joins the Commission's determination of no violation on the grounds that claim 2 of the '228 patent is invalid as anticipated under 35 U.S.C. § 102 and is directed to patent-ineligible subject matter under 35 U.S.C. § 101.

track the sensor signals.") (citing Order No. 27, at 10). *See, e.g., Vitronics Corp.,* 90 F.3d at 1582 ("[T]he specification is always highly relevant to the claim constmction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed te1m."); *Wright Med. Tech., Inc.* v. *Osteonics C01p.,* 122 F.3d 1440, 1443 (Fed. Cir. 1997) ("Claim te1ms are given their ordina1y and customaiy meaning in the field of the invention, unless a special definition is clearly stated in the specification.").

The first mention of a "request" step in the FID is in the infringement analysis pe1taining to the limitation "the activity monitor is operable to monitor and process the sensor signals discontinuously in time," where the ALJ describes the operation of the host processor in retrieving data from the- of the accelerometer package in the accused products. FID at 29. Specifically, the FID states:

> Mr. Rajagopal [Respondents' fact witness] fmther ex lained that the accelerometer ackages have a "wate1nark" [redacted]. [CX-387C (Rajagopal Dep.)] at 68-70. When the host processor [redacted], the processor sends *a request* to the accelerometer package• [redacted] *Id.*at68-7,178-79

*Id.* (emphasis added). After analyzing the parties' arguments as to whether the host processor's listening for an [redacted] is pa1t of "monitoring" sensor signals in the accused products, the ALJ concludes: "In accordance with the specification and claim language discussed above, I find that the claimed " monitoring" of "sensor signals" in the accused products comprises the request for sensor data and the subsequent transmission [of] the requested data from the accelerometer package to the processor." *Id.* at 31. Thus, the ALJ construed "monitor" in light of the operation of the accused products. The Federal Circuit has explained, however, that "[a]

claim is construed in the light of the claim language, the other claims, the prior art, the prosecution history, and the specification, *not* in light of the accused device." *SRI Int'l v. Matsushita Elec. Corp. of Am.,* 775 F.2d 1107, 1118 (Fed. Cir. 1985) (emphasis in original).

Moreover, the term "monitor" is a simple English word, and Respondents presented no evidence or argument that it has a special meaning in the art. Accordingly, the Commission finds based on the record of the investigation that there is no such special meaning.

As discussed above in connection with Order No. 34, the ALJ noted that the plain and ordinary meaning of "monitor" is "to watch, keep track of, or check," and therefore construed "monitor" to mean "to receive and track." Order No. 34 at 12. Inconsistent with this plain and ordinary meaning, as well as lack of special meaning in the art, Respondents attempt to import a "request" step into the claim term "monitor" (Respondents' Resp. at 16) by improperly overlaying their construction of the word "check" upon the ALJ's construction of "monitor." However, "check" is not a term that appears in the claim language, the specification, or the prosecution history.

Also, with respect to Respondents' "indefinitely redundant" argument from Order No. 27 regarding the terms "receive" and "monitor,"[11] removing the "request" requirement from the "monitor" step does not make the terms "receive" and "monitor" indefinitely redundant. *See* Order No. 27 at 6 (finding "monitor" to be broader than "receive" and not mutually exclusive). Moreover, as the Federal Circuit has stated, although claim term redundancy is disfavored, "the

[11] With respect to the construction of the term "monitor," Respondents argued that the two instances of the term "monitor" in the asserted claims, *i.e.*, "the activity monitor is operable to *monitor* and process the sensor signals discontinuously in time" and the "processor is operable to *monitor* the sensor signals in turn," must have a different meaning from the term "receive" in the claims, *i.e.*, "a processor operable to *receive* the sensor signals from the measurement unit." *See* Order No. 27 at 4-5 (Section III.B.1 *supra*); *Amgen*, 923 F.3d at 1031.

rule is not inflexible." *See Eli Lilly & Co. v. Teva Parenteral Medicines, Inc.*, 845 F.3d 1357, 1372 (Fed. Cir. 2017); *Power Mosfet Techs., L.L.C. v. Siemens AG*, 378 F.3d 1396, 1409-10 (Fed. Cir. 2004). A person of ordinary skill in the art would understand the differences in the two terms from the intrinsic record. *See* Philips' Opposition to Respondents' Motion for Summary Determination of Invalidity of the '228 Patent (Jun. 11, 2020), Exh. E (Young Decl.) at ¶¶ 20, 23-24; Exh. F (Young Dep. Tr.) at 57:16-58:6, 74:7-25. In addition, as properly construed in accordance with its plain and ordinary meaning and consistent with the intrinsic evidence, the "monitor" step includes the steps of receiving and tracking the sensor signals, making it of different scope than just receiving as construed by the ALJ in Order Nos. 27 and 34. *See* Order No. 27 at 10; Order No. 34 at 12..

Accordingly, the Commission, consistent with Order Nos. 27 and 34, construes the term "monitor," found in the "monitor [ ] the sensor signals discontinuously in time" and "monitor the sensor signals in turn" limitations, to mean "receive and track." Under this construction, the Commission finds that the "monitor the sensor signals in turn" limitation is met by the accused products consistent with Order No. 34's and the FID's reasoning that the "in turn" portion of this limitation is met. *See* Order No. 34 at 13-14; FID at 32-34. The record evidence establishes that the host processors of the accused products "receive and track" the sensor signals output from the accelerometer package by performing a time-division monitoring of each of the x, y, or z axis data sensor signals sequentially without overlap. *Id.*; *see also* CX-12C (Young DWS) at Q/A 48-49, 70-71, 97, 146, 149; CDX-2C.11, 13; Tr. (Rajagopal) at 146:24-147:21; CX-387C (Rajagopal Deposition Designation) at 73:9-74:11; 79:21-83:12; CX-375C (Choi Deposition Designation) at 62:6-63:2; 63:23-64:20; 81:12-24; 96:10-97:3; 97:21-98:7.

Although not disputed by the parties, the FID finds that the "monitor [ ] the sensor signals discontinuously in time" is met by the accused products under a construction of the "monitor" step including a "request step."[12] FID at 29-31. Accordingly, the Commission vacates the portion of this infringement analysis that relies on the accused products performing such "requesting," and finds that this limitation is met under the modified construction for the "monitor" step of receiving and tracking the sensor signals. The Commission therefore determines that the accused products infringe claim 2 of the '228 patent, and reverses the FID's finding to the contrary.

### C. The Technical Prong of the Domestic Industry Requirement for the '228 Patent

Order No. 34 granted Philips' motion for summary determination that it has satisfied the economic prong of the domestic industry requirement for the '228 patent with respect to only the BX-100 Biosensor Device. Order No. 34 at 15-16, 40.[13] Accordingly, to satisfy the technical prong of the domestic industry requirement for the '228 patent, Philips needed to prove before the ALJ that its Biosensor Device satisfies all limitations of at least one claim of the '228 patent. *See Polyimide Films*, 2012 WL 2131128 at *172.

#### 1. The ID

[12] For the reasons stated in n.11, *supra*, the Vice Chair would affirm the FID's analysis and findings at to the "monitor . . . discontinuously in time" limitation of claim 2.

[13] Philips did not move for summary judgement that its other asserted domestic product for the '228 patent, the Lifeline Device, satisfies the economic prong of the domestic industry requirement. Moreover, Philips chose not to proceed at trial with any economic prong evidence regarding this domestic industry product, and the FID does not address this product with respect to the economic prong. *See* PIB at 219 n.10 (Nov. 16, 2020); FID at 35-40. However, Philips did proceed at trial with technical prong evidence for both the Lifeline and Biosensor Devices. FID at 34 (citing CX-12C at QQ. 74-104).

The FID finds that the Biosensor Device does not satisfy four limitations of claim 2 of the '228 patent. FID at 36-40. Specifically, the FID finds that the Biosensor Device does not satisfy the following limitations: (1) "monitor . . . the sensor signals discontinuously in time;" (2) "process the sensor signals discontinuously in time;" (3) "the processor is operable to monitor the sensor signals in turn;" and (4) "the measurement unit is operable to output the sensor signals discontinuously in time," the latter of which is separately recited in asserted dependent claim 2. *Id.*

Regarding limitation (1), before the ALJ, Philips submitted that the transfer of data from the FIFO buffer in the accelerometer package to the host processor in both the Lifeline and Biosensor Devices shows discontinuous monitoring. *Id.* at 35 (citing PIB at 80-83). Philips submitted that, according to its expert, Dr. Young, the data from the motion sensors in each of the products is stored in the FIFO buffer of the accelerometer package before being transmitted to the host processor in bursts of data upon request. *Id.* at 37 (citing CX-12C (Young DWS) at Q. 151-54). Philips submitted that, in performing "discontinuous monitoring," the host processors request data from the accelerometer package on preset timers every 500 hundred milliseconds – thus no sensor signals are transmitted during these idle periods of monitoring. *Id.*

The FID finds that the Lifeline Device meets the discontinuous monitoring limitation, but with respect to the Biosensor Device, it finds conflicting testimony among Philips' expert and a fact witness. *Id.* at 37-38. Specifically, Dr. Young testified that the Biosensor Device operates using a preset timer similar to the Lifeline Device. *Id.* at 37 (citing CX-12C at Q. 154). The ALJ found, however, that Philips' engineer, Srikanth Thiagarajan, described a different operation

in the Biosensor Device where the host processor periodically sends an interrupt to the accelerometer package to determine whether the FIFO buffer is full, and then the accelerometer package transfers ten samples in a burst. *Id.* (citing CX-9C (Thiagarajan WS) at Q. 22; RX-688C (Thiagarajan Dep. Tr.) at 98-102). Furthermore, in his deposition testimony, Mr. Thiagarajan described the Biosensor Device's data capture as "without interruption" and discussed a document stating that the device "continuously captures." *Id.* at 37-38 (citing RX-688C at 151). The FID finds that Philips's post-hearing brief does not resolve the discrepancies between Dr. Young's analysis of the operation of the Biosensor Device and Mr. Thiagarajan's testimony. *Id.* at 38 (citing PIB at 81-82).

The FID also finds that, further confusing the record, Respondents' expert, Dr. Paradiso, testified that the Philips devices are configured to continuously obtain sensor data and are continuously checking for an interrupt. *Id.* (citing RX-561C (Paradiso Rebuttal WS (RWS)) at Q. 155). The FID finds that this conflicting evidence in the record precludes any definitive findings[14] regarding the operation of the Biosensor Device with respect to the transmission of data between the accelerometer package and the host processor. *Id.* Accordingly, the FID finds that Philips has failed to carry its burden as to the "monitor . . . the sensor signals discontinuously in time" limitation with respect to the Biosensor Device. *Id.* For the same reasons, the FID finds that limitations (2) and (4), which also require specific "discontinuous" processes, are not met. *Id.* at 38-40. Additionally, for the same reasons discussed above with

[14] Contrary to the FID's requirement for a "definitive" finding, the Commission notes that the standard of proof is the same for infringement as it is for satisfaction of the technical prong of the domestic industry requirement, *i.e.*, a preponderance of the evidence. *See, e.g.*, *Alloc*, 342 F.3d at 1375 ("The test for satisfying the "technical prong" of the industry requirement is essentially same as that for infringement, *i.e.*, a comparison of domestic products to the asserted claims.").

respect to non-infringement of the "monitor the sensor signals in turn" limitation, the FID finds that the Philips Biosensor Device does not meet this limitation. *Id.* at 39-40.

Accordingly, the FID finds that the Philip Biosensor Device does not satisfy four limitations of the asserted claim and thus has failed to satisfy the technical prong of the domestic industry requirement with respect to the '228 patent. FID at 40;[15] *see Certain Polyimide Films*.[16]

**2. The Parties' Arguments**

Philips argues that the operation of its Biosensor Device is materially the same as the accused products, as well as its Lifeline Device, which the FID finds practices all limitations of claim 2 of the '228 patent. Philips' Pet. at 25-26. Specifically, Philips submits that, like the accused Fitbit and Garmin devices as described *supra* with respect to infringement (*see* Section VI.A.2), channel data is accumulated in the FIFO buffers on the accelerometer chip and transferred to the host processor in batches of accumulated data [redacted] interrupt is generated. *Id.* at 25 (citing CX-1393C (Liu DWS) at Q. 12); *see also* FID at 29 (finding the

[15] Incongruously, the FID states in its Conclusions of Law section that Philips has satisfied the domestic industry requirement with respect to the '228 patent. FID at 162.

[16] The FID also finds that the Lifeline Device satisfies all limitations of claim 1 and asserted claim 2 of the'228 patent. *Id*. at 35-40. The FID acknowledges Order No. 34 (*see* FID at 35 n.10) but in that Order, Philips sought, and the ALJ granted, summary determination of the economic prong only with respect to the Biosensor Device. *See* Order No. 34 at 16 ("Philips moves for summary determination on the economic prong with respect to the '228 patent on one of those two product lines, the BX100.") As noted previously, Philips did not present evidence that the Lifeline Device satisfies the economic prong, and the FID makes no findings to that effect. In its Conclusions of Law, the FID states that Philips has satisfied the domestic industry requirement with respect to the '228 patent, but given that the FID finds that the technical prong is not met for the only product for which the economic prong is satisfied, this conclusion appears to be in error. Accordingly, the Commission clarifies and adopts the finding that Phillips has not satisfied the domestic industry requirement with respect to its Lifeline Device.

"monitor . . . the sensor signals discontinuously in time" limitation met by the accused products based on the "watermark interrupt" trigger). Philips contends that, in its Biosensor Device, batches of the accumulated sensor signals are burst out of the FIFO buffers to the processor over a pin labeled "SPI [redacted]." *Id.* (citing CX-93.21). Philips submits that this is accomplished by the processor initiating the same SPI [redacted] as the accused products (*see* Section III.C.1 *infra*), and when a SPI [redacted] is not occurring, no sensor signals are being transmitted. *Id.* (citing CX-1393C (Liu DWS) at Q. 13).

Philips further argues that, as with the accused Fitbit and Garmin Devices: (1) the Biosensor product's sensor signals are transmitted over the [redacted] in a serial manner, where there is no overlap among the component data; and (2) the accumulated sensor signals are stored in the processor's memory in a manner in which the processor knows the location of the x, y, and z channel data. *Id.* at 25-26 (citing the same at QQ. 14-15). Philips submits that Respondents do not dispute that the accelerometers in its Biosensor Device use FIFO buffers, which results in batches of accumulated sensor signals being transmitted over the [redacted] one sensor signal after the other in turn. *Id.* at 26. In addition, Philips submits that Respondents do not dispute that these bursts transmit sequentially ordered, non-overlapping data, and that the host processor inthe Philips Biosensor Device receives the accumulated data in the same sequential manner as itwas transmitted. *Id.* at 26, 51 (citing RIB at 78).

Based on the foregoing, Philips submits that the FID errs in finding that the Biosensor Device does not meet all limitations of claim 2. *Id.*

OUII and Respondents do not submit any new arguments beyond their above-mentioned non-infringement arguments for supporting the FID's finding that the Biosensor Device does not

meet four limitations of claims 2 of the '228 patent. *See* OUII's Resp. at 16-17; Respondents' Resp. at 4-11. Rather, they both rely on a waiver argument, contending that Philips did not petition for review with respect to all of the limitations the FID finds unsatisfied, but with respect to only the "monitor the sensor signals in turn" limitation. *Id.* Accordingly, relying on waiver and their above-discussed non-infringement arguments, OUII and Respondents submit that there is no basis to reverse the FID's finding that Philips Biosensor Device does not meet these limitations. *Id.*

**3. Analysis**

The Commission finds that the FID commits legal and factual error in finding that Philips' Biosensor Device does not satisfy all limitations of claim 2 of the '228 patent.[17] The record evidence establishes that the accused devices and the Biosensor Device operate in a similar manner where: (1) the device includes accelerometers, a FIFO buffer, and a processor; (2) data from the accelerometer sensors accumulates in the FIFO buffer [redacted] [redacted] "watermark," [redacted]; (3) [redacted] watermark level [redacted], the [redacted] processor of the accelerometer package sends an interrupt signal to the host processor, and the host processor responds with a request for data, which results in the contents of the FIFO buffer being transmitted to the host processor in a burst of data over the [redacted] SPI [redacted] of the host processor; (4) this burst of data is then processed by the host processor; (5) the sensor data transmitted from the FIFO buffer to the host processor is transmitted serially, in sequentially ordered sets of x, y, and z samples; and (6) when this SPI [redacted] is not occurring, there is no

[17] For the reasons stated *supra*, n.10, Vice Chair Stayin would affirm the FID's finding that the Philips Biosensor Device does not meet the limitations of claim 2 of the '228 patent.

sensor signal data transmitted from the accelerometer to the processor. *See, e.g.*, CX-12 (Young WS) at QQ. 39-42, 47-49, 102, 146, 154, 162-163, 173; JX-178.0023-25; CX-203C.0006-7, .0010-15; RX-561C (Paradiso WS) at QQ. 148-49.

Specifically, the datasheet for the Biosensor accelerometer states that: "[t]he LIS2DW12 embeds 32 slots of 14-bit data FIFO for each of the three output channels, X, Y and Z of the acceleration data. This *allows consistent power saving for the system*, since the host processor *does not need to continuously poll data from the sensor*, but it can wake up only when needed and *burst the significant data* out from the FIFO." JX-178.0023 (emphasis added). Also, Respondents' own expert, Dr. Paradiso, admits that the accelerometer packages and the processors of the accused devices and the Biosensor Device operate "similarly" or "in materially the same fashion." RX-561C at QQ. 148-49. Moreover, Respondents themselves admit that "[t]he Philips alleged domestic industry product—the BX-100 device—includes an STM chip package, and operates in a similar fashion to the accused products with respect to interactions between the STM chip package and the external Philips host processor. Moreover, Philips's theory of technical domestic industry is essentially the same as its infringement theory, and fails for many of the same reasons." RIB at 178.

Accordingly, there is little or no dispute that the accused devices and the Biosensor Device operate in a similar manner – sending out bursts of data serially from the FIFO buffer to the host processor [redacted] "watermark" [redacted]. Accordingly, the only dispute is whether the request for this burst of data must necessarily be included in a proper construction of the recited "monitor" step. As discussed *supra* with respect to claim construction, the Commission finds that it does not, and therefore we find that the Biosensor

Device satisfies all the limitations of claim 2. Also, contrary to the FID's reasoning, the Commission finds that there is no conflict between the testimony from Philips' expert and fact witness, Dr. Young and Mr. Thiagarajan, respectively, because the Biosensor Device datasheet, consistent with Dr. Young's testimony, supports various FIFO [redacted] for the accelerometer package including a mode using an "interrupt" trigger [redacted] for the FIFO [redacted] to initiate the burst of data samples from the FIFO buffer to the processor. *See* JX-178.0025; CX-12 (Young WS) at QQ. 41, 146. Mr. Thiagarajan's testimony is consistent with the LIS2DW12 datasheet and Dr. Young's testimony on this point. *See* CX-9C (Thiagarajan WS) at QQ. 21-23. Contrary to the FID's finding, Mr. Thiagarajan's testimony as to "continuously capturing" merely referred to the operation of the accelerometer as a measurement unit as it continuously obtains data from its sensors, but does not refer to the operation of the host processor which discontinuously, and in turn, monitors sensor signals from the FIFO buffers of the accelerometer package. And contrary to OUII's and Respondents' argument, the Commission does not find Philips' argument as to the three limitations other than the "monitor sensor signals in turn" limitation to be waived because complainants make it clear throughout their petition that they contend that the accused devices and their domestic industry product operate in materially the same way and therefore should both be found to practice all the limitations of claim 2. *See* Philips' Pet. at 1, 9, 24-26, 47, 50-51; *see also* PIB at 26-27.

Specifically, the Commission finds that: (1) the limitations "monitor . . . the sensor signals discontinuously in time," "process the sensor signals discontinuously in time," and "the measurement unit is operable to output the sensor signals discontinuously in time" are met by the Biosensor device accumulating sensor data in the FIFO buffer [redacted] watermark [redacted] is

met, and then sending the data in a burst over the [redacted] of the accelerometer package to the SPI [redacted] of the host processor in an SPI [redacted], where no sensor data is transmitted to the host processor when an SPI [redacted] is not occurring; and (2) the limitation "the processor is operable to monitor the sensor signals in turn" is met by the Biosensor device transmitting the sensor data from the FIFO buffer to the host processor serially, in sequentially ordered sets of x, y, and z samples. *See, e.g.*, CX-12C at QQ. 153-54, 162-63, 172-73; CX-203C.0006-7, .0010-15; JX-178.0023.

Based on the foregoing, the Commission finds that the Philips BX-100 Biosensor Device satisfies all limitations of claim 2 of the '228 patent and reverses the FID's finding to the contrary. Consistent with Order No. 34, the Commission therefore finds that Philips has satisfied the technical prong of the domestic industry requirement with respect to the '228 patent.

As noted previously, however, the Commission does not disturb the FID's findings that claim 2 of the '228 patent is invalid as anticipated under 35 U.S.C. § 102 and is directed to patent-ineligible subject matter under 35 U.S.C. § 101, and therefore the Commission affirms the FID's finding of no violation of section 337 with respect to the '228 patent.

### D. The Economic Prong of the Domestic Industry Requirement[18]

For the '228 patent, Order No. 34 found that Philips satisfied the economic prong with

[18] Chair Kearns notes that, in his view, a proper contextual analysis for "significance" requires some comparison of domestic and foreign activities or investments where the domestic industry products benefit from both. This comparison can be through, for example, a comparison of domestic to foreign expenditures or a value-added analysis. However, a complainant does not "need to define or quantify the industry itself in absolute mathematical terms." *Certain Stringed Musical Instruments*, 2009 WL 5134139, Comm'n Op. at *16. The qualitative nature of the various activities can also be a relevant part of the analysis. He further notes that he expects parties in 337 investigations to develop an adequate record to enable the presiding ALJ and the Commission to conduct an appropriate contextual analysis.

respect to a domestic industry in the BX-100 Biosensor Device under subparagraphs (A) and (B) of section 337(a)(3) and demonstrated a domestic industry in the process of being established under section 337(a)(2). Order No. 34, at 40. The Commission has determined on review to take no position on that Order's analysis and finding with respect to an industry in the process of being established, and affirms the Order with respect to existence of a domestic industry under section 337(a)(3)(A) and (B) for the '228 patent.

The FID finds that, for the '464 patent, Philips failed to satisfy the economic prong with respect to section 337(a)(3)(B) and (C),[19] but that it established a domestic industry in the process of being established, and therefore found the economic prong requirement to be met. FID at 137. The Commission has reviewed the FID's finding with respect to an industry in the process of being established.[20] Upon review, the Commission has determined to take no position on this issue and therefore takes no position on satisfaction of the economic prong for the '464 patent.

[19] Commissioners Stayin and Johanson join in the decision not to review the FID's determination that Philips fails to satisfy section 337(a)(3)(B) and (C) with respect the '464 patent. They further express their view that the ALJ errs to the extent that she finds that the facts of this case necessitate a comparison of domestic to foreign expenditures to satisfy the economic prong of the domestic industry test. *See* FID at 131–135.

[20] The Commission has not reviewed the FID's analysis and finding with respect to Philips' failure to establish a domestic industry under section 337(a)(3)(B) and (C).

## IV. CONCLUSION

For the reasons set forth herein, the Commission determines that complainant Philips has not established a violation of section 337 by Respondents with respect to claim 2 of the '228 patent, claims 1 and 6 of the '464 patent, and claims 1 and 6 of the '698 patent. Accordingly, the investigation is terminated with a finding of no violation of section 337.

By Order of the Commission.



Lisa R. Barton
Secretary to the Commission

Issued: May 5, 2021

**CERTAIN WEARABLE MONITORING DEVICES, SYSTEMS, AND COMPONENTS THEREOF** **Inv. No. 337-TA-1190**

## PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **COMMISSION OPINION** has been served via EDIS upon the Commission Investigative Attorney, **John Shin, Esq.**, and the following parties as indicated, on **May 5, 2021.**

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**PUBLIC VERSION**

**UNITED STATES INTERNATIONAL TRADE COMMISSION**

**Washington, D.C.**

| | |
|---|---|
| **In the Matter of**<br><br>**CERTAIN WEARABLE MONITORING DEVICES, SYSTEMS, AND COMPONENTS THEREOF** | **Inv. No. 337-TA-1190** |

# INITIAL DETERMINATION ON VIOLATION OF SECTION 337 AND RECOMMENDED DETERMINATION ON REMEDY AND BONDING

Administrative Law Judge Dee Lord

(February 4, 2021)

**Appearances**:

*For Complainants Philips North America, LLC and Koninklijke Philips N.V.:*

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*For Respondents Garmin International, Inc., Garmin USA, Inc., and Garmin Ltd.:*

M. Scott Stevens of Alston & Bird LLP in Washington, DC; and Kirk T. Bradley, Stephen R. Lareau, J. Ravindra Fernando, and Karlee N. Wroblewski of Alston & Bird LLP in Charlotte, NC.

*For the Office of Unfair Import Investigations:*

John Shin and David Lloyd of the U.S. International Trade Commission in Washington, DC.

Pursuant to the Notice of Investigation (Jan. 10, 2020) and Commission Rule 210.42, this is the administrative law judge's final initial determination and recommendation determination on remedy and bonding in the matter of *Certain Wearable Monitoring Devices, Systems, and Components Thereof*, Commission Investigation No. 337-TA-1190. 19 C.F.R. § 210.42(a)(1)(i).

For the reasons discussed herein, it is my final initial determination that there is no violation of section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337, in the importation into the United States, the sale for importation, and/or the sale within the United States after importation of wearable monitoring devices, such as activity trackers and fitness trackers, including health and activity monitoring devices, that may be worn on the wrist like a watch or bracelet or attached to clothing, with respect to U.S. Patent No. 7,845,228 ("the '228 patent") or U.S. Patent No. 9,717,464 ("the '464 patent").

## TABLE OF CONTENTS

**I. BACKGROUND ..... 1**
A. Procedural History ..... 1
B. Private Parties ..... 2
C. Products at Issue ..... 3
D. Asserted Patents and Level of Ordinary Skill in the Art ..... 4
E. Witness Testimony ..... 5
**II. JURISDICTION ..... 7**
A. Subject Matter Jurisdiction ..... 7
B. Personal Jurisdiction ..... 8
C. *In Rem* Jurisdiction ..... 8
**III. IMPORTATION ..... 9**
A. Legal Standard ..... 9
B. Importation by Respondents ..... 9
**IV. LEGAL STANDARDS ..... 12**
A. Infringement ..... 12
B. Invalidity ..... 15
C. Patent Eligibility ..... 19
D. Domestic Industry ..... 21
**V. THE '228 PATENT ..... 22**
A. Background and Asserted Claims ..... 22
B. Claim Construction ..... 24
C. Infringement ..... 25
D. Domestic Industry ..... 35
E. Patent Eligibility ..... 40
F. Invalidity ..... 46
G. Patent Exhaustion ..... 71
**VI. THE '464 PATENT ..... 74**
A. Background and Asserted Claims ..... 80
B. Claim Construction ..... 81
C. Infringement ..... 83
D. Domestic Industry—Technical Prong ..... 112
E. Domestic Industry—Economic Prong ..... 120
F. Patent Eligibility ..... 137
G. Anticipation and Obviousness ..... 143
H. Misjoinder ..... 148
**VII. REMEDY AND BONDING ..... 153**
A. Limited Exclusion Order ..... 153
B. Cease and Desist Order ..... 157
C. Bond ..... 160
**VIII. CONCLUSIONS OF LAW ..... 162**

The following abbreviations may be used in this Initial Determination:

| | |
|---|---|
| **Tr.** | Transcript |
| **WS** | Witness Statement |
| **DWS** | Direct Witness Statement |
| **RWS** | Rebuttal Witness Statement |
| **JX** | Joint Exhibit |
| **CX** | Complainant's exhibit |
| **CPX** | Complainant's physical exhibit |
| **CDX** | Complainant's demonstrative exhibit |
| **RX** | Respondent's exhibit |
| **RPX** | Respondent's physical exhibit |
| **RDX** | Respondent's demonstrative exhibit |
| **CPHB** | Complainant's pre-hearing brief |
| **CIB** | Complainant's initial post-hearing brief |
| **CRB** | Complainant's reply post-hearing brief |
| **RPHB** | Respondent's pre-hearing brief |
| **RIB** | Respondent's initial post-hearing brief |
| **RRB** | Respondent's reply post-hearing brief |
| **SPHB** | Staff's pre-hearing brief |
| **SIB** | Staff's initial post-hearing brief |
| **SRB** | Staff's reply post-hearing brief |

# I. BACKGROUND

## A. Procedural History

The Commission instituted this investigation in response to a complaint filed by Philips North America, LLC and Koninklijke Philips N.V. (collectively, "Philips") alleging violations of section 337 of the Tariff Act of 1930, as amended, by reason of infringement of certain claims of U.S. Patent No. 7,845,228 ("the '228 patent"); U.S. Patent No. 9,820,698 ("the '698 patent"); U.S. Patent No. 9,717,464 ("the '464 patent"); and U.S. Patent No. 9,961,186 ("the '186 patent"). Notice of Investigation (Jan. 10, 2020). The Commission ordered that an investigation be instituted to determine "whether there is a violation of subsection (a)(1)(B) of section 337 in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain products . . . by reason of infringement of one or more of claims 1-3 of the '228 patent; claims 1 and 6 of the '698 patent; claims 1 and 6 of the '464 patent; and claims 1, 3-4, and 8 of the '186 patent; and whether an industry in the United States exists as required by subsection (a)(2) of section 337." *Id*. at 2. The investigation was instituted upon publication of the Notice of Investigation in the *Federal Register* on Wednesday, January 15, 2020. 85 Fed. Reg. 2440-41 (2020).

Respondents Garmin International, Inc., Garmin USA, Inc., and Garmin Ltd. (the "Garmin Respondents") filed a response to the complaint and notice of investigation on February 6, 2020. Respondents Fitbit, Inc. ("Fitbit"), Ingram Micro Inc. ("Ingram Micro"), Maintek Computer (Suzhou) Co., Ltd. ("Maintek"), and Inventec Appliances (Pudong) ("Inventec") also filed responses to the complaint and notice of investigation on February 6, 2020.

In July, Philips withdrew its allegations with respect to the '186 patent. Order No. 25 (Jul. 17, 2020), *not reviewed by* Comm'n Notice (Aug. 4, 2020). The parties raised several claim

construction disputes, and certain terms in the ’228 patent, ’698 patent, and ’464 patent were construed in a *Markman* order. Order No. 26 (Jul. 27, 2020). Respondents’ motion for summary determination of invalidity based on indefiniteness of the claims of the ’228 patent was denied pursuant to Order No. 27 (Jul. 27, 2020). Philips’s motion for summary determination on the ’228 patent was granted-in-part pursuant to Order No. 34 (Oct. 1, 2020), which found that Philips had satisfied the economic prong of the domestic industry requirement for that patent. *See* Comm’n Notice (Nov. 16, 2020) (determining to review Order No. 34). The ’698 patent was terminated from the investigation on summary determination of non-infringement, and certain products were determined not to infringe the ’464 patent. Order No. 35 (Oct. 1, 2020), *under review by* Comm’n Notice (Nov. 16, 2020). Philips withdrew its allegations with respect to claims 1 and 3 of the ’228 patent. Order No. 42 (Oct. 20, 2020), *not reviewed by* Comm’n Notice (Nov. 2, 2020).

Pursuant to Order No. 14 (May 28, 2020), the target date was extended to June 4, 2021, and the evidentiary hearing was scheduled for the week of October 19, 2020. *See* Comm’n Notice (Jun. 15, 2020). In accordance with Order No. 36 (Oct. 2, 2020), a hearing was held on Wednesday, October 21, Thursday, October 22, and Friday, October 23, 2020.

### B. Private Parties

#### 1. Complainants

The Complainants are Philips North America, LLC and Koninklijke Philips N.V. (collectively, “Philips”). Notice of Investigation at 2. Philips North America is a Delaware limited liability company with a principal place of business in Massachusetts. Complaint ¶ 21. Koninklijke Philips, a corporation organized in the Netherlands, is the parent of Philips North

America. Complaint ¶ 22. Philips is comprised of several business units, including Philips Connected Sensing, Philips Lifeline, and Philips Motion Biosensor. CIB at 5-7; Complaint ¶ 23.

#### 2. Fitbit Respondents

Fitbit, Inc. is a Delaware corporation with a principal place of business in California. RIB at 15-16; Fitbit Response to Complaint ¶ 24. Ingram Micro Inc. is a Delaware corporation with its corporate headquarters in California. *Id*. at 17; Ingram Micro Response to Complaint ¶ 28. Inventec Appliances (Pudong) is a Chinese business entity with a place of business in China. *Id*. at 16; Inventec Response to Complaint ¶ 32. Maintek Computer (Suzhou) Co., Ltd. is a Chinese business entity with a place of business in China. *Id*. at 16-17; Maintek Response to Complaint ¶ 30.

#### 3. Garmin Respondents

Garmin International, Inc. and Garmin USA, Inc. ("Garmin") are Kansas corporations with their engineering headquarters in Kansas. RIB at 17; Garmin Response to Complaint ¶ 34. Garmin Ltd. is a company organized and existing under the laws of Switzerland with a place of business in Switzerland. *Id*. at 17-18; Garmin Response to Complaint ¶ 36. Garmin International, Inc. and Garmin USA, Inc. are wholly owned subsidiaries of Garmin Ltd. Garmin Response to Complaint ¶ 37.

### C. Products at Issue

The products at issue are "wearable monitoring devices, such as activity trackers and fitness trackers, including health and activity monitoring devices, that may be worn on the wrist like a watch or bracelet or attached to clothing." Notice of Investigation at 2.

The accused products are activity trackers made by Fitbit and Garmin. The accused Fitbit devices are the Charge 3, Inspire, Inspire HR, and Ace 2 trackers as well as the Versa 2,

Versa Lite Edition, and Ionic smartwatches. CIB at 14; RIB at 31; CX-0409C (Stipulation Relating to Importation and Inventory), ¶ 4. The accused Garmin devices are activity trackers and watches, including certain of Garmin's Forerunner, Vivomove, Vivosport, Vivoactive, Vivofit, Approach, Fenix, Instinc, Legacy, MARQ, Descent, D2, Quatix, and Tactix products. CIB at 19-20; CX-0425C (Garmin's Interrogatory Responses), Interrogatory Nos. 88, 89, 90, 91.

The domestic industry products include the Philips Lifeline Devices, the Philips Biosensor Device, and the Philips Health Band. CIB at 25-28.

### D. Asserted Patents and Level of Ordinary Skill in the Art

There are two asserted patents remaining in the investigation: the '228 patent and the '464 patent. Philips asserts claim 2 of the '228 patent and claims 1 and 6 of the '464 patent. Complainant Koninklijke Philips N.V. is the sole owner of and holds legal title to each of the asserted patents. CX-0001C (Wieghaus DWS) at Q/A 11-15; *see* JX-0187 ('228 patent assignment); JX-0189 ('464 patent assignment).

There is no dispute regarding the level of ordinary skill in the art for the asserted patents. For the '228 patent, Philips proposed a level of ordinary skill in the art of "an undergraduate engineering or associate[']s degree in the field of circuit design and/or 2-3 years of experience in that field." Order No. 26 at 7. For the '464 patent, Philips proposed a level of ordinary skill in the art of "an undergraduate scientific degree or associate[']s degree in a field related to electrical sensors (such as electrical, mechanical, or biomedical engineering), and/or at least 2-3 years of experience researching, developing, or working with, relevant monitoring technology where additional work experience or education can be sufficient." *Id*. at 34-35. These levels of ordinary skill in the art will be applied in this initial determination.

### E. Witness Testimony

I received testimonial evidence in this investigation in the form of witness statements, live testimony, and deposition designations.

#### 1. Fact Witnesses

Philips presented testimony from Brian Wieghaus, Philips's principal licensing counsel. CX-0001C (Wieghaus WS); Tr. 9-52. Philips also submitted testimony from Paul Baril, Peter Ridgeway, Chibing Liu, and Karen Moriarty, who are managers and officers at Philips Lifeline. CX-0002C (Baril WS); RX-0682C (Baril Dep. Tr.); CX-0008C (Ridgeway WS); RX-0687C (Baril Dep. Tr.); CX-1393C (Liu WS); RX-0689C (Liu Dep. Tr.); CX-0004C (Moriarty WS); RX-0684C (Moriarty Dep. Tr.). Philips further submitted testimony from Jeffrey Rogers and Donna Slater, employees at Philips Sleep and Respiratory Care, CX-0010C (Rogers WS), RX-0690C (Rogers Dep. Tr.), CX-0006C (Slater WS), RX-0685C (Slater Dep. Tr.); and Srik Thiagarajan, an engineer at Philips Connected Sensing. CX-0009C (Thiagarajan WS); RX-0688C (Thiagarajan Dep. Tr.).

Fitbit presented testimony from Shivia Rajagopal, a Fitbit engineer. RX-0560C (Rajagopal WS); Tr. 142-61. Fitbit also submitted testimony from James Park, the CEO of Fitbit. RX-0568C (Park WS).

Garmin presented testimony from Michael Choi, a software team lead at Garmin. RX-0563C (Choi WS); Tr. 164-67; CX-1400 (Choi Dep. Tr.). Garmin also submitted testimony from Paul MacDonald, a technical fellow at Garmin. RX-0567C (MacDonald WS); CX-1401C (MacDonald Dep. Tr.). Garmin further submitted testimony from James Rooney, the managing director of Garmin Canada. RX-0564C (Rooney WS); CX-1403C (Rooney Dep. Tr.).

### 2. Expert Witnesses

Philips relies on the testimony of Darrin J. Young regarding infringement and invalidity for the '228 patent and '464 patent.[1] CX-0012C (Young DWS); CX-0014C (Young RWS); Tr. 53-92, 341-409. Philips also relies on testimony from Michael P. Akemann regarding the economic prong of the domestic industry requirement, remedy, and bond.[2] CX-1392C (Akemann DWS); Tr. 105-138.

Respondents rely on the testimony of Joseph Paradiso regarding infringement and invalidity for the '228 patent.[3] RX-0560C (Paradiso DWS); RX-0561C (Paradiso RWS); Tr. 168-258. Respondents also rely on the testimony of Christopher Daft regarding infringement and invalidity for the '464 patent.[4] RX-0558C (Daft DWS); RX-0559C (Daft RWS); Tr. 282-339. Respondents further rely on the testimony of Michael Milani regarding the economic prong

[1] The private parties stipulated to Dr. Young's qualifications as an "expert in the fields of accelerometers, electrical design of activity monitoring devices, physiological monitoring sensors, and in the fields to which U.S. Patent Nos. 7,845,228 and 9,717,464 are directed." Joint Stipulation, JX-0213 ¶ 7.

[2] The private parties stipulated to Dr. Akemann's qualifications as an "expert in economic and financial analysis, including as it relates to the economic prong of the domestic industry requirement and remedies." Joint Stipulation, JX-0213 ¶ 9.

[3] The private parties stipulated to Dr. Paradiso's qualifications as an "expert in the fields of accelerometers, electrical design of activity monitoring devices, and in the fields to which U.S. Patent No. 7,845,228 is directed." Joint Stipulation, JX-0213 ¶ 4.

[4] The private parties stipulated to Dr. Daft's qualifications as an "expert in the fields of physiological monitoring sensors, physiological monitoring devices, neural networks, design of activity monitoring devices, and in the fields to which U.S. Patent Nos. 9,717,464 and 9,820,698 are directed." Joint Stipulation, JX-0213 ¶ 5.

of the domestic industry requirement, remedy, and bond.[5] RX-0562C (Milani RWS); CX-1402C (Milani Dep. Tr.).

### 3. Deposition Designations

Philips submitted designated deposition transcripts for Garmin employees Paul MacDonald (CX-0384C), Michael Choi (CX-0382C), John Preis (CX-0378C), Anthony Hancox (CX-1184C), Jeremy Vallad (CX-1190C), and Sam Korte (CX-1185C). Philips also submitted a designated deposition transcript for Fitbit employee Shivia Rajagopal (CX-0387C).

Respondents submitted designated deposition transcripts for Philips employee Chibing Liu (RX-0551C) and named inventors Joannes Gregorius Bremer (RX-0539C), Paraskevas Dunias (RX-0541C), Adrianus Petrus Johanna Maria Rommers (RX-0543C), James Mitchell Frix (RX-0545C), and Andrew Johnson (RX-0537C).

## II. JURISDICTION

To have the power to decide a case, a court or agency must have both subject matter jurisdiction and jurisdiction over either the parties or the property involved. 19 U.S.C. § 1337; *Certain Steel Rod Treating Apparatus and Components Thereof*, Inv. No. 337-TA-97, Commission Memorandum Opinion, 215 U.S.P.Q. 229, 231 (1981).

### A. Subject Matter Jurisdiction

Section 337 confers subject matter jurisdiction on the Commission to investigate, and if appropriate, to provide a remedy for, unfair acts and unfair methods of competition in the importation, the sale for importation, or the sale after importation of articles into the United States. *See* 19 U.S.C. §§ 1337(a)(1)(B) and (a)(2). The Commission has subject matter

[5] The private parties stipulated to Mr. Milani's qualifications as an "expert in economic and financial analysis, including as it relates to the economic prong of the domestic industry requirement and remedies." Joint Stipulation, JX-0213 ¶ 9.

jurisdiction over this investigation based on Philips's allegations that the accused products are imported into the United States. CIB at 21-22; *see Amgen Inc. v. Int'l Trade Comm'n*, 565 F.3d 846, 854 (Fed. Cir. 2009) ("In this case, the Commission had jurisdiction as a result of Amgen's allegation that Roche imported an article . . . covered by the claims of a valid and enforceable United States patent."). Respondents do not contest the Commission's subject-matter jurisdiction in this investigation. RIB at 44. Fitbit has stipulated to the importation of its products. CX-0409C. Garmin does not dispute the importation of its products. RIB at 45.

### B. Personal Jurisdiction

Respondents have submitted to the personal jurisdiction of the Commission by answering the Complaint and Notice of Investigation, participating in discovery, appearing at hearings, and filing motions and briefs. *See Certain Miniature Hacksaws*, Inv. No. 337-TA-237, USITC Pub. No. 1948, Initial Determination at 4, 1986 WL 379287, *1 (Oct. 15, 1986), *not reviewed in relevant part by* Comm'n Action and Order, 1987 WL 450871 (Jan. 15, 1987). Several Respondents dispute the Commission's jurisdiction based on arguments that they are not involved in importation, but the Federal Circuit has held that such disputes should be decided on the merits and not on jurisdictional grounds. *See Amgen Inc. v. Int'l Trade Comm'n*, 902 F.2d 1532, 1536 (Fed. Cir. 1990) (Where "the complaint came within the jurisdiction of the Commission . . . the Commission should have assumed jurisdiction, and, if the facts indicate that [complainant] cannot obtain relief under [section 337], the Commission should have dismissed on the merits.").

### C. *In Rem* Jurisdiction

The Commission has *in rem* jurisdiction over the accused products by virtue of their importation into the United States. *See Sealed Air Corp. v. U.S. Int'l Trade Comm'n*, 645 F.2d

976, 985-86 (C.C.P.A. 1981) (holding that the ITC's jurisdiction over imported articles is sufficient to exclude such articles). As discussed above, Respondents have not contested Philips's allegations of importation. RIB at 44-45. Fitbit has stipulated to the importation of its products. CX-0409C. Garmin admitted to the importation of its products in interrogatory responses. CX-0207C.0008, Interrogatory No. 6.

## III. IMPORTATION

### A. Legal Standard

The statute defines a violation of section 337 as "[t]he importation into the United States, the sale for importation, or the sale within the United States after importation by the owner, importer, or consignee, of articles that . . . infringe a valid and enforceable United State patent." 19 U.S.C. § 1337(a)(1)(B). Accordingly, a necessary element of a finding that a respondent violated section 337 requires proof that the respondent actually imported, sold for importation, or sold after importation the articles at issue. *Certain Carbon and Alloy Steel Products*, Inv. No. 337-TA-1002, Order No. 103 at 33 (Oct. 2, 2017), *not reviewed by* Comm'n Notice (Nov. 1, 2017).

### B. Importation by Respondents

#### 1. Fitbit

Fitbit, Inc. ("Fitbit") has stipulated that it imports the accused products. CX-0409C, ¶5 ("As of the date of this stipulation, [redacted]").

#### 2. Garmin

Garmin International, Inc. and Garmin USA, Inc. ("Garmin") do not contest the importation requirement. RIB at 45. Garmin admitted to the importation of its products in interrogatory responses. CX-0207C.0008, Interrogatory No. 6.

### 3. Garmin Ltd.

Philips's complaint named as a respondent "Garmin Ltd. d/b/a/ Garmin Switzerland GmbH." Complaint ¶ 36. Exhibit 12 to the complaint is an importation record showing a shipment of an accused product from "Garmin Switzerland GmbH." *See* SIB at 12 n.9. The Garmin Respondents submit that Garmin Ltd. and Garmin Switzerland GmbH are distinct entities. Garmin Response to Complaint at 1 n.1 ("The Complaint alleges that Garmin Ltd. is doing business as Garmin Switzerland Ltd., but that allegation is incorrect. Garmin Switzerland Ltd. is a distinct corporate entity from Garmin Ltd."). As evidence of importation by Garmin Ltd., Philips cites deposition testimony from John Preis, the head of the international trade compliance department at Garmin International, Inc., explaining that Garmin products are manufactured in Taiwan, sold to Garmin Ltd. (which he identifies as "Garmin Switzerland"), and then sold to Garmin International, Inc. for importation into the United States. CX-0378C at 34-35. Based on the importation record attached to the complaint and the testimony of Mr. Preis, I find that the importation requirement is satisfied by the sale for importation of products by Garmin Ltd.

### 4. Ingram

Ingram has stipulated that it sold Fitbit products after importation under a distribution agreement that ended April 1, 2019. CX-0409, ¶ 9. Ingram argues that it no longer sold any Fitbit products at the time the complaint was filed in this investigation, but the importation requirement does not require evidence of continuing activity. *See Certain Plastic Encapsulated Integrated Circuits*, Inv. No. 337-TA-315 Initial Determination at 104-105 (recognizing that the Commission would "find a violation of section 337 based on past conduct even when no present conduct constituted an unfair act."), *not reviewed by* Comm'n Notice and Opinion (Feb. 18,

1992), USITC Pub. No. 2574 (Nov. 1992); *see also Certain Rotary Printing Apparatus Using Heated Ink Composition, Components Thereof, & Systems Containing Said Apparatus & Components,* Inv. No. 337-TA-320, Order No. 1 (Jan. 14, 1991) ("Neither importation nor sale during the pendency of the investigation is required to support a Section 337 violation, and discontinuance of an unfair practice is not an adequate defense."). Ingram's past sales of Fitbit products meet the statutory importation requirement.

**5. Inventec and Maintek**

Inventec has stipulated that it assembled certain Fitbit products that were sold to Fitbit and imported into the United States. *Id*., ¶ 7. Maintek has also stipulated that it assembled certain Fitbit products that were sold to Fitbit and imported into the United States. *Id*., ¶ 8. Inventec and Maintek argue, however, that these products were not sold for importation, as required by the statute. RIB at 45. The importation requirement may be satisfied, however, where a respondent knew or should have known that the articles it sold to third parties would subsequently be imported into the United States. *See Certain Inkjet Ink Cartridges with Printheads & Components Thereof*, Inv. No. 337-TA-723, Initial Determination, 2011 WL 3489151, at *12 (June 10, 2011), *affirmed in relevant part by* Comm'n Op. (Dec. 1, 2011) ("To prove a 'sale for importation,' a complainant must prove that a respondent sold infringing articles and knew or should have known that those articles would be subsequently exported to the United States."). Here, Inventec and Maintek contracted with Fitbit, a United States corporation, to make Fitbit's products, and they should have known that such products would be imported into the United States. The importation requirement has thus been satisfied with respect to Inventec and Maintek.

# IV. LEGAL STANDARDS

## A. Infringement

Section 337(a)(1)(B)(i) prohibits "the importation into the United States, the sale for importation, or the sale within the United States after importation by the owner, importer, or consignee, of articles that – (i) infringe a valid and enforceable United States patent or a valid and enforceable United States copyright registered under title 17." 19 U.S.C. §1337(a)(1)(B)(i). The Commission has held that the word "infringe" in Section 337(a)(1)(B)(i) "derives its legal meaning from 35 U.S.C. § 271, the section of the Patent Act that defines patent infringement." *Certain Electronic Devices with Image Processing Systems, Components Thereof, and Associated Software*, Inv. No. 337-TA-724, Comm'n Op. at 13-14 (December 21, 2011).

Infringement must be proven by a preponderance of the evidence. *SmithKline Diagnostics, Inc. v. Helena Labs. Corp.*, 859 F.2d 878, 889 (Fed. Cir. 1988). A preponderance of the evidence standard "requires proving that infringement was more likely than not to have occurred." *Warner-Lambert Co. v. Teva Pharm. USA, Inc.*, 418 F.3d 1326, 1341 n.15 (Fed. Cir. 2005).

### 1. Claim Construction

"An infringement analysis entails two steps. The first step is determining the meaning and scope of the patent claims asserted to be infringed. The second step is comparing the properly construed claims to the device accused of infringing." *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 976 (Fed. Cir. 1995) (*en banc*), *aff'd*, 517 U.S. 370 (1996) (citation omitted). The construction of claims is simply a way of elaborating the normally terse claim language[] in order to understand and explain, but not to change, the scope of the claims." *Embrex, Inc. v. Serv. Eng'g Corp.*, 216 F.3d 1343, 1347 (Fed. Cir. 2000) (alterations in original)

(quoting *Scripps Clinic v. Genentech, Inc.*, 927 F.2d 1565, 1580 (Fed. Cir. 1991)). "[O]nly those [claim] terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy." *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999). The words of a claim "'are generally given their ordinary and customary meaning,'" which is "the meaning that the term would have to a person of ordinary skill in art" as of the date that the patent application was filed. *Phillips v. AWH Corp.,* 415 F.3d 1303, 1312-13 (Fed. Cir. 2005) (*en banc*) (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)).

**2. Direct and Indirect Infringement**

Under 35 U.S.C. § 271(a), direct infringement of a patent consists of making, using, offering to sell, or selling the patented invention without consent of the patent owner.

In addition to direct infringement, a respondent may be liable for indirect infringement, including induced infringement, which is defined in section 271(b) of the Patent Act: "Whoever actively induces infringement of a patent shall be liable as an infringer." 35 U.S.C. § 271(b). *See DSU Med. Corp. v. JMS Co., Ltd.*, 471 F.3d 1293, 1305 (Fed. Cir. 2006) (*en banc*) ("To establish liability under section 271(b), a patent holder must prove that once the defendants knew of the patent, they actively and knowingly aided and abetted another's direct infringement.") (citations omitted). "The mere knowledge of possible infringement by others does not amount to inducement; specific intent and action to induce infringement must be proven." *Id.* (citations omitted). The Supreme Court has held that induced infringement "requires knowledge that the induced acts constitute patent infringement." *Global-Tech Appliances, Inc. v. SEB S.A.*, 563 U.S. 754, 766 (2011). In *Suprema, Inc. v. Int'l Trade Comm'n*, the Federal Circuit upheld the Commission's interpretation of the section 337 language "articles that infringe" in the context of

induced infringement, holding that the statute "covers goods that were used by an importer to directly infringe post-importation as a result of the seller's inducement." 796 F.3d 1338, 1352-53 (Fed. Cir. 2015).

Another form of indirect infringement is contributory infringement, defined in section 271(c) of the Patent Act: "Whoever offers to sell . . . or imports into the United States a component of a patented machine, . . . or a material or apparatus for use in practicing a patented process, constituting a material part of the invention, knowing the same to be especially made or especially adapted for use in an infringement of such patent, and not a staple article or commodity of commerce suitable for substantial noninfringing use, shall be liable as a contributory infringer." 35 U.S.C. § 271(c). The intent requirement for contributory infringement requires that respondent knows "that the combination for which [the] component was especially designed was both patented and infringing." *Global-Tech*, 563 U.S. at 763. A violation of section 337 based on contributory infringement requires that "the accused infringer imported, sold for importation, or sold after importation within the United States, the accused components that contributed to another's direct infringement." *Spansion, Inc. v. Int'l Trade Comm'n*, 629 F.3d 1331, 1353 (Fed. Cir. 2010).

### 3. Literal Infringement and the Doctrine of Equivalents

A complainant must prove either literal infringement or infringement under the doctrine of equivalents. Literal infringement requires the patentee to prove that the accused device meets each and every limitation of the asserted claim(s). *Frank's Casing Crew & Rental Tools, Inc. v. Weatherford Int'l, Inc.*, 389 F.3d 1370, 1378 (Fed. Cir. 2004). "If even one limitation is missing or not met as claimed, there is no literal infringement." *Elkay Mfg. Co. v. EBCO Mfg. Co*., 192 F.3d 973, 980 (Fed. Cir. 1999). Literal infringement is a question of fact. *Finisar Corp. v.*

*DirecTV Grp., Inc.*, 523 F.3d 1323, 1332 (Fed. Cir. 2008). Under the Doctrine of Equivalents, "a product or process that does not literally infringe upon the express terms of a patent claim may nonetheless be found to infringe if there is 'equivalence' between the elements of the accused product or process and the claimed elements of the patented invention." *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 21 (1997).

### B. Invalidity

It is the respondents' burden to prove invalidity, and the burden of proof never shifts to the patentee to prove validity. *Scanner Techs. Corp. v. ICOS Vision Sys. Corp. N.V.*, 528 F.3d 1365, 1380 (Fed. Cir. 2008). "Under the patent statutes, a patent enjoys a presumption of validity, *see* 35 U.S.C. § 282, which can be overcome only through facts supported by clear and convincing evidence . . . ." *SRAM Corp. v. AD-II Eng'g, Inc.*, 465 F.3d 1351, 1357 (Fed. Cir. 2006); *see also Microsoft Corp. v. i4i Ltd. P'ship*, 564 U.S. 91, 100-114 (2011) (upholding the "clear and convincing" standard for invalidity).

The clear and convincing evidence standard placed on the party asserting an invalidity defense requires a level of proof beyond the preponderance of the evidence. Although not susceptible to precise definition, "clear and convincing" evidence has been described as evidence that produces in the mind of the trier of fact "an abiding conviction that the truth of a factual contention is 'highly probable.'" *Price v. Symsek*, 988 F.2d 1187, 1191 (Fed. Cir. 1993) (quoting *Buildex, Inc. v. Kason Indus., Inc.,* 849 F.2d 1461, 1463 (Fed. Cir. 1988)).

#### 1. Anticipation

Pursuant to 35 U.S.C. § 102, a patent claim is invalid as anticipated if:

> (1) the claimed invention was patented, described in a printed publication, or in public use, on sale, or otherwise available to the public before the effective filing date of the claimed invention; or

> (2) the claimed invention was described in a patent issued under section 151, or in an application for patent published or deemed published under section 122(b), in which the patent or application, as the case may be, names another inventor and was effectively filed before the effective filing date of the claimed invention.

35 U.S.C. § 102 (2012).[6] "A patent is invalid for anticipation if a single prior art reference discloses each and every limitation of the claimed invention. Moreover, a prior art reference may anticipate without disclosing a feature of the claimed invention if that missing characteristic is necessarily present, or inherent, in the single anticipating reference." *Schering Corp. v. Geneva Pharm., Inc.*, 339 F.3d 1373, 1377 (Fed. Cir. 2003) (citations omitted).

**2. Obviousness**

Section 103 of the Patent Act states:

> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

35 U.S.C. § 103(a) (2000).[7]

"Obviousness is a question of law based on underlying questions of fact." *Scanner Techs.*, 528 F.3d at 1379. The underlying factual determinations include: "(1) the scope and

[6] The '228 patent was enacted prior to the effective date of the America Invents Act (AIA) and is thus subject to the earlier language of 35 U.S.C. § 102, holding a patent invalid if the invention was "used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant" or "patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application." 35 U.S.C. § 102 (2000); *see* 35 U.S.C.A. § 100 (May 13, 2015) (noting effective date of AIA).

[7] The '228 patent is subject to an earlier version of 35 U.S.C. § 103, which is based on "the time the invention was made." 35 U.S.C. § 103 (2000); *see supra*, n.6.

content of the prior art, (2) the level of ordinary skill in the art, (3) the differences between the claimed invention and the prior art, and (4) objective indicia of non-obviousness." *Id.* (citing *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966)). These factual determinations are often referred to as the "*Graham* factors."

The critical inquiry in determining the differences between the claimed invention and the prior art is whether there is a reason to combine the prior art references. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418-21 (2007). In *KSR*, the Supreme Court rejected the Federal Circuit's rigid application of the teaching-suggestion-motivation test. While the Court stated that "it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does," it described a more flexible analysis:

> Often, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue . . . . As our precedents make clear, however, the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.

*Id.* at 418. Applying *KSR*, the Federal Circuit has held that, where a patent challenger contends that a patent is invalid for obviousness based on a combination of prior art references, "the burden falls on the patent challenger to show by clear and convincing evidence that a person of ordinary skill in the art would have had reason to attempt to make the composition or device . . . and would have had a reasonable expectation of success in doing so." *PharmaStem Therapeutics, Inc. v. ViaCell, Inc.*, 491 F.3d 1342, 1360 (Fed. Cir. 2007).

In addition to demonstrating that a reason exists to combine prior art references, the challenger must demonstrate that the combination of prior art references discloses all of the limitations of the claims. *Hearing Components, Inc. v. Shure Inc.*, 600 F.3d 1357, 1373-1374 (Fed. Cir. 2010), *abrogated on other grounds by Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898 (2014) (upholding finding of non-obviousness based on substantial evidence that the asserted combination of references failed to disclose a claim limitation); *Velander v. Garner*, 348 F.3d 1359, 1363 (Fed. Cir. 2003) (explaining that a requirement for a finding of obviousness is that "all the elements of an invention are found in a combination of prior art references").

### 3. Indefiniteness

"The Patent Act requires that a patent specification 'conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as [the] invention.'" *Nautilus, Inc. v. Biosig Instruments, Inc.,* 572 U.S. 898 (2014) (quoting 35 U.S.C. § 112, ¶ 2). "[T]he second paragraph of § 112 contains two requirements: first, [the claim] must set forth what the applicant regards as his invention, and second, it must do so with sufficient particularity and distinctness, *i.e.*, the claim must be sufficiently definite." *Allen Eng'g Corp. v. Bartell Indus., Inc,.* 299 F.3d 1336, 1348 (Fed. Cir. 2002) (citation and internal quotation marks omitted) (alteration in original). A claim does not satisfy the second requirement and is thereby indefinite "if read in light of the specification delineating the patent, and the prosecution history, [it] fail[s] to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus*, 534 U.S. at 901. Indefiniteness is a question of law, subject to a determination of underlying facts. *Akzo Nobel Coatings, Inc. v. Dow Chem. Co.,* 811 F.3d 1334, 1343-44 (Fed. Cir. 2016). The party challenging the validity of a claim bears the burden of establishing indefiniteness. *Id*.

#### 4. Inventorship

"[O]ne cannot obtain a valid patent if 'he did not himself invent the subject matter sought to be patented.'" *In re Verhoef*, 888 F.3d 1362, 1365 (Fed. Cir. 2018). In general, "'[t]he inventors as named in an issued patent are presumed to be correct.'" *Nartron Corp. v. Schukra U.S.A. Inc.,* 558 F.3d 1352, 1356 (Fed. Cir. 2009) (quoting *Hess v. Advanced Cardiovascular Sys., Inc.,* 106 F.3d 976, 980 (Fed. Cir. 1997).

### C. Patent Eligibility

"A patent may be obtained for 'any new and useful process, machine, manufacture, or composition of matter of any new and useful improvement thereof.'" *Bascom Global Internet Servs., Inc. v. AT&T Mobility*, *LLC,* 827 F.3d 1341, 1347 (Fed. Cir. 2016) (quoting 35 U.S.C. § 101). "The Supreme Court has 'long held that this provision contains an important implicit exception: Laws of nature, natural phenomena, and abstract ideas are not patentable.'" *Id.* (quoting *Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*, 133 S. Ct. 2107, 2116 (2013)). "[T]he Supreme Court set forth a two-step analytical framework to identify patents that, in essence, claim nothing more than abstract ideas." *Id.* In the first step, the court determines "'whether the claims at issue are directed to a patent-ineligible concept.'" *Id.* (quoting *Alice,* 134 S. Ct. at 2355). If so, the court determines whether, "'considering the elements of each claim both individually and 'as an ordered combination,'" "the additional elements 'transform the nature of the claim' into a patent-eligible application.'" *Id.* (quoting *Alice Corp. v. CLS Bank Int'l,* 134 S. Ct. at 2355).

Under step one of the *Alice* analysis, the Federal Circuit holds that claims focused "on collecting information, analyzing it, and displaying certain results of the collection and analysis," "fall into a familiar class of claims 'directed to' a patent-ineligible concept." *Electric Power*

*Grp., LLC v. Alstom S.A.,* 830 F.3d 1350, 1353 (Fed. Cir. 2016). At step two, the question is whether anything in the claim elements, scrutinized "more microscopically," removes "the claims from the class of subject matter ineligible for patenting." *Id.* at 1354. What is required to establish eligibility, under both steps one and two, is an element of technological innovation that amounts to more than the abstract idea itself. "[I]t is 'relevant to ask whether the claims are directed to an improvement in computer functionality versus being directed to an abstract idea, even at the first step of the *Alice* analysis.'" *Procter & Gamble Co. v. QuantifiCare Inc.,* 288 F. Supp. 3d 1002, 1022 (N.D. Cal. 2017). A patentee may be required to present "an arguably inventive set of components or methods, such as measurement devices or techniques, that would generate new data." *Electric Power,* 830 F.3d at 1355.

Another consideration under step two is the "machine-or-transformation" test. *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 82 (2012) (citing *Bilski v. Kappos,* 561 U.S. 593 (2010)). This test is satisfied when a patent "does not merely claim a principle, but a machine embodying a principle." *Id.* at 82-84 (quoting *Neilson v. Harford,* Webster's Patent Cases, at 371). As explained by the Supreme Court in *Mayo*, the patentability of the invention in *Neilson* depended not on the mere existence of a mechanical apparatus applied to furnaces, but on "interposing a receptacle for heated air between the blowing apparatus and the furnace." *Id.* at 83. The receptacle "accomplished the object of applying the blast, which was before of cold air, in a heated state to the furnace." *Id.* The "claimed process [thus] included not only a law of nature but also several unconventional steps (such as inserting the receptacle, applying heat to the receptacle externally, and blowing the air into the furnace) that confined the claims to a particular, useful application of the principle." *Id.* at 84.

The principle announced in *Nielson* and adopted in *Mayo* has resulted in several decisions finding patent eligibility based on demonstrated technological innovation.[8]

### D. Domestic Industry

In patent-based proceedings under section 337, a complainant must establish that an industry "relating to the articles protected by the patent . . . exists or is in the process of being established" in the United States. 19 U.S.C. § 1337(a)(2). Under Commission precedent, the domestic industry requirement of section 337 consists of an "economic prong" and a "technical prong." *See, e.g., Alloc, Inc. v. Intl Trade Comm'n,* 342 F.3d 1361, 1375 (Fed. Cir. 2003).

To meet the technical prong, the complainant must establish that it practices at least one claim of the asserted patent. *Certain Point of Sale Terminals and Components Thereof*, Inv. No. 337-TA-524, Order No. 40 at 17-18 (Apr. 11, 2005). "The test for satisfying the 'technical prong' of the industry requirement is essentially [the] same as that for infringement, *i.e.*, a

[8] This line of cases, sometimes identified as the *McRO-Enfish-DDR* line of authority, "stand for the proposition that specific technological modifications to solve a problem or improve the functioning of a known system generally produce patent eligible subject matter." *Phoenix Licensing, L.L.C. v. Consumer Cellular, Inc.,* No. 2:16-CV-0152-JRG-RSP, 2017 WL 1065938, at *18 (E.D. Tex. Mar. 8, 2017), *report and recommendation adopted,* No. 2:16-CV-00152-JRG-RSP, 2017 WL 1177988 (E.D. Tex. Mar. 30, 2017) (citing *Trading Techs. Int'l*, 675 F. App'x. 1001, 1005 (Fed. Cir. 2017)). The *McRO* court found patent eligibility in specific rules for improving computer animation. *McRO, Inc. v. Bandai Namco Games Am.,* 837 F.3d 1299 (Fed. Cir. 2016). The Federal Circuit found that "patents that automated part of a preexisting method for 3-D facial expression animation were not abstract because the patent 'focused on a specific asserted improvement in computer animation, *i.e.*, the automatic use of rules of a particular type." *Id.* at 1314. "[I]n *Enfish,* the Federal Circuit determined that claims directed to a specific type of self-referential table constituted a specific 'solution to a problem in the software arts' such that they were 'non-abstract improvements to computer technology.'" *Finjan, Inc. v. Blue Coat Sys.,* Case No. 15-cv-03295 (BLF), 2016 WL 7212322 at *5 (quoting *Enfish, LLC v. Microsoft Corp.,* 822 F.3d 1327, 1339 (Fed. Cir. 2016) ). In *DDR Holdings, LLC v. Hotels.com, L.P.,* 773 F.3d 1245, 1248 (Fed. Cir. 2014), the court found eligible patents based on "systems and methods of generating a composite web page that combines certain visual elements of a 'host' website with content of a third-party merchant."

comparison of domestic products to the asserted claims." *Alloc*, 342 F.3d at 1375. With respect to the "economic prong," subsection (3) of Section 337(a) provides:

> For purposes of paragraph (2), an industry in the United States shall be considered to exist if there is in the United States, with respect to the articles protected by the patent, copyright, trademark, mask work, or design concerned –
>
> (A) significant investment in plant and equipment;
>
> (B) significant employment of labor or capital; or
>
> (C*)* substantial investment in its exploitation, including engineering, research and development, or licensing.

19 U.S.C. § 1337(a)(3).

## V. THE '228 PATENT

### A. Background and Asserted Claims

The '228 patent is titled "Activity Monitoring" and names inventors Joannes Gregorius Bremer, Paraskevas Dunias, Gillian Antoinette Mimnagh-Kelleher, Adrianus Petrus Johanna Maria Rommers, and Wilhelmus Lambertus Marinus Cornelius Verhoeven. JX-0001 ("the '228 patent"), cover. The patent issued from a PCT application filed on November 21, 2003, claiming priority to a European patent application filed on December 10, 2002. *Id*.

The patent describes an activity monitor "that reduces the amount of power consumed during a monitoring operation." '228 Patent, Abstract. The specification describes a "known" system of human activity monitoring that has the drawback of using "relatively high power consumption." *Id.* at 1:38-40. The cause of this drawback is identified as "continuous monitoring of the accelerometer signals." *Id.* at 1:39. According to the patent, the solution is an activity monitor "operable to monitor and process the sensor signals discontinuously." *Id.* at 1:53-54.

The activity monitor comprises a measurement unit, a processor, and a memory unit. *Id*. at 1:62-2:4.

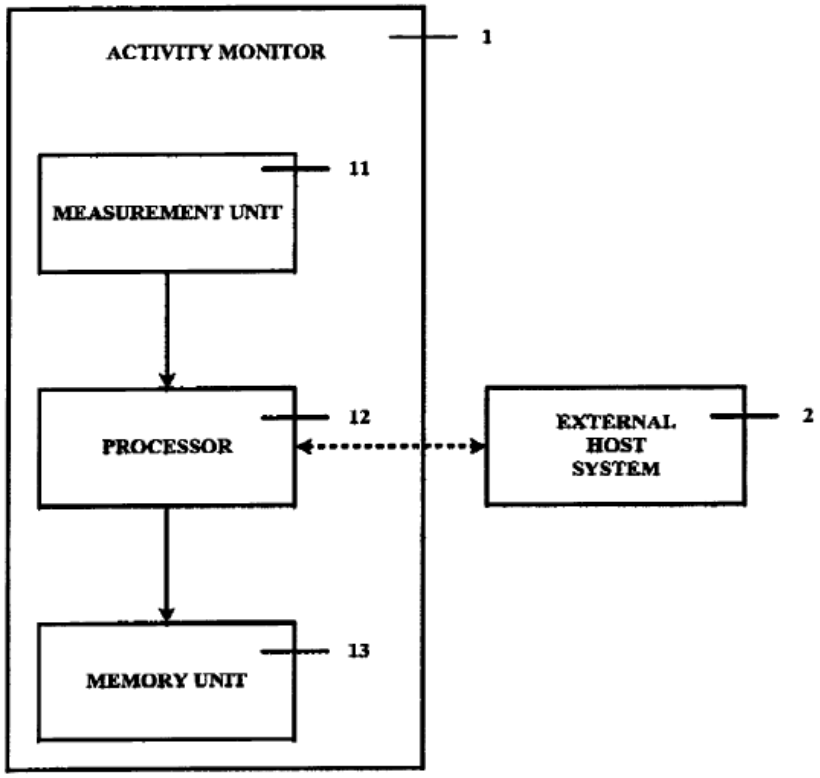



**FIG. 1**

'228 patent, Fig. 1. "The measurement unit comprises three accelerometers, which are arranged in mutually orthogonal directions." *Id*. at 2:16-17. The activity monitor reduces power consumption by using "discontinuous monitoring activity," whereby "the processor goes into a standby (or sleep) mode after a few seconds of monitoring." *Id*. at 2:60-63. This standby mode can be controlled by software that "could detect changes in the human behavior and adopt the switch on, switch off strategy of the activity monitor." *Id*. at 2:63-67. The patent notes that further power reduction can be achieved "by switching off the monitoring unit itself, such that

the accelerometers or motion sensors are only active for a discontinuous amount of time." *Id.* at 3:3-6.

Claim 1 of the '228 patent recites:

> 1. An activity monitor comprising:
>
> a measurement unit including a plurality of motion sensors operable to produce respective sensor signals indicative of motion experienced thereby; and
>
> a processor operable to receive the sensor signals from the measurement unit and to process the sensor signals in accordance with a predetermined method,
>
> characterized in that the activity monitor is operable to monitor and process the sensor signals discontinuously in time and the processor is operable to monitor the sensor signals in turn.

*Id*. at 3:17-27. Claim 2 depends from claim 1:

> 2. An activity monitor as claimed in claim 1, wherein the measurement unit is operable to output the sensor signals discontinuously in time.

*Id*. at 3:28-30.

**B. Claim Construction**

The parties agreed to construe the term "activity monitor" to mean a device for monitoring physical activity of an individual or object; the parties also agreed to construe "a plurality of motion sensors operable to produce respective sensor signals" to mean two or more motion sensors, such as uniaxial accelerometers, each of which produces a sensor signal, such as an x, y, or z axis data signal. Order No. 26 at 8. In the *Markman* order, the claimed "processor" was found not to be subject to 35 U.S.C. § 112, ¶ 6. *Id*. at 8-10. The term "monitor and process the sensor signals discontinuously in time" was construed to require interruptions, pauses, breaks or the like between periods when the sensor signals are monitored and processed. *Id*. at 10-15. The term "monitor the sensor signals in turn" was construed to mean sequentially ordered non-

overlapping monitoring of the sensor signals by the processor, *e.g.*, a time division monitoring of each of the x, y, or z axis data signals sequentially without overlap. *Id*. at 15-18. In Order No. 27 (July 27, 2020), the term "monitor" in the '228 patent was found to be not indefinite.

### C. Infringement

Philips accuses Fitbit and Garmin products of infringing claim 2 of the '228 patent. CIB at 58. Each of these products contains a chip package [redacted], which includes a tri-axial accelerometer, processor, and a FIFO (first-in, first-out) buffer. *See* CX-0012C (Young DWS) at Q/A 41, 62; RX-0573 (Rajagopal WS) at Q/A 6, 20-22; RX-0563C (Choi WS) at Q/A 16, 20. The accused products also contain a separate host processor, which processes data from the accelerometer package. *See* CX-0012C (Young DWS) at Q/A 43, 64; RX-0573 (Rajagopal WS) at Q/A 5; RX-0563C (Choi WS) at Q/A 11. In the Garmin products, there is an additional component called the "Sensor Hub," which receives data from the accelerometer package and outputs it to the host processor. *See* CX-0012C (Young DWS) at Q/A 64; RX-0563C (Choi WS) at Q/A 11, 30-31.

There is no dispute that the accused products are "activity monitors," as described in the preamble of claim 1. Each limitation of claims 1 and 2 is addressed below:

#### 1. "a measurement unit"

Claim 1 of the '228 patent requires "a measurement unit including a plurality of motion sensors operable to produce respective sensor signals indicative of motion experienced thereby." '228 patent at 3:17-20. Philips identifies the accelerometer package in each accused product as the claimed "measurement unit." CIB at 59-60. In a summary determination motion, Respondents had argued that the accelerometer packages could not be "measurement units" because they contained processors in addition to motion sensors. Motion Docket No. 1190-027,

Motion Memo. at 22-36 (Aug. 20, 2020); *see also* SIB at 32-36. Respondents' argument was rejected in Order No. 35, which found that the '228 patent does not preclude the measurement unit from including a processor. Order No. 35 at 27-31 (Oct. 1, 2020). There is no dispute that each accused product includes an accelerometer package and that each accelerometer package contains a plurality of motion sensors that produce sensor signals, as identified by Dr. Young. CX-0012C at Q/A 38, 60, 61. Accordingly, Philips has shown that the accused products infringe the "measurement unit" limitation.

**2. "a processor"**

Claim 1 of the '228 patent also requires "a processor operable to receive the sensor signals from the measurement unit and to process the sensor signals in accordance with a predetermined method." '228 patent at 3:21-23. Philips identifies a host processor in each accused product as the claimed "processor." CIB at 16, 21, 60. Relying on the testimony of Dr. Young, Philips submits that the host processors receive sensor signals from the accelerometer package in each accused product. *Id.* at 60-61; CX-0012C (Young DWS) at Q/A 136, 138-39. With respect to the accused Garmin products, Dr. Young explains that the sensor signals are processed by a "Sensor Hub" before being received by the host processor. CX-0012C at Q/A 138.

Respondents do not dispute that each accused product contains a host processor that receives signals related to the motion of the device, but they argue that the signals received by the processor are not the same "sensor signals" produced by the motion sensors described in the "measurement unit" limitation. RIB at 51-58. These motion sensors generate analog signals that are sampled and digitally processed in the accelerometer packages before being output to the host processors. *See* CX-0012C (Young DWS) at Q/A 44-45, 66-67; RX-0573C (Rajagopal

WS) at Q/A 14; RX-0563C (Choi WS) at Q/A 31. According to Dr. Paradiso, the "bursts of digital data" that are received by the host processors are "[n]othing like the analog signals" produced by the motion sensors. Tr. (Paradiso) at 236:18-20. The processing performed in the accelerometer packages includes sampling, filtering, and scaling of the sensor signal. *Id*. at 183-84, 235-37.

Philips maintains that the "sensor signals" are the same whether they are analog, digital, or undergo some signal processing. CRB at 5-13. The specification of the '228 patent does not distinguish between analog and digital signals, using the term "data signals" to describe the output of the measurement unit and the input to the processor. '228 patent at 1:65-2:3. The specification cites an article, "A Triaxial Accelerometer and Portable Data Processing Unit for the Assessment of Daily Physical Activity" by Bouten *et al.* ("Bouten"), '228 patent at 1:13-17, which describes "acceleration signals" that have been subject to filtering and amplification before being digitized. JX-0081 at .0008. In the prosecution history, the applicant and the examiner read the claimed "sensor signals" to cover signals in a prior art reference that had undergone analog-to-digital conversion. *See* JX-0004.0241, Response to Final Office Action at 5 (Jun. 7, 2005); JX-0004.0299, Examiner's Answer at 4 (Feb. 1, 2008). Philips argues that the claim language "sensor signals" does not require signals to be analog or digital, citing *Superguide Corp. v. DirecTV Enter., Inc.*, where the Federal Circuit refused to limit the word "regularly received television signal" to analog or digital because "[t]he claim language does not limit the disputed phrase to any particular type of technology or specify a particular type of signal format, such as analog or digital," and "neither 'analog' or 'digital' appears in any of the asserted claims." 358 F.3d 870, 878 (Fed. Cir. 2004).

Respondents argue that literal infringement requires the accused processors to receive the same analog signals generated by the motion sensors. RRB at 12-18. Respondents cite *Digital Biometrics, Inc. v. Identix, Inc*., where the Federal Circuit affirmed a judgment of non-infringement because "the data generated by the [accused] CCD is not digital data; it is analog." 149 F.3d 1335, 1348 (Fed. Cir. 1998) ("*Digital Biometrics*"). The *Digital Biometrics* opinion is not applicable to the present dispute, however, because the record in that case included clear distinctions between digital and analog data. *Id*. at 1346 ("The intrinsic evidence clearly indicates that the applicant distinguished between analog 'frames' and digital 'arrays.'"). The parties have not identified any relevant discussion of analog or digital sensor data in the specification or prosecution history of the '228 patent. To the contrary, as discussed above, prior art cited in the specification and in the prosecution history refers to both analog and digital data as sensor data. Respondents fail to cite any evidence that the additional processing of the sensor signals in the accused products transforms them into different signals.

Accordingly, Philips has shown that the accused products infringe the "processor" limitation even though the data from the accelerometers is subject to analog-to-digital conversion and other signal processing before being received by the processor. These are the same sensor signals, representing the same motion that was detected in the measurement unit.

**3. "the activity monitor is operable to monitor and process the sensor signals discontinuously in time"**

Claim 1 of the '228 patent further requires "that the activity monitor is operable to monitor and process the sensor signals discontinuously in time." '228 patent at 3:24-26. In accordance with the *Markman* order, this limitation requires interruptions, pauses, breaks or the like between periods when the sensor signals are monitored and processed. Order No. 26 at 10-

15. As discussed below, monitoring and processing are separate limitations that must be satisfied.

**a. "monitor . . . the sensor signals discontinuously in time"**

Philips points to the transfer of data [redacted] in the accelerometer package of each accused product to show discontinuous monitoring. CIB at 65-71. According to Dr. Young, the data from the motion sensors in each of the accused products is stored [redacted] CX-0012C (Young DWS) at Q/A 146 (Fitbit), 149-50 (Garmin). Fitbit engineer Shivia Rajagopal testified that the accelerometer packages in the Fitbit products [redacted] CX-0387C (Rajagopal Dep.) at 117-27. Mr. Rajagopal further explained that the accelerometer packages [redacted] *Id*. at 68-70. When the host processor [redacted], the processor sends a request to the accelerometer package [redacted]. *Id*. at 68-71, 78-79. Garmin engineer Michael Choi confirmed that the Garmin products [redacted] RX-0563C (Choi WS) at Q/A 31; CX-0375C (Choi Dep.) at 49-50, 88-90, 128-30. Based on this evidence, Philips submits that the accused products monitor and process the sensor signals discontinuously in time because [redacted] CIB at 65-71; CRB at 13-23.

Respondents argue that this limitation is not infringed because the host processors continuously "monitor" [redacted] RIB at 58-65. Fitbit cites the testimony of

Mr. Rajagopal that the host processors are [redacted] Tr. at 152:18-153:7. Fitbit CEO James Park testified that the Fitbit host processor [redacted] RX-0568C (Park WS) at Q/A 68. Garmin engineer Michael Choi testified that the Garmin SensorHub [redacted] RX-0563C (Choi WS) at Q/A 35. Respondents' expert Joseph Paradiso explained that the host processors [redacted] Tr. at 237-39 [redacted] Staff agrees with Respondents' argument that continuous monitoring [redacted] precludes infringement of this limitation. SIB at 41-46.

In reply, Philips argues that continuous monitoring for the [redacted] is irrelevant to infringement, because the claim language only requires discontinuous monitoring of "the sensor signals." CRB at 13-20. I agree with Philips that the continuous monitoring [redacted] in the accused products does not preclude infringement of this limitation. The claim language does not require all processor operations to be discontinuous but refers specifically to the monitoring and processing of the "sensor signals." The [redacted] is not a "sensor signal"—[redacted]

The use of an [redacted] is consistent with the specification. In one embodiment, "discontinuous monitoring" is achieved by putting the processor into a standby (or sleep) mode and starting up again to monitor sensor data. '228 patent at 2:60-63. The specification suggests that "the software could detect changes in the human behavior and adopt the switch on, switch off strategy of the activity monitor." *Id*. at 2:63-68. In such an embodiment, the processor

would be continuously monitoring for a signal that indicates a change in human behavior; [redacted] is part of the claimed "monitoring" of "sensor signals."

In accordance with the specification and claim language discussed above, I find that the claimed "monitoring" of "sensor signals" in the accused products comprises the request for sensor data and the subsequent transmission the requested data from the accelerometer package to the processor. There is no dispute that the [redacted] sensor data in the accused products are requested and received intermittently, [redacted] Accordingly, there are breaks between each cycle of requesting and receiving data, and the accused products thus infringe the limitation requiring discontinuous monitoring of the sensor data.

**b. "process the sensor signals discontinuously in time"**

The limitation further requires discontinuous processing of the sensor signals. According to Dr. Young, the discontinuous receipt of sensor signals in the host processors will necessarily result in discontinuous processing of those signals. CX-0012C at Q/A 146, 150. Mr. Rajagopal questions this assumption, however, explaining that there are many processing steps that are performed in the host processor, and "[i]t would be wrong to assume or conclude that there are breaks in processing of accelerometer samples [redacted] RX-0573C at Q/A 36. Dr. Paradiso submits that it is possible for a processor to "receive the data in bursts but then spend the entirety of the time in-between bursts processing that received data." RX-0561C at Q/A 105-106. Respondents and Staff argue that

Philips has failed to prove that this limitation is infringed, because there is no evidence in the record that explicitly demonstrates discontinuous processing by the host processors. RIB at 66-71; SIB at 46-49.

Infringement of this limitation may be inferred, however, from the discontinuous monitoring of sensor signals and circumstantial evidence regarding the operation of the host processors. As discussed above, sensor data is received by the host processors [redacted] with pauses or breaks [redacted] Engineers at Fitbit and Garmin have admitted that the [redacted] RX-0573C (Rajagopal WS) at Q/A 34 [redacted] RX-0563C (Choi WS) at Q/A 38 [redacted] When data is received discontinuously and [redacted], it is reasonable to conclude that the data is processed discontinuously. Philips has thus proven infringement of this limitation by a preponderance of the evidence.

**4. "the processor is operable to monitor the sensor signals in turn"**

The final limitation of claim 1 of the '228 patent requires that "the processor is operable to monitor the sensor signals in turn." '228 patent at 3:26-27. This limitation was construed to mean sequentially ordered non-overlapping monitoring of the sensor signals by the processor, *e.g.*, a time division monitoring of each of the x, y, or z axis data signals sequentially without overlap. Order No. 26 at 15-18.

To show infringement of this limitation, Philips points to the [redacted] in the accused products, which is used to transmit data between the accelerometer packages and the host processors. CIB at 75-76. According to Dr. Young, the sensor signals in the accused products are transmitted serially, in sequentially ordered sets of x, y, and z samples.

CX-0012C at Q/A 70, 97. There is no overlap between x, y, and z samples in this transmission, and Philips thus submits that the sensor signals are monitored "in turn."

As discussed above, however, the monitoring step in the accused products includes both the request for sensor signals and the receipt of those signals by the host processor. Respondents argue that this limitation is not infringed because the accused products [redacted] RIB at 74-75; *see* RX-0561C (Paradiso RWS) at Q/A 124 [redacted]; *see also* RX-0573C (Rajagopal WS) at Q/A 31 [redacted] RX-0563C (Choi WS) at Q/A 39 [redacted]). Notably, Dr. Paradiso explains that the accelerometer packages can optionally be configured to read data for only one axis at a time. RX-0561C at Q/A 126; *see also* Tr. at 159:17-23 [redacted] In the accused products, the evidence indicates that both Fitbit and Garmin have configured their products to [redacted].[9]

Philips and Staff argue that the claim construction for "in turn" does not require [redacted] CIB at 76; SRB at 14. In an order addressing summary determination, I previously held that Philips had shown infringement of this limitation under the

[9] As discussed below in the context of the technical prong of the domestic industry requirement, there is evidence that [redacted] can include commands requesting individual x, y, or z samples "in turn." *See* RX-0551C (Liu Dep. Tr.) at 157-58. Philips has not identified evidence that such commands are used in the accused products.

proper construction of "in turn." Order No. 34 at 13-14. Respondents' non-infringement argument is not based on the construction of "in turn," however. The critical issue is the meaning of "monitor," and whether this limitation requires the processor in the accused products to both request and receive the sensor signals "in turn."

I previously found that the verb "monitor" describes a step that includes receiving sensor signals but occurs before those signals are processed, in accordance with the claim language of the '228 patent. Order No. 27 at 7. Order No. 27 also cited several dictionary definitions for the term "monitor" that were identified by the parties. *Id*. at 9-10. There was no dispute between the parties regarding the applicability of these definitions, which included "to watch, keep track of, or check," "to keep track of systematically with a view to collecting information," "to test or sample, especially on a regular or ongoing basis," or "to check or evaluate [something on a constant or regular basis]." *Id*. The intrinsic and extrinsic evidence thus supports a construction for "monitor" that includes both requesting and receiving the sensor signals.

When the request for sensor signals is recognized as part of the monitoring step, the "in turn" limitation is not infringed. The evidence of record indicates that [redacted] Accordingly, the processor is not operable to monitor the sensor signals "in turn."

Because the accused products do not infringe the "in turn" limitation, there is no infringement of claim 1 of the '228 patent.

**5. "the measurement unit is operable to output the sensor signals discontinuously in time"**

Claim 2 of the '228 patent requires that "the measurement unit is operable to output the sensor signals discontinuously in time." '228 patent at 3:28-30. As discussed above, the

accelerometer packages in the accused products [redacted] triggering a request for the output of sensor data. This process repeats intermittently [redacted] and this operation thus meets the limitation recited in claim 2 requiring the output of sensor signals "discontinuously in time." There is no infringement of this claim, however, because it depends from claim 1, which is not infringed.

### D. Domestic Industry

Philips relies on its Lifeline devices and Biosensor device to meet the technical prong of the domestic industry requirement. CIB at 25-27.[10] Dr. Young offered testimony explaining how these products practice claims 1 and 2 of the '228 patent. CX-0012C at Q/A 74-104.

There is no dispute that the domestic industry products are "activity monitors," as described in the preamble of claim 1. Each limitation of claims 1 and 2 are addressed below:

#### 1. "a measurement unit"

With respect to the "measurement unit" limitation, Philips identifies STMicroelectronics accelerometer packages contained in the Philips Lifeline devices and the Philips Biosensor device. CX-0012C (Young DWS) at Q/A 78, 133. Each Philips Lifeline device contains a [redacted] accelerometer package, and the Biosensor device contains a [redacted] accelerometer package. *Id*. Each of these accelerometer packages contains three accelerometers, a processor, and a FIFO buffer. *Id*. at Q/A 84-89, 133; CX-0093 ([redacted] datasheet); JX-0106 ([redacted] datasheet). There is no dispute that these accelerometer packages contain a plurality of motion sensors that produce senor signals, as required by the claim language. As discussed above,

[10] Pursuant to Order No. 34, Philips was found to have satisfied the economic prong of the domestic industry requirement. *See* Comm'n Notice (Nov. 16, 2020) (determining to review Order No. 34).

Respondents dispute whether an accelerometer package containing a processor can be the claimed "measurement unit," but this argument was rejected on summary determination. Order No. 35 at 27-31. Accordingly, Philips has shown that the domestic industry devices practice the "measurement unit" limitation.

**2. "a processor"**

Each Philips Lifeline device includes a host processor, which is [redacted]. CX-0012C (Young DWS) at Q/A 141 (citing JX-0109C (Philips Lifeline block diagram)). The Philips Biosensor device includes a [redacted]. *Id*. at Q/A 143 (citing CX-0202C [redacted]). Philips submits that these host processors receive and process the sensor signals from the measurement unit. CIB at 78-79.

Respondents argue that these host processors do not "receive the sensor signals from the measurement unit," but as discussed above in the context of infringement, Respondents' argument relies on an overly restrictive construction of "sensor signals." RIB at 78; CIB at 79-80. There is no dispute that the signals received by the processors in the Philips products represent the same motion that was detected in the measurement unit. Accordingly, I find that the domestic industry devices practice the "processor" limitation.

**3. "the activity monitor is operable to monitor and process the sensor signals discontinuously in time"**

The parties' disputes with respect to the "activity monitor" limitation for the technical prong of the domestic industry requirement are the same as those discussed above in the context of infringement. *See* RIB at 78-79. The "monitor" and "process" limitations are addressed separately below.

**a. "monitor . . . the sensor signals discontinuously in time"**

Philips points to the transfer of data from the [redacted] in the accelerometer package of each domestic industry product to show discontinuous monitoring. CIB at 80-83. According to Dr. Young, the data from the motion sensors in each of the domestic industry products is stored in the [redacted] of the accelerometer package before being transmitted to the host processor in bursts of data. CX-0012C (Young DWS) at Q/A 151-54.

In the Lifeline devices, the host processors request data from the accelerometer package on preset timers every [redacted]. *Id*. at Q/A 152. This operation was confirmed by Philips engineer Chibing Liu. RX-0551C at 150-52. Respondents rely on the rebuttal testimony of Dr. Paradiso, who acknowledges that the accelerometer packages in the Lifeline devices transfer data every [redacted]. RX-0561C (Paradiso RWS) at Q/A 150. Respondents characterize this regular data transfer as "continuous," but I agree with Philips that the periodic bursts of data meet the claim limitation for discontinuous monitoring, as it has been construed, with interruptions, pauses, breaks or the like between periods when the sensor signals are monitored. Philips has thus shown that the Lifeline devices practice this limitation.

With respect to the Philips Biosensor device, Dr. Young testifies that the Biosensor device operates [redacted]. CX-0012C at Q/A 154. Philips engineer Srikanth Thiagarajan described a different operation in the Biosensor device, however, where the host processor periodically sends an interrupt to the accelerometer package to determine whether the [redacted] CX-0009C (Thiagarajan WS) at Q/A 22; RX-0688C (Thiagarajan Dep. Tr.) at 98-102. Respondents further cite deposition testimony from Mr. Thiagarajan describing the Biosensor device's data capture as "without interruption" and discussing a document stating that

the device "continuously captures." RX-0688C at 151. Philips's post-hearing brief does not resolve the discrepancies between Dr. Young's analysis of the operation of the Biosensor device and Mr. Thiagarajan's testimony. *See* CIB at 81-82. Further confusing the record, Dr. Paradiso submits that the Philips devices are configured to continuously obtain sensor data and are continuously checking for an interrupt. RX-0561C at Q/A 155. The conflicting evidence in the record precludes any definitive findings regarding the operation of the Biosensor device with respect to the [redacted]. Accordingly, Philips has failed to carry its burden on the monitoring limitation with respect to the Biosensor device.

**b. "process the sensor signals discontinuously in time"**

As discussed above, Philips has shown that the host processors of the Lifeline devices monitor the sensor signals discontinuously in time by [redacted]. Philips submits that this evidence also shows discontinuous processing because the signals must be received before they are processed. CIB at 83. Respondents argue that discontinuous processing cannot be inferred from discontinuous monitoring, RIB at 79, but as discussed above in the context of infringement, circumstantial evidence regarding the structure and operation of these products makes it reasonable to conclude that this limitation is met. Here, Dr. Young's opinion, CX-0012C at Q/A 152, is supported by Mr. Liu's testimony regarding the receipt of sensor signals by the host processor in the Lifeline devices. RX-0551C at 150-52. Accordingly, Philips has shown that the Lifeline devices process the sensor signals discontinuously in time.

With respect to the Biosensor device, however, Philips has failed to adduce evidence that reliably shows how the sensor data from the accelerometer package is received and processed by

the host processor. Accordingly, Philips has failed to carry its burden on the technical prong on the "discontinuously in time" limitation with respect to the Biosensor device.

**4. "the processor is operable to monitor the sensor signals in turn"**

With respect to the "in turn" limitation, Philips relies on the SPI interface between the host processor and the accelerometer package in the domestic industry products. CIB at 84-85. As discussed above in the context of infringement, this limitation requires that the request and receipt of sensor signals is sequential for the x, y, and z samples.

For the Lifeline products, Dr. Young cites the testimony of Chibing Liu, who describes [redacted] from the accelerometer packages. CX-0012C (Young DWS) at Q/A 161. In his deposition, Mr. Liu describes a process where the host processor initiates "[redacted] RX-0551C (Liu Dep.) at 157:1-9. Mr. Liu describes separate commands that [redacted]. *Id.* at 157:10-158:2.

With respect to the Biosensor device, Dr. Young relies on [redacted]. CX-0012C at Q/A 163 (citing CX-0203C). Based on this document, Dr. Young offers his opinion that the x, y, and z samples are monitored sequentially, in a non-overlapping manner. *Id.*

Respondents argue that this limitation is not met by the domestic industry products because [redacted]. RIB at 79. As described by Mr. Liu, however, [redacted]

[redacted]. RX-0551C at 157-58. In contrast, Mr. Thiagarajan admitted that there is [redacted]. RX-0688C at 159-60. Accordingly, Philips has shown that the Lifeline devices monitor the sensor signals in turn, but the Biosensor device does not meet this limitation.

**5. "the measurement unit is operable to output the sensor signals discontinuously in time"**

As discussed above, sensor signals in the accelerometer package are accumulated in a FIFO before being transmitted to the host processors in the domestic industry products. In the Lifeline devices, [redacted]. CX-0012C (Young DWS) at Q/A 152; RX-0551C (Liu Dep. Tr.) at 150-52. As discussed above, the "discontinuously in time" limitation of claim 1 is satisfied by these periodic requests, and because the data is sent from the accelerometer packages in response to the requests, the "discontinuously in time" limitation of claim 2 is also satisfied. Accordingly, Philips has shown that the Lifeline devices practice claim 2 of the '228 patent.

With respect to the Biosensor device, Philips has failed to establish how the accelerometer packages transmit sensor data to the host processors—conflicting testimony from Philips's witnesses allege [redacted] *See* CIB at 81-82. As discussed above, this conflicting evidence precludes any finding regarding the "discontinuously in time" limitation of claim 1. Philips has similarly failed to show that the limitation of claim 2 is practiced by the Biosensor device.

**E. Patent Eligibility**

Respondents assert that claim 2 of the '228 patent is directed to ineligible content under section 101 of the Patent Act, 35 U.S.C. §101. RIB at 79-88. Respondents contend that claim 2

is directed to an abstract idea consisting of turning off power intermittently to decrease energy consumption and contains no inventive concept. *Id.* Staff agrees. SIB at 53-59.

In opposition, Philips maintains that claim 2 is directed to "specific solutions that improve computer functionality." CIB at 136. They say the invention improves computer functionality by using a measurement unit that outputs sensor signals discontinuously to a processor that is programmed to process the signals discontinuously. CRB at 62-66.

The claims of the '228 patent concern an activity monitor consisting of a measurement unit and a processor capable of monitoring and processing sensor signals "discontinuously in time." '228 patent at 3:17-27. Claim 2 describes an activity monitor in which the measurement unit "is operable to output the sensor signals discontinuously in time." *Id*. at 3:28-30.

Identifying the abstract idea is key to determining eligibility under section 101. The Federal Circuit has cautioned courts not to describe claims at too high a level of abstraction, and to ensure that the actual language of the claims is given appropriate weight. Eligibility must be "considered in light of the specification, based on whether" the "'character'" of the claims "'as a whole is directed to excluded subject matter.'" *Enfish, LLC v. Microsoft Corp.,* 822 F.3d 1327, 1335 (Fed. Cir. 2016) (quoting *Internet Patents Corp. v. Active Network, Inc.,* 790 F.3d 1343, 1346 (Fed. Cir. 2015)). The correct inquiry focuses on "the claimed advance over the prior art." *Genetic Techs. Ltd. v. Merial L.L.C.,* 818 F.3d 1369, 1375 (Fed. Cir. 2016). "We must therefore ensure at step one that we articulate what the claims are directed to with enough specificity to ensure the step one inquiry is meaningful." *Thales Visionix Inc. v. U.S.,* 850 F.3d 1343, 1347 (Fed. Cir. 2017).

Based on the language of the claims and the specification in the '228 patent, there is no danger of describing the patented idea at too high a level of abstraction, since the language of the

patent itself describes the invention abstractly. The idea is to lower consumption of energy by programming the operating parts of an activity monitory monitor to operate discontinuously in time rather than being constantly "on." As argued by Respondents, this is "a timeworn, abstract idea to save power, energy, or resources by doing something discontinuously instead of continuously," and the patent describes no new or inventive process for achieving this abstract goal. RIB at 81. The specification simply recites the abstract idea as the invention embodied in claim 2: "Further power reduction could be achieved by switching off the monitoring unit itself, such that the accelerometers or motion sensors are only active for a discontinuous amount of time." '228 Patent at 3:3-6.

Respondents are correct that the claims at issue are not rescued from ineligible abstraction simply because the idea of saving power by using a power source intermittently (or not all) appears in the context of activity monitors. "An abstract idea does not become nonabstract by limiting [it] to a particular field of use or technological environment[.]" *Intell. Ventures I LLC v. Capital One Bank (USA)* ("*Capital One I*"), 792 F.3d 1363, 1366 (Fed. Cir. 2015). Nor does the fact that the '228 patent claims recite computer- or processor-implemented limitations render them non-abstract. With processor-implemented claims, the question is whether the claims "are directed to an improvement in the functioning of a computer or merely adding conventional computer components to well-known business practices." *Affinity Labs of Texas v. Amazon.com Inc.*, 838 F.3d 1266, 1270 (Fed. Cir. 2016) (quotes omitted). The claims of the '228 patent are not directed to an improvement in the functioning of a computer—the claims simply recite the abstract idea of saving power in an electronic device through discontinuous operations, an abstract idea using generic processing components "to perform

generic [processing] functions." *Alice*, 573 U.S. at 225. Claim 2 does not offer a technological solution to overcome a problem specifically arising in the realm of computer technology.

As Respondents point out, the invention described in the '228 patent is in no way limited to the realm of computer technology. Long before computers, the advantages of intermittent monitoring in saving energy were recognized. Respondents provide an example: a security company wishes to monitor the front door, back door, and parking lot of a building. The company may decide to save expense by sending one security guard to make "rounds" of the three points rather than hiring three guards to monitor all three doors simultaneously all the time. The security guard could further conserve his own energy by taking breaks between rounds, when it is unlikely that circumstances will be rapidly changing. This method of discontinuous monitoring could have been used by guards at Buckingham Palace or Hadrian's Wall. The alleged invention of the '228 patent merely applies this abstract idea to the field of activity monitors.

Philips's arguments in opposition are futile. They contend that accelerometers are not purely functional, without explaining the relevance of that argument to section 101. Philips argues that: "While an off-the-shelf processor may have been available when the patent application was filed, Dr. Young does not agree that claiming one makes a patent claim generic or purely functional." CIB at 136. This argument has nothing to do with the pertinent inquiry under section 101. No one contends that claiming an off-the-shelf processor "makes a patent claim" ineligible.[11]

[11] The parties' reliance on expert testimony regarding the eligibility issue is bewildering. The Commission has affirmed several summary determinations finding patents ineligible, notwithstanding arguments that expert testimony is required to resolve the issues, and the federal courts do so routinely. *See, e.g., Certain Road Construction Machines and Components Thereof*,

Philips argues that the '228 patent "is far more concrete" than patents that have been deemed eligible in other cases. CRB at 63. In each of the instances Philips cites, however, the court found that the patented invention represented a technological improvement. The point is that the invention of the '228 patent is not a technological improvement: it merely applies a long-used abstract principle to a conventional device. Contrary to Philips's contentions, the '228 patent purports to solve "the problem of high power consumption" by turning the equipment on and off, not by "improving computer functionality." *Id.* at 64.

Philips asserts: "The [Respondents'] arguments, again, invite legal error because they are totally divorced from the language of claim 2 of the '228 patent." To the contrary, the patent language reveals no technological advance, claiming only an "activity monitor" with a "measurement unit" and a "processor," with the only substantive limitations restricting the operation of device to be "discontinuously in time" and "in turn." Philips never specifies what it is that ties this claim language to any technological improvement. It never identifies inventive technology that enables the claimed device to operate intermittently to overcome a technological problem.

Turning to step two of the *Alice* analysis, Philips states that claim 2 "improves computer functionality by using a measurement unit to output sensor signals discontinuously in time to a processor that is operable to process those sensor signals in accordance with a predetermined

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Inv. No. 337-TA-1088, Comm'n Op., 2019 WL 6003332, at *5-10 (July 15, 2019) (affirming ineligibility of patent directed to a paving machine invalid under Section 101); *Certain Activity Tracking Devices,* Inv. No. 337-TA-963, Order No. 40 at 29 (Mar. 3, 2016). reviewed and aff'd with modification, Comm'n Notice (April 4, 2016)); *see also* Order No. 54 at 24 (April 27, 2016), reviewed, Comm'n Notice (June 2, 2016). *See also, Berkheimer v. HP Inc.*, 881 F.3d 1360, 1368 (Fed. Cir. 2018) ("Patent eligibility has in many cases been resolved on motions to dismiss or summary judgment."). Legal argument presented as expert opinion, as in this instance, is unpersuasive.

method that includes monitoring those sensor signals both discontinuously in time and in turn." CRB at 65. "The result," they assert, "is an improvement to a physical device—an activity monitor that can accurately monitor movement, while at the same time avoiding high power consumption." *Id.*[12]

The technological improvement to computer functionality is identified as discontinuous monitoring using a measurement unit and a processor programmed to achieve discontinuous monitoring. *See* '228 patent at 2:60-63 ("This discontinuous monitoring activity can be achieved by programming the processor unit appropriately, so that the processor goes into a standby (or sleep) mode after a few seconds of monitoring."). Nothing about the use of the measurement unit or the processor as described is unconventional. It may be useful to monitor and process the sensory inputs discontinuously in time, but there is nothing technologically innovative about doing so. The claims recite the abstract idea of discontinuous monitoring of signals in turn without specifying any technological innovation that embodies the alleged invention. Merely stating that a claim to discontinuous operation of a measurement unit is "rooted in computer technology" does not describe an inventive concept that transforms an abstract idea into patent eligible subject matter. *BSG Tech LLC v. Buyseasons, Inc.*, 899 F.3d 1281, 1290 (Fed. Cir. 2018) ("It has been clear since *Alice* that a claimed invention's use of the ineligible concept to which it is directed cannot supply the inventive concept that renders the invention 'significantly more' than that ineligible concept."). Accordingly, Respondents and Staff have carried the burden to demonstrate by clear and convincing evidence that the claims of the '228 patent are ineligible under section 101.

[12] Improving a "physical" device clearly does not in itself suffice to establish patent eligibility. *See supra*, n.8.

## F. Invalidity

### 1. Anticipation

Respondents contend that claim 2 of the '228 patent is anticipated by U.S. Patent No. 6,077,236, naming inventor David Cunningham ("Cunningham", JX-0139); U.S. Patent No. 6,002,963, assigned to Pacesetter, Inc. ("Pacesetter", JX-0144); or the paper "Using an Accelerometer Sensor to Measure Human Hand Motion" by Brian B. Graham ("Graham", JX-0161). RIB at 88-118.

#### a. Cunningham

Cunningham is a patent that issued on June 20, 2000, from an application filed on June 7, 1994. JX-0139. Cunningham describes a pacemaker and is entitled "Apparatus for Monitoring Cardiac Contractility." *Id*. Cunningham's pacemaker uses motion sensors to measure movements in the heart. *Id*. at 1:12-20.

There is no dispute that Cunningham discloses an "activity monitor," as described in the preamble of claim 1 of the '228 patent. Each limitation of claim 1 and 2 is addressed below:

##### i. "a measurement unit"

For the "measurement unit" limitation, Respondents identify Cunningham's "multiaxial acceleration transducer 2 located in the tip 1 of the catheter implanted in the heart." JX-0139 at 6:1-3. Cunningham further discloses that the acceleration transducer is "formed by three uniaxial transducers 2x-2y-2z." *Id*. at 6:29-33. *See* RX-0560C (Paradiso DWS) at Q/A 81. There is no dispute that Cunningham anticipates this limitation.

##### ii. "a processor"

For the "processor" limitation, Respondents identify "a master control unit to receive the three signals of the transducers in successive time intervals." JX-0139 at 4:14-15. *See* RX-0560C (Paradiso DWS) at Q/A 81. Cunningham states: "The master control unit 9 . . . processes

the acceleration signal." *Id*. at 6:7-10; *see also id*. 8:12–14 (describing "processing of these signals by the master control unit 9"). Cunningham also describes additional details regarding the processing that is performed: "The master control unit 9 reconstructs within itself the three analog signals from the three acceleration transducers activated in a pulsed mode, amplifies them, filters them in a band from 15 to 100 Hz approximately, and measures within each cardiac cycle the peak-to-peak value of acceleration in the three directions considered, namely x-y-z." *Id*. at 6:56-62. Staff agrees with Respondents that master control 9 meets the limitations of the claimed "processor." SIB at 60-62.

Philips identifies a smaller component within the master control unit as the appropriate processor, arguing that the master control unit is not the claimed "processor" because it performs several functions in addition to processing the sensor signals. *See* CX-0014C (Young RWS) at Q/A 22 (identifying master control unit 9 and unit 47 in Cunningham).

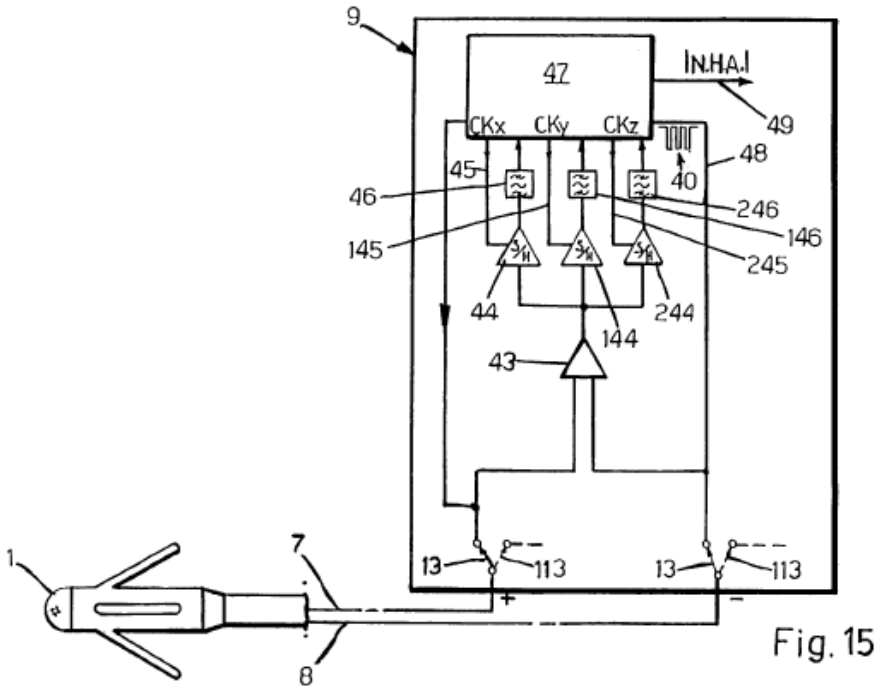



Fig. 15

JX-0139, Fig. 15. There is nothing in the '228 patent that precludes the claimed "processor" from performing functions in addition to those recited in the claim, however. Philips concedes that the limitations of the claimed "processor" are performed by internal unit 47 within the master control unit 9; and accordingly, there is no dispute that the processor limitation is satisfied by master control unit 9.

I agree with Respondents and Staff that Cunningham's master control unit 9 meets the limitations of the claimed "processor." Accordingly, the processor limitation is anticipated by Cunningham.

#### iii. "the activity monitor is operable to monitor and process the sensor signals discontinuously in time"

For the "discontinuously in time" limitation, Respondents identify disclosures in Cunningham describing the timing of the sensor signals. RIB at 93-98. In particular, Cunningham states: "A time interval of the order of approximately 100 microseconds is used, in a ratio of 1/30 to the sampling period which is typically approximately 3000 microseconds." JX-0139 at 4:15-18. The specification notes that the use of this sampling period decreases power consumption. *Id*. at 4:18-22. With respect to discontinuous monitoring of the sensor signals, Cunningham discloses that "approximately 100 microseconds of each sampling cycle must be dedicated to the reading of signals from the three acceleration transducers 2x-2y-2z." *Id*. at 8:9-11. With respect to discontinuous processing, Cunningham describes a "principle that only a small time interval of the available cycle will be dedicated to the analysis of the signal from the transducers 2x-2y-2z." *Id*. at 8:21-23. Dr. Paradiso offers his opinion that the disclosures in Cunningham anticipate the "discontinuously in time" limitation. RX-0560C at Q/A 89-93.

Philips argues that the sampling cycle described in Cunningham is a continuous sampling rate, rather than discontinuous monitoring and processing. CIB at 95-101. Dr. Young

characterizes the operation of Cunningham as "continuous," rather than discontinuous. CX-0014C at Q/A 25. Dr. Young compares the sampling cycle in Cunningham to the sampling described in an article, "A Triaxial Accelerometer and Portable Data Processing Unit for the Assessment of Daily Physical Activity" by Bouten *et al.*, which was cited in the specification of the '228 patent. JX-0081C ("Bouten"). The '228 patent specification criticizes Bouten for "continuous monitoring" that "results in relatively high power consumption." '228 patent at 1:38-40.

Dr. Paradiso disagrees with Dr. Young's reading of the '228 patent specification, comparing the sampling cycle of Cunningham with the embodiment in column 3 of the '228 patent, where "[f]urther power reduction could be achieved by switching off the monitoring unit itself." '228 patent at 3:3-6. With respect to the Bouten article, Respondents argue that the sampling disclosed in Bouten is not monitoring of the sensor signals but merely the conversion of analog sensor signals to digital data. RRB at 39-40. Respondents submit that the sampling in Bouten is continuous, with the sensors and processors always powered on. RRB at 40. In contrast, Cunningham specifically describes the power savings achieved by its sampling cycle. JX-0139 at 7:66-8:2 ("Since the duty cycle will be of the order of 1/30 for a repetition period of 3000 microseconds, the mean consumption is of the order of 1 μA which is a necessary and sufficient condition for the implantability of the device.").

Staff agrees with Respondents that Cunningham anticipates this limitation, citing Dr. Young's admission that Cunningham only monitors and processes sensor signals 3% of the time. SIB at 62-64; Tr. (Young) at 359:11-14. Staff submits that Philips's arguments are not consistent with the claim construction for "discontinuously in time." *Id*.

I agree with Respondents and Staff that Cunningham anticipates the "discontinuously in time" limitation. Philips argues that Cunningham's 3000 microsecond sampling cycle is continuous rather than discontinuous, but the construction for this term only requires interruptions, pauses, breaks or the like between periods when the sensor signals are monitored and processed. Order No. 26 at 10-15. Cunningham clearly discloses a brief time interval in each cycle dedicated to monitoring and processing the sensor signals, interrupted by longer pauses. Like the '228 patent, Cunningham claims that these breaks in monitoring and processing reduce power consumption. Accordingly, I find that Cunningham anticipates the "discontinuously in time" limitation.

#### iv. "the processor is operable to monitor the sensor signals in turn"

With respect to the "in turn" limitation, Respondents identify Cunningham's disclosure of "an integrated electronic circuit enabling a master control unit to receive the three signals of the transducers in successive time intervals." JX-0139 at 4:11-18; *see also id*. at 6:52-56 ("The circuit 10 . . . performs timing functions, to make available in the single output conductor 8 the signals from the three uniaxial transducers 2x-2y-2z in distinct and successive time intervals."). Specifically, the device disclosed in Cunningham "read[s] the corresponding data" from each axis for 30 microseconds, for "a total of approximately 90-100 microseconds . . . to permit the data from the three transducers to be available in succession." *Id*. at 7:60–64. Respondents and Staff submit that these disclosures show that Cunningham anticipates the "in turn" limitation of the '228 patent. RIB at 98-102; SIB at 65; *See* RX-0560C (Paradiso DWS) at Q/A 98-100.

Philips's arguments with respect to the "in turn" limitation rely on their contention that the claimed "processor" in Cunningham is unit 47 rather than master control unit 9. CIB at 98-101. As discussed above, however, there is nothing in the '228 patent that precludes

Respondents from identifying master control unit 9 as the claimed "processor." There is no dispute that this limitation is anticipated by Cunningham when master control unit 9 is the claimed "processor." *See* CRB at 27-29. Cunningham describes specific timing initiated by the master control unit 9 to obtain and receive sensor signals from each of three transducers in succession, which meets the "in turn" limitation.

**v. "the measurement unit is operable to output the sensor signals discontinuously in time"**

With respect to the additional limitation of claim 2, Respondents point to the aforementioned discontinuous sampling cycle disclosed in Cunningham. RIB at 93-98. Specifically, Cunningham states: "The electronic circuitry . . . associated with the said multiaxial accelerometer . . . when commanded by the master control unit, is activated for approximately 30 microseconds once every 3000 microseconds, permitting a significant reduction in current consumption." JX-0139 at 4:48-55. Dr. Paradiso explains that this cycling of the accelerometer outputs sensor signals discontinuously in time. RX-0560C at Q/A 101. Staff agrees with Respondents that this limitation is anticipated by Cunningham. SIB at 66.

Philips argues that Cunningham's sampling cycle affects the generation of sensor signals rather than the output of sensor signals. CIB at 101-02. According to Dr. Young, claim 2 of the '228 patent requires the measurement unit to first generate and store the sensor signals before altering the timing of signal output to be discontinuous. CX-0014C at Q/A 31-32. There is nothing in the specification of the '228 patent that would support such a construction, however, and there is one embodiment disclosed where "the accelerometers or motion sensors are only active for a discontinuous amount of time." '228 patent at 3:3-6. Furthermore, the plain language of the claims does not preclude a measurement unit that outputs discontinuously by

periodically stopping the generation of sensor signals. This limitation is thus disclosed by Cunningham.

Accordingly, I find that Cunningham anticipates claim 2 of the ’228 patent.

**b. Pacesetter**

Pacesetter is a patent that issued on December 14, 1999, from an application filed on February 17, 1995, naming inventors Gabriel Mouchawar, James D. Causey III, and Sheldon B. Moberg. JX-0144. Pacesetter is entitled “Multi-Axial Accelerometer-Based Sensor for an Implantable Medical Device and Method of Measuring Motion Measurements Therefor.” *Id*. During prosecution of the ’228 patent’s counterpart in the European Patent Office, Philips admitted that Pacesetter’s European counterpart application was “the closest prior art” to the counterpart claims to those at issue here. RX-0026 at 1–2.

Pacesetter describes a motion sensor for an implantable medical device. JX-0144, Abstract. There is no dispute that Pacesetter discloses an “activity monitor,” as described in the preamble of claim 1 of the ’228 patent. Each limitation of claim 1 and 2 is addressed below:

**i. “a measurement unit”**

Pacesetter describes a motion sensor that includes two “transducers 202 and 204,” which “provide first and second acceleration signals, respectively, that are indicative of the accelerations experience by each transducer.” JX-0144 at 9:23-26, Fig. 2. There is no dispute that these are a plurality of motion sensors meeting the limitations of the claimed “measurement unit” of claim 1 of the ’228 patent.

**ii. “a processor”**

There is no processor explicitly depicted in Pacesetter, but the specification describes “[c]onductors . . . to provide current measurements indicative of sensor motion to signal

processing circuitry in the implantable medical device . . . ." JX-0144 at 15:42-45; *see also id.* at 10:14-17 ("the circuitry (not shown) used to measure the resistances from the two conductors (and calculate the accelerations therefrom) preferably reside in the implantable medical device."). The disclosed transducers provide acceleration signals over these conductors. *Id*. at 9:23-26 ("Over two conductors 208 and 210, the transducers 202 and 204 provide first and second acceleration signals"). Dr. Paradiso testifies that these disclosures indicate the presence of a "processor" meeting the limitations of claim 1 of the '228 patent. RX-0560C (Paradiso DWS) at Q/A 119-21. Staff agrees that the "processor" limitation is anticipated by Pacesetter. SIB at 68.

I agree with Respondents and Staff that this limitation is anticipated. Although there is no "processor" explicitly depicted in Pacesetter's figures, the operation of processing circuitry to measure resistances and calculate accelerations is explicitly described. Pacesetter describes such components receiving and processing the sensor signals, which anticipates this limitation.

**iii. "the activity monitor is operable to monitor and process the sensor signals discontinuously in time"**

For the "discontinuously in time" limitation, Respondents identify a portion of Figure 3 of Pacesetter, which depicts an "excitation voltage" for the motion sensors. RIB at 105-08. Pacesetter states: "The excitation signal emitted by the power source 314 is preferably a square wave." JX-0144 at 9:52-53.

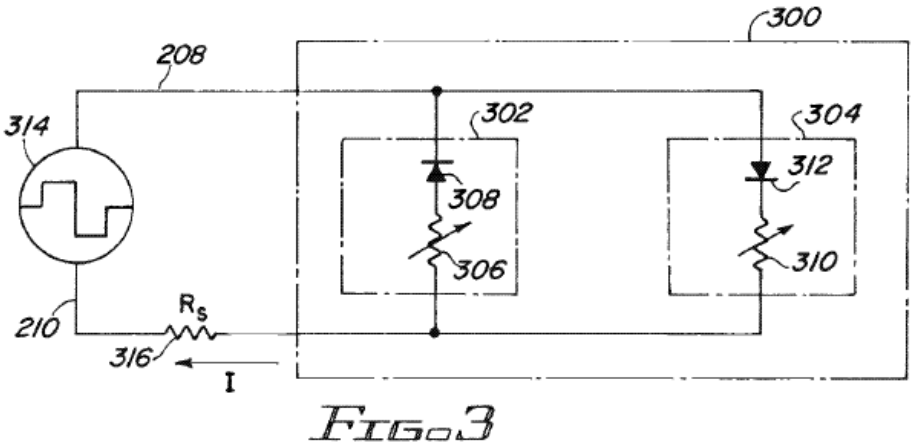



FIG. 3

Based on the depiction of the square wave of excitation signal 314 in Figure 3, Dr. Paradiso identifies "intervals of zero potential at the beginning and end of the readout cycle." RX-0560C at Q/A 124. He thus submits that the figure shows "one cycle of a square wave with a gap at the beginning and end, which is where the sensors will be off." Tr. at 210-11. Respondents contend that Pacesetter anticipates the "discontinuously in time" limitation based on Dr. Paradiso's interpretation of Figure 3. RIB at 105-08. Staff agrees that the depiction of the excitation signal in Figure 3 of Pacesetter is sufficient to show anticipation of this limitation. SIB at 67-68.

Philips disagrees with Dr. Paradiso's interpretation of Figure 3 of Pacesetter. CIB at 105-07; CRB at 36-40. There is no interval of zero potential described in the text of Pacesetter, and Dr. Young characterizes the depiction of excitation signal 314 in Figure 3 as "merely an electrical symbol used for identifying electrical components." CX-0014C at Q/A 40. Dr. Young submits that the description in Pacesetter is consistent with a repeating square wave, which alternates between activating each of the transducers. *Id.*; *see* JX-0144 at 9:53-56 ("The square wave must exhibit a voltage magnitude large enough to cause a voltage greater than the forward bias voltage of the diodes 308 and 312 to appeal across those diodes . . . only one accelerometer 306 or 310 will conduct current during each phase.").

On this record, I agree with Philips that the "discontinuously in time" limitation is not anticipated by Pacesetter. Although Dr. Paradiso offers a plausible interpretation of Figure 3 of Pacesetter to show discontinuous excitation of the transducers, this evidence is not clear and convincing. There is only one square wave depicted in Pacesetter's Figure 3, without any repeating cycle, and there is no gap between cycles described in Pacesetter's specification. Accordingly, it is not clear that Pacesetter discloses any interruption, pause, or break between periods that would anticipate the "discontinuously in time" limitation.

#### iv. "the processor is operable to monitor the sensor signals in turn"

Respondents rely on the same alternating signal in Pacesetter to meet the "in turn" limitation. RIB at 108-09. Pacesetter discloses that "only one of the diodes 308 and 312 is forward biased (turned on) during each phase of the excitation signal. Thus, only one accelerometer 306 or 310 will conduct current during each phase." JX-0144 at 9:56-60; *see also id*. at 7:5-13 ("In response to the excitation signal being in the first polarity, the first transducer conducts in a first direction while the second transducer does not conduct any current. Conversely, in response to the excitation signal being in the second polarity, the second transducer conducts in a second direction opposite the first direction, while the first transducer does not conduct. The first and second motion measurements are taken when the respective first and second transducers conduct current."). Staff agrees with Respondents that this limitation is anticipated by Pacesetter. SIB at 68-69.

Philips argues that this limitation is not anticipated because Pacesetter fails to disclose how any processor monitors the sensor signals. CIB at 107-08. Dr. Young criticizes Dr. Paradiso's opinions for focusing on the generation of sensor signals rather than the

monitoring claimed in the '228 patent. CX-0014C (Young RWS) at Q/A 41-42. Philips submits that this evidence is insufficient to show anticipation of the "in turn" limitation. CRB at 40-41.

I agree with Philips that Pacesetter does not anticipate the "in turn" limitation. As discussed above in the context of infringement, the claimed "monitoring" in the '228 patent is more than merely receiving the sensor signals. Pacesetter does not describe the operation of the processor with respect to the alternating sensor signals, and there is no indication that the processor monitors the signals "in turn." The alternating signal in Pacesetter that causes the accelerometers to activate in turn is provided by the power source, not a processor. *See* JX-0144 at 9:50-60. The disclosure of alternating signals in Pacesetter, without the involvement of the processor, is insufficient to anticipate the '228 patent claim, which requires that "the processor is operable to monitor the sensor signals in turn."

**v. "the measurement unit is operable to output the sensor signals discontinuously in time"**

For the same reasons discussed above with respect to the "discontinuously in time" limitation of claim 1, Pacesetter does not anticipate the "discontinuously in time" limitation of claim 2.

Accordingly, claim 2 of the '228 patent is not anticipated by Pacesetter.

**c. Graham**

Brian B. Graham is the author of a thesis, "Using an Accelerometer Sensor to Measure Human Hand Motion," which was submitted to the Department of Electrical Engineering and Computer Science at the Massachusetts Institute of Technology on May 11, 2000. JX-0161. Library records indicate that Graham was publicly available as early as July 27, 2000, and no later than June 1, 2001. *See* RX-0560 (Paradiso DWS) at Q/A 135; JX-0170; JX-0171.

Graham describes the development of a three-axis accelerometer used for measuring human hand motion. JX-0161, Abstract. There is no dispute that Graham discloses an "activity monitor," as described in the preamble of claim 1 of the '228 patent. Each limitation of claim 1 and 2 is addressed below:

**i. "a measurement unit"**

There is no dispute that Graham discloses a "measurement unit." RIB at 111. One of the goals of the project was to "showcase a specific accelerometer fabricated by the MIT Microsystems Laboratory." JX-0161 at 12. Graham describes "three accelerometers in the fingertip sensor to sense three-dimensional motion." *Id*. at 46.

**ii. "a processor"**

Graham describes several stages of processing for sensor data from the accelerometers. "Each accelerometer is connected to a linear variable differential transformer (LVDT) signal conditioner IC, which converts the differential capacitance into an analog voltage proportional to the proof mass position in the die." *Id*. "The analog outputs of the LVDT signal conditioners from each acceleration axis are passed through anti-aliasing filters and then into separate channels of a 4-channel 16-bit analog-to-digital converter (ADC). The serial digital output from the ADC is passed to a first-in-first-out (FIFO) buffer on the digital board, which both buffers the data and converts the serial signal into a parallel signal." *Id*. These processing steps are depicted in Figure 5-1 of Graham. *Id*.



Dr. Paradiso identifies Graham's sensor electrical circuit, including both the analog and digital processing, as the claimed "processor" of the '228 patent. RX-0560C (Paradiso DWS) at Q/A 139-41. Staff agrees that these circuits comprise the claimed "processor." SIB at 70. Philips does not dispute that there are disclosures in Graham that meet the "processor" limitation of the '228 patent. CIB at 109-113.[13]

Accordingly, Graham anticipates the "processor" limitation.

[13] In their post-hearing brief, Respondents identify the laptop in Figure 5-1 as the claimed "processor," treating the analog and digital processing as part of the claimed "measurement unit." RIB at 111-113. Complainants argue that Respondents should be precluded from identifying the Graham's laptop as the "processor," because that is different from the one disclosed in their pre-hearing brief, where Respondents only identified the analog and digital processing circuitry as the claimed "processor." CRB at 43-46 (citing RPHB at 145-147); *see also* SPHB at 52-53. I agree with Complainants that Ground Rules 8.2 and 11.1 preclude Respondents from raising new invalidity contentions. Order No. 2 at 18, 32; *see Certain Integrated Circuit Chips and Products Containing the Same*, Inv. No. 337-TA-859, Comm'n Op. at 23 (Aug. 22, 2014) (finding invalidity argument waived). Respondents' new post-hearing contentions will not be entertained—the invalidity arguments addressed herein are those raised in Respondents' pre-hearing briefs and Staff's post-hearing briefs, supported by Dr. Paradiso's testimony.

### iii. "the activity monitor is operable to monitor and process the sensor signals discontinuously in time"

Respondents submit that the operation of the FIFO in Graham meets the "discontinuously in time" limitations. RIB at 113-17. "The FIFO receives 2000 to 6400 bytes per second, which allows the computer software to delay acquiring the data 1 to 0.31 seconds before the buffer overflows and data is lost." JX-0161 at 61. Dr. Paradiso explains that Graham thus discloses bursts of data from the FIFO that are separated by delays in time. RX-0560C at Q/A 147. Respondents [redacted] which describes "Defer" functions:

[redacted]

JX-0161 at 64. Graham describes the data acquisition steps: "If the memory capacity flags indicate the FIFO has data available, a parallel port control line connected to the read pin on the

FIFO is switched, loading the next byte of data into the FIFO output registers." *Id*. at 65. Graham further describes a process where "Visual Basic programs need to periodically defer use of the computer's CPU to allow low-level processes to run, such as responding to keyboard data entry of mouse clicks." *Id*. In the system described in Graham, "deferral occurs once each second." *Id*. At the hearing, Dr. Paradiso explained that no data is obtained from the FIFO during the deferral, creating interruptions or breaks that meet the "discontinuous in time" limitation. Tr. at 243-45. Staff agrees that the operation of the FIFO meets the "discontinuous in time" limitation. SIB at 70-72.[14]

Philips argues that there is no evidence of Graham's FIFO being used to burst data intermittently. CIB at 113-15. Dr. Young explains that the FIFO outputs data continuously because the acquisition cycle in Graham states that a byte is read from the FIFO whenever data is available. CX-0014C at Q/A 50. Dr. Young identifies disclosures in Graham describing data that is "sampled in sequence in an endless loop." *Id*. at Q/A 52.

I agree with Philips that Graham does not disclose "bursts" of data, as claimed by Dr. Paradiso. Nevertheless, I find that the deferral cycle depicted in Figure 6-1 of Graham meets

[14] Staff also references a second argument that was raised in Respondents' pre-hearing brief. SIB at 70; RPHB at 149-50. Graham describes "a variable sampling frequency," which can be "adjusted by hand by changing a potentiometer on the digital board." JX-0161 at 70. Graham explains that the sampling frequency is limited by "the rate of data acquisition and processing by the software," and "the sampling frequency needs to be decreased to avoid overflowing the FIFO." Dr. Paradiso opines that this variable sampling frequency meets the "discontinuous in time" limitation. RX-0560C (Paradiso DWS) at Q/A 146. Dr. Young disagrees with this interpretation, however, suggesting that the variable sampling frequency represents continuous monitoring of sensor signals for the purpose of avoiding pauses, interruptions, or breaks. CX-0014C (Young RWS) at Q/A 48. Based on the identified disclosures and expert testimony, I find that this limitation is not anticipated by the variable sampling frequency in Graham—there is no evidence that this sampling frequency creates the pauses, interruptions, or breaks in data that are required by this limitation.

the "discontinuously in time" limitation of the '228 patent. As disclosed in Graham and explained by Dr. Paradiso at the hearing, the one-second deferral cycle creates interruptions or breaks that meet the "discontinuously in time" limitation, as it has been construed. Moreover, because processing follows the output of data from the FIFO, both the monitoring and processing of sensor signals is discontinuous. The "discontinuously in time" limitation is thus anticipated by Graham.

#### iv. "the processor is operable to monitor the sensor signals in turn"

Graham discloses an analog-to-digital converter (ADC) in its processing circuitry, describing its operation:

> The ADC has four channels—three are used for each of the three accelerometer channels, and the fourth is used as a parsing channel. The fourth channel is railed to above the valid input range, so the ADC output for that channel will always be the maximum. As the four channels are sampled in sequence in an endless loop, each time a channel is the maximum value the data acquisition program can recognize this channel as the parsing channel and correctly process the following three data channels correctly.

JX-0161 at 57. Dr. Paradiso relies on these disclosures when opining that the "in turn" limitation is anticipated by Graham. RX-0560C at Q/A 150. Staff submits that this operation of the ADC meets the "in turn" limitation of the '228 patent. SIB at 54-55.[15]

[15] Respondents rely on an alternate theory of anticipation for the "in turn" limitation, pointing to the transfer of data to Graham's laptop over a parallel cable. RIB 117-18. This theory relies on a contention that the laptop is the claimed "processor," but as discussed *supra*, n.13, Respondents did not raise this contention in their pre-hearing brief. Even if this theory had not been waived, Respondents have not identified sufficient evidence to anticipate this limitation. Although Graham indicates that these signals would be sent in the same sequence that the accelerometers were originally sampled, Respondents fail to specify any "monitoring" operations performed by the laptop—the sampling loop is controlled by the analog circuitry and is not monitored by the laptop.

Complainants argue that the acquisition of data from the ADC relates to the sampling of sensor signals rather than the claimed monitoring. CIB at 118. The '228 patent does not make this distinction between sampling and monitoring, however, as discussed above in the context of the Cunningham reference. Accordingly, the sampling loop of Graham anticipates the "in turn" limitation of the '228 patent.

Graham thus anticipates each limitation of claim 1 of the '228 patent.

#### v. "the measurement unit is operable to output the sensor signals discontinuously in time"

As discussed above in the context of claim 1, the data acquisition from the FIFO in Graham meets the "discontinuously in time" limitation for monitoring and processing sensor signals. These are functions of the claimed "processor," however, and the data acquisition flow for the FIFO does not affect the output of sensor data from the accelerometer sensors and related components identified by Respondents as the claimed "measurement unit." *See* CIB at 120.[16] Accordingly, the "discontinuously in time" limitation of claim 2 is not anticipated, and Graham does not anticipate claim 2 of the '228 patent.

### 2. Obviousness

Respondents contend that claim 2 of the '228 patent is obvious in view of the Texas Instruments 3-V Accelerometer Featuring TLV2772 Application Report ("TI Application Report", JX-0159). RIB at 119-29. The TI Application Report was published in 1998. RX-0560C (Paradiso DWS) at Q/A 186; JX-0159, cover.

[16] As discussed above, Respondents alternative theory based on Graham's "variable sampling frequency" does not show anticipation of the "discontinuously in time" limitation. Moreover, the "variable sampling frequency" only affects the operation of the claimed "processor," not the claimed "measurement unit."

The TI Application Report describes a "complete solution for digital measurement of acceleration." JX-0159 at 3. There is no dispute that the TI Application Report discloses an "activity monitor," as described in the preamble of claim 1 of the '228 patent. Each limitation of claim 1 and 2 is addressed below:

**a. "a measurement unit"**

There is no dispute that the TI Application Report discloses a "measurement unit." RIB at 120. The device that is described includes a "shock sensor" that "converts mechanical acceleration into electrical signals." JX-0159 at 7. "The shock sensor contains three piezoelectric sensing elements oriented to simultaneously measure acceleration in three orthogonal linear axes." *Id.*

**b. "a processor"**

The TI Application Report further discloses "Signal Conditioning" and analog-to-digital conversion. JX-0159 at 7. The "Signal Conditioning" includes an "operational amplifier" that "provides amplification and frequency shaping of the shock sensor output." *Id.* Respondents identify these components as the claimed "processor." RIB at 121. The flow of sensor data in the TI Application Report is depicted in Figure 1-1:

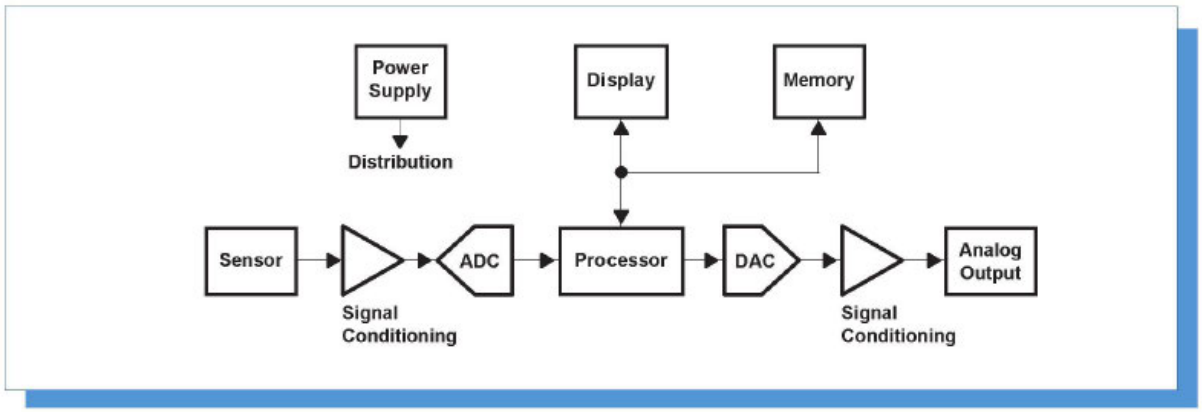



Figure 1–1. Typical Analog Data Collection System

JX-0159 at 5. Accordingly, the TI Application Report discloses a "processor" that meets this

limitation.

**c. "the activity monitor is operable to monitor and process the sensor signals discontinuously in time"**

Respondents contend that the "discontinuously in time" limitations of claim 1 are rendered obvious by the TI Application Report in combination with a FIFO buffer. RIB at 121-27. Respondents identify references to a "Burst Mode" and a sleep mode in the TI Application Report. JX-0159 at 29, 30; *see* RX-0560C (Paradiso DWS) at Q/A 195. Respondents argue that it would have been obvious to one of ordinary skill in the art to combine a FIFO buffer with the TI Application Report's device to implement the disclosed burst mode and sleep mode. RIB at 124-27.

There is no dispute that FIFO buffers were known to those of ordinary skill in the art at the time of the '228 patent, but Philips disputes whether it would have been obvious to combine a FIFO buffer with the TI Application Report. CRB at 50-56.

Dr. Paradiso submits that the use of a FIFO buffer would have been an obvious choice for one of ordinary skill in the art to implement the burst function described in the TI Application Report. RX-0560C at Q/A 200, 201. In his opinion, a FIFO buffer would be the natural choice for this system because it keeps the data signals in order. *Id*. at Q/A 202, 203. He further submits that a person of ordinary skill in the art would have been motivated to facilitate larger bursts, using a FIFO buffer as an obvious implementation. *Id*. at Q/A 204. Respondents argue that using a FIFO buffer in the device described in the TI Application Report would increase efficiency without adding complexity. RIB at 127. Staff agrees with Respondents that the "discontinuously in time" limitation would be obvious in view of the TI Application Report in combination with a FIFO buffer. SIB at 74-75.

Philips argues that Dr. Paradiso fails to offer any credible motivation for combining the

TI Application Report device with a FIFO buffer. CRB at 50-56. Dr. Young notes that there are no details describing the operation of the burst mode referenced in the TI Application Report, and he explains that the addition of a FIFO buffer would not necessarily result in a device that monitors signals "discontinuously in time." CX-0014C (Young RWS) at Q/A 73, 75. Philips argues that Dr. Paradiso relies on hindsight to incorporate a FIFO buffer into the device described in the TI Application Report. CRB at 52.

I agree with Philips that Respondents have failed to carry their clear and convincing burden to show that this limitation is obvious. Respondents fail to identify any disclosure in the TI Application Report explaining the operation of its "burst mode," and the only evidence that is offered in support of the contention that one of ordinary skill in the art would have been motivated to use a FIFO buffer to facilitate larger bursts of data is Dr. Paradiso's conclusory testimony. Respondents rely heavily on Dr. Young's opinions that FIFO buffers were known by persons of ordinary skill to be used for monitoring signals discontinuously in time at the time of the '228 patent. *See* CX-0014C (Young RWS) at Q/A 89. But even if this testimony is credited, it does not necessarily follow that it would have been obvious to modify any prior art reference to incorporate the use of a FIFO buffer. There is no evidence in the TI Application Report that the device described therein would be improved by the addition of a FIFO buffer for monitoring signals discontinuously in time. Respondents have failed to identify a credible reason to modify the prior art, and they have thus failed to show that this limitation is obvious.

**d. "the processor is operable to monitor the sensor signals in turn"**

Respondents submit that the TI Application Report discloses monitoring the sensor signals "in turn" because there is evidence that data is transferred using a serial interface. RX-0560C (Paradiso DWS) at Q/A 270; JX-0159, Fig. 5-6, Appendix A. As discussed above in the

context of infringement, however, the use of a serial interface is not sufficient to show that this limitation is met. Accordingly, Respondents have failed to show that the "in turn" limitation is rendered obvious by the TI Application Report.

**e. "the measurement unit is operable to output the sensor signals discontinuously in time"**

With respect to the "discontinuously in time" limitation of claim 2, Respondents rely on a combination of the TI Application Report and a FIFO buffer. RIB at 121-27. As discussed above in the context of claim 1, Respondents have failed to establish that it would have been obvious to one of ordinary skill in the art to combine the TI Application Report with a FIFO buffer to implement a device that monitors signals "discontinuously in time." Accordingly, the "discontinuously in time" limitation of claim 2 has not been shown to be invalid as obvious.

Respondents have failed to carry their burden to show that claim 2 of the '228 patent is invalid as obvious in view of the TI Application Report in combination with a FIFO.

**3. Written Description**

Respondents allege that claim 1 of the '228 patent fails the written description requirement with respect to the "discontinuously in time" and "in turn" limitations. RIB at 129-36. To comply with the written description requirement of 35 U.S.C. § 112, "the specification must describe an invention understandable to that skilled artisan and show that the inventor actually invented the invention claimed." *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010). The Federal Circuit held that "the level of detail required to satisfy the written description requirement varies depending on the nature and scope of the claims and on the complexity and predictability of the relevant technology." *Id*. at 1351.

**a. "discontinuously in time"**

Claim 1 requires the activity monitor to "monitor and process the sensor signals discontinuously in time." The specification discloses several examples of discontinuous monitoring and processing, where the processor intermittently enters a standby (or sleep) mode. '228 patent at 2:38-68. The processor can enter the standby mode for "a predefined period of time" or a "variable time interval" based on software. *Id*. In a separate embodiment, the specification provides that "power reduction could be achieved by switching off the monitoring unit itself, such that the accelerometers or motion sensors are only active for a discontinuous amount of time." *Id*. at 3:3-6.

Respondents argue that the written description requirement is not satisfied because the specification only discloses embodiments where the processor is turned off, skipping sensor data that is obtained by the motion sensors. RIB at 129-33. They submit that there is no written description support for discontinuous monitoring and processing based on the accumulation of sensor data in memory that is periodically transferred to the processor. *Id*. Respondents emphasize that periodically transferring data from memory does not skip any data, which they argue is a feature of the accused products that is not disclosed in the specification. *Id*.

Philips argues that the '228 patent specification discloses several embodiments of discontinuous monitoring and thus supports a broader scope for the claim language. CRB at 57-60. Philips submits that the use of memory buffers was known at the time of the invention, and one of skill in the art would have understood such an implementation to be within the scope of the invention. *Id*. Staff agrees with Philips that the written description requirement is satisfied. SRB at 28.

I agree with Philips and Staff that the "discontinuously in time" limitation is adequately supported by the written description of the '228 patent. The Federal Circuit has held that "the law does not require that an applicant describe in his specification every conceivable and possible future embodiment of his invention." *Superguide Corp. v. DirecTV, Enter. Inc.,* 358 F.3d 870, 880 (Fed. Cir. 2004). Respondents' reading of the specification is overly restrictive, because there are multiple embodiments of the invention, including an embodiment where the accelerometers or motion sensors are only active for a discontinuous amount of time, which would not generate any sensor signals that are skipped. *See* '228 patent at 3:3-6. The inventors were not required to describe a FIFO buffer to satisfy the written description requirement.

**b. "monitor the sensor signals in turn"**

Respondents further argue that the written description requirement is not satisfied with respect to the "in turn" limitation. RIB at 133-36. The term "in turn" only appears in the claim language, with no reference to any sequential monitoring of sensor signals in the description of any embodiment in the specification. The "monitor the sensor signals in turn" limitation was part of a dependent claim in the originally filed patent application. JX-0004.009, U.S. Appl. No. 10/537,878 at 5 (Jun. 7, 2005). During prosecution, the applicant explicitly stated the meaning of this claim language:

> [T]he Appellant respectfully asserts that the plain meaning of claim limitation "in turn" as recited in dependent claims 4 and 13 and consistent with the specification comprises a sequentially ordered non-overlapping monitoring of the sensors (e.g., a time-division monitoring of the sensors). In other words, the plain meaning of the limitation "in turn" encompasses the sensor signals are monitored one after the other (i.e., in due order of succession).

JX.0004.318, BPAI Appeal Brief at 9-10 (Apr. 1, 2008). In the *Markman* order, this limitation was construed in accordance with this prosecution history statement. Order No. 25 at 15-18.

Philips argues that the written description limitation is satisfied by the recitation of the "in turn" limitation in the claim language of the original application. CIB at 132-34. *See Mentor Graphics Corp. v. EVE-USA, Inc*. 851 F.3d 1275, 1297 (Fed. Cir. 2017) ("Original claims are part of the original specification and in many cases will satisfy the written description requirement."). Staff agrees with Philips that the original application provided sufficient written description for this limitation. SRB at 28-29.

There is no dispute that the "in turn" claim language was recited in the original specification, but the critical question for the written description requirement is whether one of ordinary skill in the art would have read this language to have disclosed the sequential monitoring of sensor signals that was described later during prosecution. Respondents rely on the testimony of Dr. Paradiso, who offers his opinion that one of ordinary skill "would have no basis to think that, based on the application, the '228 patent's inventors actually invented, possessed, or contemplated, 'sequentially ordered non-overlapping monitoring of the sensor signals.'" RX-0560C (Paradiso DWS) at Q/A 214. Philips offers rebuttal testimony from Dr. Young, who finds the '228 patent specification sufficient for one of ordinary skill in the art to understand that the inventors invented, possessed, or contemplated this limitation. CX-0014C (Young RWS) at Q/A 88. The opinions of both experts are wholly conclusory, and I do not find any of this testimony to be helpful for determining whether one of ordinary skill in the art would have read the "in turn" claim language to disclose sequentially ordered monitoring. There is no convincing evidence in the record showing what one of ordinary skill in the art would have understood from the "in turn" language in the claims. Because it is Respondents' burden to prove invalidity by clear and convincing evidence, I find that a failure to satisfy the written description requirement has not been proven.

### 4. Inventorship

Respondents contend that claim 2 of the '228 patent is invalid because the inventors did not invent what is claimed in the patent. RIB at 136-40. A patent claim may be invalid when a named inventor "did not himself invent the subject matter sought to be patented." 35 U.S.C. § 102(f) (2000). The "inventors as named in an issued patent are presumed to be correct," and incorrect inventorship must be proven by clear and convincing evidence. *Hess v. Advanced Cardiovascular Sys., Inc.*, 106 F.3d 976, 979-80 (Fed. Cir. 1997).

Relying on inventor testimony, Respondents submit that the device that was actually in the possession of the inventors did not have a FIFO buffer to output sensor data discontinuously, and that the prototype device output sensor data using three parallel connections, rather than a serial interface. *Id.*; Tr. (Young) at 381-82; RX-0543C (Rommers Dep.) at 91-92; RX-0539C (Bremer Dep.) at 73; RX-0117. Philips and Staff argue that Respondents have failed to meet the clear and convincing standard for challenging inventorship. CRB at 61-62; SIB at 79-80.

I agree with Philips and Staff that no improper inventorship has been shown. The '228 patent itself is *prima facie* evidence for inventorship, and Respondents have not overcome the statutory presumption. Respondents rely on evidence that certain elements of the invention were missing from the inventors' documents and testimony, but inventors are not required to show actual reduction to practice. The Federal Circuit has held that patentees can rely on "a constructive reduction to practice that in a definite way identifies the claimed invention." *Ariad Pharm.*, 598 F.3d at 1352. As discussed above, Respondents dispute whether the disclosure in the specification is sufficient to describe the claimed invention, but that issue is properly addressed in the context of 35 U.S.C. § 112, not 35 U.S.C. § 102(f). Respondents have not established any independent ground for invalidity based on improper inventorship.

### G. Patent Exhaustion

Under the patent exhaustion doctrine, two factors must be demonstrated to establish that the doctrine applies: (1) there must be an authorized sale of a product that practices the patent; and (2) the accused product must substantially embody the patented invention. RIB at 141 (quoting *Quanta Computer, Inc. v. LG Electronics, Inc.,* 553 U.S. 617, 630-38 (2008)). Complainants maintain that Respondents have failed to establish both factors.

#### 1. Background

The basis for the allegation of patent exhaustion is [redacted] JX-0117C. Respondents claim that Complainants' rights in the '228 patent were exhausted [redacted]. RIB at 141.

Philips maintains, to the contrary, that [redacted] CIB at 138. Philips points to the [redacted] *Id.* (citing JX-0117C at ¶ 1.13).

Philips states further that [redacted] *Id.* at 142 (citing CX-0001C (Wieghaus WS) at Q/A 18.[17] As a result, Philips contends, [redacted], that patent still is assigned to Complainants. CX-0001C (Wieghaus WS) at Q/A 21 (citing JX-0187).

Respondents counter that there is no evidence that [redacted] consented to have [redacted] Respondents state that when Philips advised [redacted] that Philips was [redacted]

[redacted]

RIB at 146 (quoting CX-0215C). Respondents note that Philips requested that it [redacted] *Id.* Respondents maintain that this is insufficient evidence of consent [redacted]

With respect to the issue of substantial embodiment, Philips argues that the accused products do not substantially embody the asserted claims because the [redacted] in the

[17] Mr. Wieghaus is a Philips attorney of long standing, with responsibility for Philips's licensing program. CX-0001C at ¶ 3-4. The extent to which he has personal knowledge of the matters on which he testifies is unclear. *See* Tr. at 52:6-13. Testimony from a fact witness who lacks personal knowledge is of no evidentiary value. *See also* G.R. 9.2 (Legal experts may only testify as to procedures of the U.S. Patent and Trademark Office).

accused products are sold with several modes of operation, including a "FIFO mode" and a "Bypass mode," and that the end user determines which mode is used. CIB at 140. According to Philips, the accused products are designed by Respondents [redacted] Philips also states that the accused products could not practice the '228 patent if they operated in the bypass mode because there would be "no monitoring or outputting of the sensor signals discontinuously in time." *Id.* at 140-141.

Because potential use of the accused chips in the bypass mode was intended by the patentees, Philips asserts, [redacted] have a non-infringing use and therefore, under the law of exhaustion, do not substantially embody the '228 patent. "Because the Bypass Mode is a standard configuration for all the accelerometer chips at issue in this Investigation, and was reasonably available for the Respondents to utilize, the use of the Bypass Mode is 'reasonable,'" Philips contends. *Id.* at 141 (citing *LifeScan Scotland, Ltd. v. Shasta Techs., LLC,* 734 F.3d 1361, 1369 (Fed. Cir. 2013). Philips argues that [redacted] explicitly describes the bypass mode as a potential mode to its customers in its accelerometer data sheets.

Respondents contend that the [redacted] chip packages substantially embody the '228 patent because the chip packages embody the inventive aspects of the patents, and the accused feature of the chip packages has no reasonable noninfringing use "if [Complainant's] infringement theory is accepted." RIB at 141.

Staff maintains that Respondents have not met the requirements to satisfy the exhaustion defense. Staff says that Respondents have not proved an authorized sale, since the [redacted], and the [redacted] in the accused

products does not substantially embody the patented invention. SIB at 80-82.[18]

**2. Discussion**

The authorized sale of an article that substantially embodies a patent exhausts the patent holder's rights and prevents the patent holder from invoking patent law to control post-sale use of the article. *Quanta Computer, Inc. v. LG Elecs., Inc.*, 553 U.S. 617, 638 (2008). "The doctrine of patent exhaustion provides that the initial authorized sale of a patented item terminates all patent rights to that item." *Quanta*, 553 U.S. at 625. "Exhaustion protects an authorized acquirer's freedom from the legal restrictions imposed by the patent statute." *Helferich Patent Licensing, LLC v. New York Times Co.*, 778 F.3d 1293, 1301 (Fed. Cir. 2015). "Specifically, once there has been an authorized sale of a patented item, that sale "'confers on the purchaser, or any subsequent owner, 'the right to use [or] sell' the thing as he sees fit." *Id.* at 1301 (quoting *Bowman v. Monsanto Co.,* 133 S. Ct. 1761, 1766 & n. 2 (2013)).

**a. No Authorized Sale**

"'Exhaustion is triggered only by a sale authorized by the patent holder.'" *JVC Kenwood Corp. v. Nero, Inc*., 797 F.3d 1039, 1046 (Fed. Cir. 2015) (quoting *Quanta,* 553 U.S. at 636). "[I]f the thing that is sold 'substantially embodies' patented subject matter owned by the entity that authorized the sale, then the patent is exhausted as to the thing sold." *Id.* (citing *Quanta,* 553 U.S. at 638). Respondents bear the burden of establishing the affirmative defense of patent exhaustion. *See Qualcomm Inc. v. Apple Inc.,* No. 17cv1375 DMS(MDD), 2019 WL 448278, at *1 (S.D. Cal. Feb. 5, 2019) ("As the party asserting patent exhaustion, Apple bears the burden of proving the elements of that defense."). Philips contends that "[b]ecause Respondents have not

[18] I find no independent analysis of the substantial embodiment issue in Staff's brief.

demonstrated that [redacted] has a license as to the '228 patent, they are unable to satisfy their burden of showing [redacted] was an 'authorized' sale." CIB at 144.

**i. Inclusion of the '228 patent in the [redacted]**

[redacted] JX-0117C at ¶ 1.07 (emphasis added).

The application for the '228 patent was filed on November 21, 2003, claiming priority to a foreign application filed on December 10, 2002, and the patent was issued on December 7, 2010. JX-0001, cover. [redacted]. *Id*., § 6.01; *see* CPHB at 346.

Philips maintains, to the contrary, that the '228 patent was not licensed [redacted]. CIB at 142-44. Based on my reading of the contract, however, I must give effect to [redacted]

**ii. [redacted]**

In support of its argument that the '228 patent was not licensed under the [redacted], Philips points to [redacted]. CX-0215C. There is no dispute

that [redacted] *See* RIB at 145-46. Philips submits, however, that rights to the '228 patent [redacted]. CX-0001C (Wieghaus WS) at Q/A 20-21. Philips cites the assignment records for the '228 patent, which show that the patent is owned by Philips, [redacted]. JX-0187.

Philips argues: [redacted] CIB at 143. Apparently, Philips reasons [redacted] Respondents, however, argue that the licenses granted to [redacted].[20]

I find that [redacted] reasonably may have believed that it continued to have rights in the '228 patent by virtue of the [redacted]. At least, nothing in the record indicates why ST would have objected if it assumed, based on the [redacted] Philips and Staff seem to take the view that because Respondents have the ultimate burden of persuasion as to the affirmative defense of exhaustion, they invariably carry the evidentiary burden. This is not true with respect to evidence that Philips has itself introduced into the record to rebut Respondents' exhaustion

[19] [redacted]

[20] The agreement provides that it "[redacted] JX-0117C at § 6.01

defense. As it stands, Respondents have made a *prima facie* showing that [redacted], and Philips has produced insufficient evidence to rebut this finding.

### iii. Impact of Contract Limitations

The parties also dispute the impact of certain [redacted] Respondents point to the [redacted] JX-0117C at ¶ 4.01(i).

Philips, on the other hand, points to [redacted] *Id.*¶ 4.01. Philips says this [redacted]. *Id.* (quoting JX-0117C at ¶ 4.01). "In other words," Philips states, "[redacted] CIB at 139.

Respondents argue that Philips's reliance on [redacted] is misplaced. They cite *Quanta* as precedent. In that case, Respondents argue: "LGE and Intel executed a cross-licensing agreement, which permitted 'Intel to manufacture and sell microprocessors and chipsets that use the LGE Patents.'" RRB at 75 (quoting *Quanta,* 553 U.S.

at 623). The Court's rationale for applying the exhaustion doctrine in *Quanta,* however, is inapplicable here, as explained below.

*Quanta* explains that the patent exhaustion doctrine curbs efforts by inventors to limit the use of their patents after sale. The Court says: "'the scope of the grant which may be made to an inventor in a patent, pursuant to the [patent] statute, must be limited to the invention described in the claims of his patent.'" *Quanta,* 553 U.S. at 626 (quoting *Motion Picture Patents Co. v. Universal Film Mfg. Co.,* 243 U.S. 502, 518 (1917). Accordingly, the Supreme Court opines that "the right to vend is exhausted by a single, unconditional sale, the article sold being thereby carried outside the monopoly of the patent law and rendered free of every restriction which the vendor may attempt to put upon it." *Id.* at 626 (quoting *Motion Picture,* 243 U.S. at 516).

The Supreme Court in *Quanta* relied on facts showing that "'the only apparent object of Intel's sales to Quanta was to permit Quanta to incorporate the Intel Products into computers that would practice the patents.'" *Quanta,* 553 U.S. at 632. [redacted] per the *Quanta* decision itself. In *Quanta*, the Supreme Court applied the exhaustion doctrine in part because: "Nothing in the License Agreement restricts Intel's right to sell its microprocessors and chipsets to purchasers who intend to combine them with non-Intel parts. It broadly permits Intel to 'make, use, [or] sell' products free of LGE's patent claims." Quanta, 553 U.S. at 636 (alteration in original). [redacted]. *See* JX-0117C

at ¶ 4.03. [redacted]

[redacted]

**b. No Substantial Embodiment**

Patent exhaustion applies only when the allegedly licensed component "substantially embodies" the patented invention. *Quanta*, 553 U.S. at 617–18. "'Substantial embodiment'" is established if (1) the only reasonable and intended use of the article is to practice the allegedly exhausted patent; and (2) the article embodies the essential or inventive features of the allegedly exhausted patent. *Id.* at 631-32); *LifeScan Scotland, Ltd. v. Shasta Techs., LLC,* 734 F.3d 1361, 1368-70 (Fed. Cir. 2013). To determine that the article sold has a reasonable and intended use that does not practice the patent, "the features partially practicing the patent . . . must have an alternative use.' *Quanta,* 553 U.S. at 632 n. 6.

The sale of a component part [redacted] may exhaust the patent if the relevant features upon which an infringement claim is based do not have a reasonable and intended non-infringing use. *Id*. at 631–32. Philips's infringement theory is based on the Respondents' use of [redacted]. Respondents contend that Philips's sole argument on the exhaustion issue is not that the accused feature [redacted] can be used in a noninfringing way, but rather that it can be disabled and, thus, not used at all. Respondents contend that there must be an actual use of the allegedly infringing features that does not infringe. RIB at 152 (citing *Quanta,* 553 U.S. at 632 n.6).

Respondents argue that Complainants have not demonstrated that the [redacted]. According to Respondents, Philips's infringement theory is that [redacted] meets the claim limitations regarding discontinuity, and thus establishes infringement. *Id.* at 153-154 (citing CX-0012C (Young DWS) at Q/A 45 (opining

that there is infringement [redacted]). In short, Respondents say, if Philips is correct about infringement, then '[redacted] *Id.*

Philips maintains that Respondents misstate the infringement argument. Philips says the component that partially practices the '228 patent [redacted]. Philips says this necessarily defeats Respondents' argument [redacted]. As discussed above in context of infringement and the domestic industry requirement, the '228 patent is only infringed where [redacted]. Accordingly, [redacted] do not "substantially embody" the patent.

For this reason and the reasons set forth above, I find that Respondents have not carried the burden to establish the exhaustion defense with respect to the'228 patent.

## VI. THE '464 PATENT

### A. Background and Asserted Claims

The '464 patent is titled "Continuous Transdermal Monitoring System and Method," naming inventors James Tyler Frix, Andrew Johnson, James Mitchell Frix, and Robert Andrew Taylor. JX-0002 ("the '464 patent"), cover. The patent issued from an application filed on April 18, 2016, claiming priority to an application originally filed on July 7, 2014. *Id*.

The '464 patent describes a method for continuous transdermal monitoring ("CTM") of the human body, including by "measuring pulse oximetry of a subject." *Id*. at 4:24-33. CTM may also include measurements of "pulse rate, blood oxygen saturation, transdermal core temperature, Global Positioning System ('GPS') coordinates, 3-axis accelerometer outputs, skin and ambient temperature readings, hydration levels, and barometric readings." *Id*. at 4:33-40.

The invention described includes "algorithms for collecting accurate pulse oximetry readings, as well as other sensor readings, by minimizing the effects of motion artifact errors when the reading(s) is taken." *Id.* at col. 6:30-33. "An exemplary algorithm involves measuring when user motion and/or movement is at a minimum." *Id*. at 6:33-35.

Philips alleges that claims 1 and 6 of the '464 patent are infringed by the pulse oximetry functionality of the accused Garmin devices and practiced by the heartbeat functionality of Philips's domestic industry product, the Philips Health Band. Claim 1 of the '464 patent recites:

> 1. A method for minimizing the effects of motion artifact on sensor readings taken during continuous transdermal monitoring of a body part in motion, the method comprising:
>
> monitoring, with a processor, an output signal from an accelerometer, wherein the output signal indicates acceleration and deceleration of the body part of a user as the body part is in motion;
>
> determining, with the processor, that the output signal is within a predetermined range that includes indication of acceleration and deceleration, wherein indication of acceleration and deceleration corresponds with a motion direction change of the body part in motion;
>
> based on the determination that the output signal is within the predetermined range, monitoring, with the processor, a plurality of readings from a sensor, wherein monitoring the plurality of readings from the sensor occurs over a time window that coincides with the output signal remaining within the predetermined range; and
>
> recording in a memory device the monitored plurality of readings from the sensor.

*Id*., col. 20:30-51. Claim 6 depends from claim 1 and requires that the accelerometer be "a 3-axis accelerometer." *Id.*, col. 20:66-67.

### B. Claim Construction

During claim construction proceedings, the parties disputed the constructions of two limitations: (1) "a predetermined range that includes indication of acceleration and deceleration, wherein indication of acceleration and deceleration corresponds with a motion direction change

of the body part in motion" and (2) "based on the determination that the output signal is within the predetermined range, monitoring, with the processor, wherein monitoring the plurality of readings from the sensor occurs over a time window that coincides with the output signal remaining within the predetermined range."

The *Markman* order found that the "predetermined range" limitation requires a "predetermined range of acceleration and deceleration based on the output signal of the accelerometer that corresponds with a change in direction of the body part in motion being monitored." Order No. 26 (July 27, 2020) at 37. The *Markman* order also found that no construction was needed for the term "in motion," which is recited in the "predetermined range' limitation, and that the term should be given its plain and ordinary meaning.[21] *Id.* at 44.

The *Markman* order addressed the construction of the "based on the determination" limitation in two parts. The language "based on the determination that the output signal is within the predetermined range, monitoring, with the processor" was found to require that "when the processor determines that the accelerometer's output signal is within the predetermined range, the processor makes the decision to monitor and monitors." *Id.* at 47. The "wherein" clause of the limitation—"wherein monitoring the plurality of readings from the sensor occurs over a time window that coincides with the output signal remaining within the predetermined range"—was construed to mean "wherein the monitoring of the plurality of readings from the sensor occurs only while the accelerometer's output signal remains within the predetermined range." *Id.*

[21] The term "in motion" appears two more times in claim 1 of the '464 patent. The term is recited in the preamble—"A method for minimizing the effects of motion artifact on sensor readings taken during continuous transdermal monitoring of a body part in motion, the method comprising . . . ."—and the "monitoring" limitation—"monitoring, with a processor, an output signal from an accelerometer, wherein the output signal indicates acceleration and deceleration of the body part of a user as the body part is in motion." '464 patent, col. 20:31-37.

Order No. 35 (Oct. 1, 2020) at 14, which granted-in-part and denied-in-part Respondents' motion for summary determination of non-infringement (Motion Docket No. 1190-027), clarified that the "based on the determination" step's "plurality of readings" are output by the non-accelerometer sensor and are not generated by the processor from the non-accelerometer sensor's signal. Order No. 35 further found that "the claim encompasses methods in which the non-accelerometer sensor generates readings irrespective of whether the accelerometer's signal is in the predetermined range, so long as the processor only monitors the readings when the accelerometer's signal is within the predetermined range." *Id.* at 20.

In addition, the parties agreed that the preamble of claim 1—"A method for minimizing the effects of motion artifact on sensor readings taken during continuous transdermal monitoring of a body part in motion . . . ."—is limiting and means "a method for improving the timing of measurements taken during continuous transdermal monitoring of a body part in motion, such that inaccuracies attributable to motion artifacts are minimized." Order No. 26 at 35.

**C. Infringement**

Philips asserts that Garmin indirectly infringes claims 1 and 6 of the '464 patent through induced infringement and contributory infringement. According to Philips, Garmin's customers directly infringe the claims by using the pulse oximetry functionality of the accused Garmin products. For the reasons below, I find that the accused functionality does not infringe the asserted claims. Because there has been no act of direct infringement, Garmin has not indirectly infringed the asserted claims. *See Novartis Pharms. Corp. v. Eon Labs Mfg., Inc.,* 363 F.3d 1306, 1308 (Fed. Cir. 2004) ("When indirect infringement is at issue, it is well settled that there can be no inducement or contributory infringement absent an underlying direct infringement." ); *Dynacore Holdings Corp. v. U.S. Philips Corp.,* 363 F.3d 1263, 1272 (Fed. Cir. 2004) ("Indirect

infringement, whether inducement to infringe or contributory infringement, can only arise in the presence of direct infringement, though the direct infringer is typically someone other than the defendant accused of indirect infringement.").

### 1. The accused '464 Garmin devices

Philips accuses Garmin's "Gen 3" devices of infringing claims 1 and 6 of the '464 patent. CIB at 24. These devices include the Forerunner 245 Series, Forerunner 945 Series, vivoactive 4/4S, vivomove Style, vivomove Luxe, vivomove 3/3S, Fenix 5/5+/6 Series, Legacy Hero Series, Legacy Saga Series, MARQ Series, Venu, and D2 Delta PX Series devices. *Id.* Each Garmin Gen 3 device is an activity tracker that has a host processor and a tri-axial accelerometer. *Id.* at 19-20. In addition to a host processor and accelerometer, each Garmin Gen 3 device has a "sensor hub" that coordinates the data transmission from the sensors on the device. CX-0375C (Choi Dep.) at 21:2-18; 25:2-9; 28:15-23. The sensor hub is a specialized microprocessor designed specifically to handle and communicate sensor data. *Id.* at 21:2-18. The sensor hub of each Garmin Gen 3 device receives sensor signals from the accelerometer chip. *Id*. at 49:25-50:22; 62:5-63:2; 88:23-89:18; 128:21-129:4; 149:20-150:5.

The accused devices have a pulse oximetry functionality that allows the devices to determine a user's blood oxygen level ($SpO_2$). Red and infrared LEDs located on the back of the Garmin Gen 3 devices are used to take pulse oximetry readings. CX-0384C (MacDonald Dep.) at 24:23-25:21. To measure the user's blood oxygen level, the Garmin devices activate the red and infrared LEDs, which illuminate the blood flowing through the blood vessels in the user's skin. CX-0012C (Young DWS) at Q/A 209. A photodetector detects the light reflected back and produces a signal. *Id.* Changes in the photodetector's signal indicates the user's blood oxygen level. *Id.*

Pulse oximetry readings are only taken if the accelerometer signal indicates that the motion level is [redacted]

**2. The accused devices do not infringe the asserted claims.**

The accused functionality is fundamentally different than the functionality described in and claimed by the ’464 patent. As described in the specification, the claimed invention minimizes the effects of motion artifacts on sensor readings of a body part by monitoring only the readings that were taken while the body part was undergoing a motion direction change. The specification uses the runner’s arm shown in Figure 2A to illustrate the disclosed invention.



As shown in the figure, the runner's arm moves back and forth between the rearmost position (position P1) and the forwardmost position (position P4). '464 patent at 13:52-56. The runner's "arm may accelerate and then decelerate as it moves from position Pl to P2 to P3 to P4." *Id.* at 13:61-63. Similarly, the runner's "arm may accelerate and then decelerate as it moves from position P4 to P3 to P2 to Pl." *Id.* at 13:63-65. Typically, when the runner's arm is at position P1 or P4, the runner's feet will not be in contact with the ground. *Id.* at 13:56-60. The patent notes that pulse oximetry readings are optimally taken when the arm is at points P1 and P4. *Id.* at 13:64-14:5. At these points, inaccuracies attributable to motion artifacts are minimized because the runner's feet are no longer in contact with the ground and the runner's arm is "at a momentarily stationary position as it decelerates to a minimum, *e.g.,* substantially zero, acceleration before it reverses its direction of motion (points Pl and P4)." *Id.* at 13:64-14:5. As described in the context of the runner's arm shown in Figure 2A, inaccuracies attributable to motion artifacts are lowest when the body part being monitored is changing direction.

The invention described in the specification minimizes motion artifacts on sensor readings without requiring the user to curtail his or her movement. For example, the invention

allows accurate sensor readings of the runner in Figure 2A, without requiring the runner to stop and hold still. Improving the accuracy of "real time pulse oximetry monitoring in users that are moving, such as athletes, runners, *etc.*" was an objective of the disclosed invention.

> The effect of motion artifact on the accuracy of a pulse oximetry measurement makes pulse oximetry technology known in the art less than ideal for real time pulse oximetry monitoring in users that are moving, such as athletes, runners, *etc.* Body movement during a reading may provide inaccurate, misleading, or ineffective data. Therefore, there is a need in the art for a system and method that provides an accurate pulse oximetry reading, as well as other physiological calculations and/or combinations of physiological calculations, when a user is in motion.

'464 patent at 1:39-49. As will be discussed below, this aspect of the invention is reflected in the claim language and the prosecution history of the '464 patent.

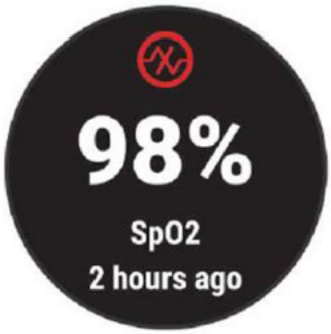
In contrast to the invention of the '464 patent, a runner using the accused Garmin devices is required to stop in order to take a pulse oximetry reading. The Garmin devices allow pulse oximetry readings to be taken either manually or automatically. JX-0041 (Owner's Manual for the Forerunner 245/245 Music Devices) at .0023. The automatic mode is called the "Pulse Oximeter Sleep Tracking" mode. In this mode the Garmin device "continuously measure[s] [the user's] blood oxygen saturation wile [the user] sleep[s]." *Id.* As the name indicates, the manual mode must be triggered by the user. In order to use the manual mode to take a pulse oximetry reading, Garmin instructs users to "[k]eep still" and that the accuracy of the reading can vary based on the user's "stillness."

## Getting Pulse Oximeter Readings

You can manually begin a pulse oximeter reading on your device at any time. The accuracy of the reading can vary based on your blood flow, the device placement on your wrist, and your stillness.

1. Wear the device above your wrist bone.
   The device should be snug but comfortable.
2. Select **UP** or **DOWN** to view the pulse oximeter widget.
3. Select **START**.
4. Hold the arm wearing the device at heart level while the device reads your blood oxygen saturation.
5. Keep still.

The device displays your oxygen saturation as a percentage.




JX-0041 (Owner's Manual for the Forerunner 245/245 Music Devices) at .0023 (highlighting added); *see also id.* at .0018 ("For pulse oximeter readings you should remain motionless."). If the pulse oximetry data is erratic or does not appear, Garmin advises users to "Remain motionless while the device reads your blood oxygen saturation." JX-0041 (Owner's Manual for the Forerunner 245/245 Music Devices) at .0023. In other words, in order to use the Garmin

pulse oximetry functionality, the runner discussed above with respect to Figure 2A of the '464 patent, would have to stop running and hold "still."[22]

For the reasons set forth below, I find that the accused products do not satisfy claim 1's "predetermined range" limitation either literally or under the doctrine equivalents. In addition, the accused products do not satisfy the preamble of claim 1. Because the products do not infringe claim 1, they do not infringe claim 6, which depends from claim 1. *See, e.g., Wahpeton Canvas Co., Inc. v. Frontier, Inc.,* 870 F.2d 1546, 1553 (Fed. Cir. 1989) ("It is axiomatic that dependent claims cannot be found infringed unless the claims from which they depend have been found to have been infringed . . . .").

**a. The accused Garmin devices do not literally infringe the claimed "predetermined range" limitation.**

The term "predetermined range" appears in two steps of the method of claim 1: the "determining" step and the "based on the determination" step. '464 patent at 20:38-49. The "determining" step requires the processor to determine whether the accelerometer's output signal is within a "predetermined range" that includes an "indication of acceleration and deceleration . . . correspond[ing] with a motion direction change of the body part in motion." *Id.* The "based on the determination" step requires that the processor make the decision to monitor and monitors readings from the non-accelerometer sensor "when the processor determines that the accelerometer's output signal is within the predetermined range" and continue to monitor the readings "only while the accelerometer's output signal remains within the predetermined range." Order No. 26 (July 27, 2021) at 47.

[22] Philips does not identify the pulse oximetry mode that it accuses of infringing the '464 patent: the manual mode, the sleep tracking mode, or both. The infringement analysis set forth below is applicable to both modes.

As a preliminary matter, an inconsistency in Philips's infringement arguments must be addressed. Although the "predetermined range" is the same in both steps, Philips identifies different alleged "predetermined ranges" for each step.

The accused method takes the root sum square computed from the accelerometer readings and subtracts the portion of the acceleration that is attributable to the force of gravity. CX-0012C (Young DWS) at Q/A 247; CX-1148C.0060, lines 256-258. [redacted] CX-0012C (Young DWS) at Q/A 247; CX-1148C.0060, lines 256-258. [redacted]

[redacted]

CX-1148C.0057; CX-0012C (Young DWS) at Q/A 247.

For the "determining" step, Philips and its expert appear to argue that predetermined values form three non-overlapping "predetermined ranges:" [redacted] *See, e.g.,* CIB at 160 [redacted] In response to Garmin's non-infringement theories, Dr. Young credibly explained how these values are predetermined ranges that include indication of acceleration and deceleration since the values, although positive, correspond to the root mean square of both

positive and negative accelerometer signals.") (internal citations omitted). Under this infringement theory, there are three separate "predetermined ranges."

In contrast to their identification of the three non-overlapping ranges for the alleged "predetermined range" of the "determining" step, for the alleged "predetermined range" of the "based on the determination" step, Philips and its expert appear to identify the overarching range of 0 [redacted] as the claimed predetermined range. CIB at 167 [redacted] CX-0012C (Young DWS) at Q/A 259 [redacted]. This range encompasses the three ranges discussed above. According to Philips and its expert, the accused products satisfy the "based on the determination" step because the accused products take pulse oximetry readings only when the motion level is [redacted]

The following infringement analysis relies on the alleged "predetermined range" identified by Philips for the "based on the determination" step, *viz.,* [redacted]. As set forth in claim 1, the claimed "predetermined range" is a "range" that has been "predetermined" and has an "indication of acceleration and deceleration" that "corresponds with a motion direction change of the body part in motion." '464 patent at 20:38-42. While there is no dispute that the accused [redacted] threshold is "predetermined," Garmin and Staff argue that it is not a

range and that it does not have the required indication of acceleration and deceleration corresponding to a motion direction change.

With regard to whether the motion-level threshold forms a range, Garmin and Staff point to the testimony of Garmin's expert, Dr. Daft, who opines that the threshold is not a range because it is a single value as opposed to a range of values. *See, e.g.,* RX-0559C (Daft RWS) at Q/A 49. In making this argument, Garmin and Staff misconstrue Philips's allegations. Philips does not contend that the threshold value [redacted] is a range onto itself; Philips contends that the motion-level threshold forms a range that encompasses values up to and including [redacted] *See, e.g.,* CIB at 167 [redacted] In other words, Philips identifies the values from [redacted] as the accused range, not the single value of [redacted]. Based on the foregoing, I find that the motion-level threshold is the maximum value of a range from [redacted]

The other dispute is whether the range formed motion-level threshold has an "indication of acceleration and deceleration" that "corresponds with a motion direction change of the body part in motion," as required by claim 1. For the reasons set forth below, I find that the alleged predetermined range does not have the required indication.

**i. The alleged "predetermined range" does not include an "indication of acceleration and deceleration" that "corresponds with a motion direction change of the body part in motion."**

The claim language of the "determining" step requires that the processor compare the output signal of the accelerometer with a "predetermined range" having an "indication of acceleration and deceleration" that "corresponds with a motion direction change of the body part in motion." '464 patent at 20:38-42. The step that precedes the "determining" step requires that

the accelerometer's output signal "indicate[] acceleration and deceleration of the body part of a user as the body part is in motion." '464 patent at 20:34-37. Thus, the explicit claim language requires the processor to compare an accelerometer output signal that indicates the acceleration and deceleration of the body part to a predetermined range that indicates the acceleration and deceleration of a user's body part. According to Philips, the accused devices satisfy the "determining" step by comparing the root mean square value derived from the accelerometer signal to the threshold value [redacted]. If the root mean square value is equal to or less than the threshold value, the Garmin devices monitor the pulse oximetry readings. If the root mean square value is greater than the threshold value, the pulse oximetry functionality is inactivated.

The flaw in Philips's infringement theory is that the root mean square value and the values in the range formed by the threshold value are scalar quantities. RX-0559C (Daft RWS) at Q/A 49. Scalar quantities indicate the magnitude of acceleration but not its direction. *Id.* In contrast to the root mean square and threshold value, acceleration and deceleration are vector quantities. *Id.* Vector quantities indicate both the magnitude and the direction of the acceleration. *Id.*

Acceleration and deceleration describe the direction a body is accelerating along a particular axis. RX-0559C (Daft RWS) at Q/A 46. "By convention, an acceleration along a chosen axis carries a positive value, whereas a deceleration along the same axis carries a negative value." CX-0012C (Young DWS) at Q/A 11. For example, the accelerometers in the accused products measure acceleration and deceleration along each of three axes—x, y, and z—and generate an output signal for each axis. *Id.* at Q/A 13-14, 38. If the accelerometer reports a positive value for the x axis, the body part is accelerating, *i.e.*, accelerating in the positive direction, along the x axis. RX-0559C (Daft RWS) at Q/A 46. A negative value indicates that

the body is decelerating, *i.e.*, accelerating in the negative direction, along the x axis. *Id.* Although the accelerometers generate separate values for the monitored body part's acceleration and deceleration, the distinction between acceleration and deceleration is lost by the time the accused method compares the root mean square to the threshold value.

The accused method calculates the root mean square for each sampling of values provided by the accelerometer. For each sampling, the accelerometer reports three values, one for each of the three axes (x, y, and z). CX-0012C (Young DWS) at Q/A 246; CX-0384C (MacDonald Dep.) at 74:1-75:6, 105:1-6. The values are either positive indicating acceleration or negative indicating deceleration. CX-0012C (Young DWS) at Q/247; CX-0384C (MacDonald Dep.) at 74:1-75:6, 105:1-6. The values reported by the accelerometer are vectors: each value represents a magnitude and direction. RX-0559C (Daft RWS) at Q/A 49. The root mean square of the x, y, and z values is calculated in three steps. First, each value is squared, *i.e.,* each value is multiplied by itself. CX-0012C (Young DWS) at Q/A 241; RX-0559C (Daft RWS) at Q/A 45; RX-0567C (MacDonald WS) at Q/A 51. Second, the squared values are added together to calculate the "sum of squares." CX-0012C (Young DWS) at Q/A 241; RX-0559C (Daft RWS) at Q/A 45; RX-0567C (MacDonald WS) at Q/A 51. Third, the root mean square is calculated by taking the square root of the sum of squares. CX-0012C (Young DWS) at Q/A 241; RX-0559C (Daft RWS) at Q/A 45; RX-0567C (MacDonald WS) at Q/A 51. The first step of this process—multiplying each value by itself—erases any distinction between acceleration and deceleration because the resulting squared value is always positive. Because of this, the root mean square represents only magnitude and does not indicate direction. As Philips acknowledges, deceleration and acceleration can result in the same root mean square. CIB at 158.

It is the root mean square calculated from the values reported by the accelerometer, not the accelerometer values themselves, that is used in the alleged "determining" step of the accused method. In the alleged "determining" step, the root mean square is compared to the threshold value of [redacted]. If the root mean square is [redacted] or less, the red and infrared LEDs are activated, and pulse oximetry measurements are taken. If the root mean square is greater than the threshold value, the read and infrared LEDs remain inactivated or, if they are already activated, inactivated so that pulse oximetry measurements cannot be taken. The threshold value like the root mean square is a scalar quantity: The threshold value is always positive and only indicates magnitude, not direction. Accordingly, neither value used in the comparison—the root mean square and the threshold value—provides an indication of acceleration or deceleration.

In addition to not providing an "indication of acceleration and deceleration," the range created by the [redacted] threshold does not satisfy the "predetermined range" limitation for a second reason. The threshold value and the range formed by that value do not have any correspondence with a motion direction change of a body part in motion. It does not meet this requirement for two reasons. First, as discussed below in the context of the preamble, a person of ordinary skill in the art would not consider a body part with a motion level of [redacted] or less to be in motion. *See infra.* Second, even if a body part with a motion level of [redacted] were considered to be in motion, the threshold value and the range formed by the threshold value have no correspondence with a "motion direction change."

As Philips acknowledges, the Garmin devices use the accelerometer output signal to "determine whether the amount of total motion is within the range of acceptable motion." CRB at 79; *see also id.* at 81 ("The parties and experts do not dispute that the '464 Garmin Devices

evaluate the amount of motion occurring [redacted] Under Philips's theory, the "range of acceptable motion" is the range created by the [redacted] threshold value. The threshold value is the maximum level of motion that can be tolerated for an accurate pulse oximetry reading. It does not matter whether the motion is acceleration or deceleration or whether the monitored body part is undergoing a motion direction change. If the motion level is at or below the motion-level threshold, the Garmin devices will take pulse oximetry readings irrespective of whether there is a motion direction change.

**ii. Philips's infringement argument is inconsistent with the prosecution of the '464 patent.**

The asserted claims were allowed only because the applicants amended the claimed "predetermined range" to its current form requiring the range to "include[] indication of acceleration and deceleration" that "corresponds with a motion direction change of the body part in motion." The applicants' reason for making this amendment undermines Philips's interpretation of the "predetermined range."

Application claims 1 and 6 issued as claims 1 and 6. The only difference between the issued claims and the original application claims relates to the requirements for the "predetermined range" set forth in the "determining" step. As originally drafted, application claim 1 required "a predetermined range that includes indication of a zero acceleration." JX-0005.0052. In the first office action, the examiner found that application claim 1 was anticipated by U.S. Published Patent Application 2005/0228298 to Banet *et al.* ("Banet;" RX-0135) and application claim 6 was obvious in view of Banet in combination with a second prior art reference. JX-0005.0087-.0088, .0093.

Banet discloses a "monitoring device capable of determining when the user's wrist is at rest using a motion sensor disposed within a wrist module that is attached to the user's wrist. When at rest, the monitoring device utilizes a vital sign monitor to determine a plurality of vital signs of the user." RX-0135.0001. Banet further teaches that the motion sensor is preferably an accelerometer. *Id.* Like the accused products, Banet uses an accelerometer to determine whether the user's motion level is within an acceptable range. Specifically, Banet teaches that data-processing circuit 18 of monitoring device 10 "employs an algorithm that detects a signal from an accelerometer 34 and processes the signal to determine if a user's hand is at rest or in motion." RX-0135.0015. The "signals (*e.g.* voltage)" from the accelerometer "vary with motion of the user's hand." *Id.* "[T]he microprocessor processes the signals to detect if the hand is at rest or in motion." *Id.* If the microprocessor determines that the hand is at rest, it "sends a signal to the pulse-oximetry circuit 35 to initiate" pulse oximetry measurements "of the patient or athlete." *Id.*

Although Banet does not disclose explicitly that the algorithm employed by Banet uses a threshold to determine whether the acceleration or deceleration reported by accelerometer indicates that the body part is at rest or in motion, the examiner found that such a threshold was inherently disclosed because "determining whether the limb is in motion or at rest inherently requires some predetermined voltage minimum to be crossed." JX-0005.0088. The threshold value used in Banet is a value other than zero. Figure 8 shows the accelerometer signal from a hand at rest.



RX-0135.0010. As the examiner concluded, Figure 8 shows that when a hand is "at rest" "the voltage [of the accelerometer signal] is of low amplitude but not necessarily zero." JX-0005.0088; *see also,* Tr. (Daft) at 320:17-22 ("And an example of that actually is the Banette [*sic*] reference, which is part of the '464 prosecution history. It actually has a graph of a hand at rest. It's got the accelerometer output of that. And you can see clearly that there is motion even when a human is trying to hold it at rest."). Thus, like the accused method's threshold, Banet's non-zero threshold forms a range. JX-0005.0088, .0125 (finding Banet discloses a "predetermined range that includes indication of a zero acceleration"); RX-0559C (Daft RWS) at Q/A 57 (opining that a "predetermined range that includes indication of a zero acceleration" encompasses "a range from zero to a single positive threshold value").

In order to gain allowance, the applicants amended the "determining" step to its current form to require "a predetermined range that includes indication of a ~~zero~~ acceleration and deceleration, wherein indication of acceleration and deceleration corresponds with a motion direction change of the body part in motion." JX-0005.0145 (underlining and strikethrough in original to indicate deletion and addition of words). In view of the amendment, the examiner allowed the pending claims. JX-0005.0156. While finding that Banet was the closest prior art reference to the pending claims, the examiner found that Banet did not disclose the

"predetermined range," as amended. *Id.* at .0157. In reaching this conclusion, the examiner noted that he was interpreting the claim "such that the determining whether the output signal is within a predetermined range must include signals indicating motion of a moving body part in one direction and motion of the moving body part in an opposing direction." *Id.* The examiner's reference to signals indicating movement in opposing directions is a reference to acceleration and deceleration, which—as described above—indicate whether the acceleration along a given axis is in the positive direction (acceleration) or in the negative direction (deceleration). According to the examiner, the use of signals indicating deceleration and acceleration in the "determining" step "would simply not be present in Banet's rest versus motion determination." *Id.*

Accordingly, the applicants added the claimed "predetermined range" in order to distinguish claim 1's "determining" step from Banet's disclosure of a method for timing pulse oximetry readings to the periods in which the body part's motion level—as measured by an accelerometer—was within a range formed by a motion-level threshold. With this amendment, claim 1's "determining" step could no longer be satisfied by simply comparing motion level to a threshold. The amended claim step requires determining whether the body part's acceleration and deceleration indicates the body part is undergoing a motion direction change.

Arguing that the prosecution history is not inconsistent with its infringement theory, Philips states that "Banet is different in kind from the claimed method at issue in Claim 1." CRB at 81. Philips is correct, Banet is different in kind from the claimed method; that is why the claims were allowed over Banet. Banet is, however, not different in kind from the accused method. At most, with respect to the "predetermined range" limitation, the difference between Banet and the accused method is one of degree, not kind. Banet limits pulse oximetry reading

periods to periods where the body part at rest; the accused products limit pulse oximetry readings to periods in which the body part is at rest or, at most, undergoing "light motion."[23] Like Banet, the accused products use an accelerometer to determine the motion level of a monitored body part. As in Banet, the accused products compare the monitored body part's motion-level to a predetermined non-zero threshold. If the acceleration and deceleration is equal to or is less than the threshold, the products initiate pulse-oximetry readings. The only relevant difference between the accused system and Banet is that the accused products may have a higher motion-level threshold than the system disclosed in Banet. The thresholds in both the accused products and Banet, however, serve the same purpose: determining whether monitored body part's motion level is sufficiently low to allow accurate pulse-oximetry readings.

**iii. Philips's arguments are unpersuasive.**

In support of its contention that the accused method satisfies the "predetermined range" limitation, Philips raises a number of arguments. These arguments are unpersuasive.

Laying the premise for its arguments, Philips notes that, "[i]n real world situations, the output signal from a three-axis accelerometer used in an activity monitor such as one of the '464 Garmin Devices is always going to represent acceleration or deceleration in three directions." CIB at 158-59. There is no dispute that the accelerometers in the accused products measure acceleration and deceleration along three axes. From this non-controversial statement, Philips draws two conclusions. First, that "the processor in the '464 Garmin Devices determines that the output signal from the accelerometer is within a predetermined range that includes indication of acceleration and deceleration." *Id.* Second, "that this indication of acceleration and

[23] As discussed below with respect to the preamble of claim 1, one of ordinary skill in the art would not consider a body part with a motion level of [redacted] or less to be in motion.

deceleration corresponds with a motion direction change of the body part in motion, because acceleration and deceleration are measured along all three directions (x, y and z)." *Id.* The conclusions drawn by Philips do not flow logically from the premise that the accelerometer measures acceleration and deceleration along three axes. Philips does not explain the reasoning underlying its conclusions and simply cites the testimony of its expert.

The cited testimony of Dr. Young is conclusory. After explaining how the Garmin source code sets a [redacted] threshold—an explanation that appears to be non-controversial—Dr. Young concludes:

> Again, these values are predetermined ranges that include indication of acceleration and deceleration since the values, although positive, correspond to the root mean square of both positive and negative accelerometer signals. The acceleration and deceleration corresponds [*sic*] with a motion direction change of the body part in motion, because the ranges indicate acceleration and deceleration along all three axes; x, y and z.

CX-0012C (Young DWS) at Q/A 247. Dr. Young does not explain the basis for either conclusion. Such unsupported, conclusory expert opinion is entitled to little weight. *See Velander v. Garner,* 348 F.3d 1359, 1371 (Fed. Cir. 2003) (rejecting argument that Board of Patent Appeals and Interferences erred by "accord[ing] little weight to [expert witnesses'] broad conclusory statements that it determined were unsupported by corroborating references"); *Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.,* 776 F.2d 281, 294 (Fed. Cir. 1985) ("Lack of factual support for expert opinion going to factual determinations, however, may render the testimony of little probative value in a validity determination."); *Carella v. Starlight Archery & Pro Line Co.,* 804 F.2d 135, 138 (Fed. Cir. 1986) ("Although in some circumstances unsupported oral testimony can be sufficient to prove prior knowledge or use, it must be regarded with suspicion and subjected to close scrutiny.").

Dr. Young's first conclusion—that the range formed by the accused method's threshold value includes an indication of acceleration and deceleration because "the values, although positive, correspond to the root mean square of both positive and negative accelerometer signals"—ignores that the "determining" step expressly requires that the predetermined range itself, not the accelerometer signal, include an "indication of acceleration and deceleration." CX-0012 (Young DWS) at 247. As discussed above, the values compared in the accused method—the root mean square and the threshold value—are scalar quantities that indicate magnitude, not direction. In contrast, acceleration and deceleration are vector quantities that indicate direction, as well as magnitude. Because they do not indicate direction, the scalar quantities used in the accused method cannot provide an "indication of acceleration and deceleration."

Dr. Young does not explain the basis for his second conclusion that the values in the range formed by the threshold value correspond to "a motion direction change of the body part in motion, because the ranges indicate acceleration and deceleration along all three axes." *Id.* As discussed above, the accelerometers in the accused products generate values for acceleration and deceleration along three axes (x, y, and z). If the root mean square of these values is less than 250 milli-Gs, the accused products take pulse oximetry readings. Any correspondence between the periods in which the root mean square is below the threshold and a motion direction change would be purely coincidental.

To satisfy the requirements of the "predetermined range" limitation, Philips and its expert appear to be relying on the attributes of the accelerometer's output signal rather than the attributes of the range formed by the threshold value. CRB at 78-79 ("The x, y, and z accelerometer signals received by the processor in the '464 Garmin Devices reflect an amount of motion in either direction—positive for acceleration and negative for deceleration. Taken

together, these signals indisputably reflect an amount of acceleration and deceleration that is occurring in three directions. Likewise, the indications of acceleration and deceleration by these output signals correspond with a motion direction change of the body part in motion, because acceleration or deceleration along more than one axis represents a motion direction change of a body part in motion.") (internal citations omitted). The claim language requires two different indications of acceleration and deceleration. The "monitoring" step, which precedes the "determining" step, requires that the processor monitor "an output signal from an accelerometer . . . [that] indicates acceleration and deceleration of the body part of a user as the body part is in motion." '464 patent at 20:34-37. The "determining" step requires that "predetermined range" include an "indication of acceleration and deceleration" that "corresponds with a motion direction change of a body part in motion." *Id.* at 20:38-42. The two indications of acceleration and deceleration are separate and distinct claim elements. For instance, the indication of acceleration and deceleration required of the accelerometer's output signal is not required to correspond to a "motion direction change of a body part in motion."

**b. The accused products do not infringe the "predetermined range" limitation under the doctrine of equivalents.**

Philips argues in the alternative that if the accused products do not infringe "predetermined range" limitation literally, they do so under the doctrine of equivalents ("DOE"). Under the DOE, "a product or process that does not literally infringe upon the express terms of a patent claim may nonetheless be found to infringe if there is 'equivalence' between the elements of the accused product or process and the claimed elements of the patented invention." *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 21 (1997). Although the DOE allows a "patentee to claim those insubstantial alterations that were not captured in drafting the original patent claim but which could be created through trivial changes," under prosecution history

estoppel a patentee cannot use the DOE to recapture subject matter surrendered during prosecution. *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabuskiki Co.* ("*Festo VIII*"), 535 U.S. 722, 733-34 (2002). Such surrender occurs "[w]here the original application once embraced the purported equivalent but the patentee narrowed his claims to obtain the patent or to protect its validity." *Id.*

Making a narrowing amendment to secure a claim's issuance creates a presumption that prosecution history estoppel applies. *Id.* at 740-41. The presumption, however, is rebuttable as there may be some instances "where the amendment cannot reasonably be viewed as surrendering a particular equivalent." *Id.* Such situations include where the equivalent was unforeseeable at the time of the application or where the rationale underlying the amendment bears no more than a tangential relation to the equivalent in question. *Id.* at 741.

As discussed above, the applicants amended claim 1 during prosecution in order to overcome Banet. There is no dispute that the amendment was a narrowing amendment. As such, the amendment triggers a rebuttable presumption that Philips is estopped from asserting infringement under the DOE. *Festo VIII,* 535 U.S. at 740-41. Philips argues that it is not estopped because the amendment bears no more than a tangential relationship to the accused equivalent. CIB at 161-62.

Philips argues that the amendment was tangential to the accused "determining" step because Banet "was not asserted to disclose the equivalent in question, *i.e.,* comparing a magnitude value of some amount of acceleration or deceleration against a threshold range of acceleration or deceleration." CIB at 161. According to Philips, its argument is "supported by the Examiner's reasons for allowance, where the Examiner characterized Banet as using a "rest versus motion" determination, as opposed to comparing a certain amount of motion against a

predetermined range of motion. *Id.* (quoting JX-0005.0157). Philips's argument is based on a misreading of both Banet and the prosecution history.

As discussed above, Banet discloses using an accelerometer to determine the motion level of a user's body part and then comparing the motion level to a threshold. RX-0135.0015 ("[T]he accelerometer 34 measures signals (*e.g.* voltage) that vary with motion of the user's hand" and then "sends the signals to the microprocessor."); JX-0005.0088 (the examiner noting that "determining whether the limb is in motion or at rest inherently requires some predetermined voltage minimum to be crossed"). If the motion level is below the threshold, the body part in Banet is deemed to be at rest; if the motion level is above the threshold, the body part is deemed to be in motion. JX-0005.0088, .0125. If the body part is deemed to be at rest, the processor in Banet triggers a pulse oximetry reading. RX-0135.0015. The threshold value used in Banet is not zero. RX-0135.0010 (Fig. 8: showing a "Signal from Accelerometer" for a "HAND AT REST"); JX-0005.0088 (examiner noting that Figure 8 shows that when a hand is "at rest" "the voltage [of the accelerometer signal] is of low amplitude but not necessarily zero"). Because the threshold value in Banet is not zero, the threshold value—like the threshold value used in the accused method—forms a "predetermined range." JX-0005.0088 (finding that Banet discloses a "predetermined range that includes indication of zero acceleration"), .0125 (same).

Like Banet, the accused method compares the monitored body part's motion level, as indicated by an accelerometer output signal, to a threshold value to determine whether the motion level is at a level that would allow for an accurate pulse oximetry reading. If the motion level exceeds the threshold value, the motion level is too high for an accurate reading; if the motion level is below the threshold, the motion level is low enough to allow for an accurate

reading. At most, the accused method's threshold value may be slightly higher than the threshold value in Banet. As discussed above, this would be a difference of degree, not kind.

Philips's reliance on the examiner's comment regarding "Banet's rest versus motion determination" is misplaced. The examiner allowed the pending claims over Banet because Banet did not disclose the "predetermined range," which had been amended to require to include an "indication of acceleration and deceleration" that "corresponds to a motion direction change of the body part in motion." JX-0005.0157. As noted by the examiner such an indication would "simply not be present in Banet's rest versus motion determination." *Id.* The method of Banet—like the accused method and in contrast to the amended claim—does not determine whether the user's body part is undergoing a motion direction change; the method determines whether the body part's motion level exceeds a motion-level threshold. As observed by the examiner, such a method does not require a "predetermined range" that "includes indication of acceleration and deceleration" that "corresponds to a motion direction change of the body part in motion."

Based on the foregoing, I find that Philips has not shown that the narrowing amendment to claim 1 is tangential to the alleged equivalent.

Even if Philips's DOE argument were not precluded under prosecution history estoppel, it would fail. To show equivalence under the DOE, the patent holder must show that the motion-level threshold "perform[s] substantially the same function in substantially the same way with substantially the same results" as the claimed "predetermined range." *Ring & Pinion Service Inc. v. ARB Corp.,* 743 F.3d 831, 835 (Fed. Cir. 2014). The motion-level threshold used by the accused products does not perform substantially the same function as the claimed "predetermined range." As discussed above, the claimed invention uses the "predetermined range" to ensure that monitoring of the pulse oximetry readings coincides with motion direction

changes of the body part. The accused method takes pulse oximetry measurements if the body part's motion level does not exceed the threshold value. With the accused method, the pulse oximetry readings will only coincide with motion direction changes through happenstance. The motion-level threshold in the accused products does not perform its function in substantially the same way as the claimed "predetermined range." The motion-level threshold does not include an "indication of acceleration and deceleration" so that the accused system can determine whether a motion direction change is occurring. The motion-level threshold does not produce substantially the same result as the claimed "predetermined range." The motion-level threshold does not time the pulse oximetry readings to coincide with motion direction changes of the body part.

**c. The Garmin devices do not satisfy the preamble of claim 1.**

The parties agree that the preamble of claim 1—"A method for minimizing the effects of motion artifact on sensor readings taken during continuous transdermal monitoring of a body part in motion . . . ."—is limiting and means "a method for improving the timing of measurements taken during continuous transdermal monitoring of a body part in motion, such that inaccuracies attributable to motion artifacts are minimized." Order No. 26 at 35; '464 patent at 20:31-33. Thus, the agreed upon construction has two requirements: "improving the timing of measurements" and a body part "in motion." According to Garmin and Staff, the accused method does not satisfy either element.

Garmin and Staff argue that the accused method does not improve the timing of measurements because the processor continually monitors readings from the PPG sensor. In addition to taking pulse oximetry readings using the red and infrared LEDs, the PPG sensor measures user's heart rate using green LEDs. Order No. 35 (Oct. 1, 2021) at 11-12. While the processor only activates the red and infrared LEDs to take pulse oximetry measurements if the

motion level is [redacted] or less, the PPG sensor measures the user's heart rate using the green LEDs at all motion levels. *Id.* at 21-23. According to Garmin and Staff, the accused method does not improve the timing of the measurements from the PPG sensor because the sensor is continually taking measurements. RIB at 181-182; SIB at 87-88. Neither the claim language nor the agreed-upon construction requires, however, that the method improve the timing for all the measurements from a sensor. Philips alleges that the accused method improves the timing of the pulse oximetry measurements by limiting the measurements to periods in which the motion level is [redacted] or less. The timing of the PPG sensor's heart rate measurements is irrelevant to whether the timing of the pulse oximetry measurements has been improved.

Garmin and Staff also argue that the accused method does not satisfy the preamble because the accused method does not take pulse oximetry measurements of a body part in motion. The accused method does not take pulse oximetry readings if the monitored body part's motion level exceeds [redacted]. According to Garmin and Staff one of ordinary skill in the art would not consider a body part with a motion level of [redacted] to be in motion. In support of this argument, Garmin and Staff point to the testimony of Garmin's expert, Dr. Daft, and Paul MacDonald, a Technical Fellow at Garmin. According to Dr. Daft, [redacted] "represents an extremely small amount of motion. It's basically no motion." RX-0559C (Daft RWS) at Q/A 52. Dr. Daft further opined that one of ordinary skill would not consider a body part with a motion level of [redacted] to be in motion. *Id.* Mr. MacDonald testified that [redacted] of movement is "pretty low. It represents a body part that is essentially stationary." RX-0567C (MacDonald WS) at Q/A 75. According to Mr. MacDonald, [redacted] "is about the amount of motion that a user's arm would experience when holding up the watch and

examining the face." RX-0567C (MacDonald WS) at Q/A 75. By comparison, an arm that is moved while the user is walking is going to experience multiple Gs of acceleration. *Id.*

In support of its contention that one of ordinary skill in the art would consider a body part with a motion level of [redacted] to be in motion, Philips cites the testimony of its expert Dr. Young and the Garmin source code. While Dr. Young testifies that the accused method satisfies the preamble, he does not explain why he considers a body part with a motion level of [redacted] to be in motion. CX-0012C (Young DWS) at Q/A 222-223. Dr. Young's conclusory opinion that the accused method satisfies the preamble's requirement of monitoring a body part in motion is entitled to little weight. *See Velander,* 348 F.3d at 1371; *Ashland,* 776 F.2d at 294; *Carella,* 804 F.2d at 138.

With regard to the Garmin source code, [redacted] Order No. 35, which granted-in-part and denied-in-part Respondents' motion for summary determination of no infringement, found that [redacted] created a genuine dispute of material fact concerning whether the accused method monitored a body part in motion. Order No. 35 (Oct. 1, 2021) at 26. Because Order No. 35 was applying the summary determination standard, all reasonable inferences were drawn in favor of Philips, as the non-movant. *Certain Foodservice Equipment and Components Thereof,* Inv. No. 337-TA-1166, Comm'n Op. at 9 (Dec. 16, 2020) (""[I]n deciding a motion for summary judgment, 'the evidence of the nonmovant is to be believed, and all justifiable

inferences are to be drawn in his favor.'") (quoting *Liebel-Flarsheim Co. v. Medrad, Inc.,* 481 F.3d 1371, 1377 (Fed. Cir. 2007)) (alteration in original). The summary determination standard is no longer applicable.

The Garmin source code's description of range [redacted] is not entitled to significant weight. There is no information about the authors of the source code. There is no reason to believe that the authors were persons of ordinary skill in the art who appreciated that [redacted] was commensurate to the motion level of an arm that is being held up while the user examines his or her watch.

Countering the source code's description of the range is the sworn testimony of Dr. Daft and Mr. MacDonald that one of ordinary skill in the art would consider [redacted] to be stationary. RX-0559C (Daft RWS) at Q/A 51; RX-0567C (MacDonald WS) at Q/A 75. This testimony was not available prior to the issuance of Order No. 35. The only evidence that Garmin cited to counter the source code's characterization [redacted] was the deposition testimony of Mr. MacDonald. Order No. 35 (Oct. 1, 2021) at 25-26. At his deposition, Mr. MacDonald characterized [redacted] as being "pretty small" or "pretty low." *Id.* (internal citation and quotation marks omitted). Mr. MacDonald's deposition testimony is conclusory; Mr. MacDonald does not explain why he considers [redacted] pretty small or pretty low. In contrast, in his witness statement Mr. MacDonald explains that he considers [redacted] to be "essentially stationary" because it "is about the amount of motion that a user's arm would experience when holding up the watch and examining the face" and that an arm being moved while the user is walking will experience multiple Gs of motion. RX-0567C (MacDonald WS) at Q/A 75-76.

Philips also fails to provide any objective standard that would provide a rational basis for finding that a body part with a motion level of [redacted] is in motion. The accused devices are not being attached to rocks; there are being worn by living, breathing people. As Mr. MacDonald testified "it is practically impossible for any person to keep their arm completely still." RX-0567C (MacDonald WS) at Q/A 75-76. Hence, even when a person's body part is at "rest," it is generating motion that can be measured by an accelerometer. This is shown by two prior art references.

The first reference is Banet, which is discussed above. Figure 8 of Banet depicts the "Signal from Accelerometer" from a hand at rest.



RX-0135.0010. As can be seen from the accelerometer, even though the hand is "at rest," the accelerometer is detecting movement. JX-0005.0088; Tr. (Daft) at 320:17-22.

The second reference is discussed below with respect to Garmin's and Staff's invalidity contentions. PCT Application WO 2011/0102044 to Marcus Schwenk *et al.* ("Schwenk;" JX-0141) was published on January 27, 2011, three years before the '464 patent's earliest alleged priority date. JX-0141.0001. Schwenk discloses "a method for operating a monitoring system for monitoring physiological data of a patient." *Id.* In addition to monitoring a patient's physiological data, the method monitors the patient's motion activity. *Id.* at .0003. Schwenk

teaches that the patient's physiological data should be measured when the patient's motion activity level is low, but not zero. *Id.* at .0004. A motion activity level of zero means there is no detectable motion, which according to Schwenk, indicates that the monitoring system is not attached to the user. *Id.* at .0003-.0004. Thus, Schwenk equates a motion level of zero not with a limb being at rest, but with a monitor not attached to a human being.

Based on the foregoing, I find that Philips has failed to show that the accused method monitors a body part in motion as required by the preamble of claim 1.

### D. Domestic Industry—Technical Prong

Philips relies on the Philips Health Band to satisfy the technical prong of the domestic industry requirement. According to Philips, the Health Band practices claims 1 and 6 of the '464 patent.

#### 1. Philips Health Band

The Health Band is "a health monitoring device that tracks and monitors various physiological parameters of a user." CX-0012C (Young DWS) at Q/A 214. The device is worn on the user's wrist and has a cardio and motion monitoring module. *Id.* at Q/A 225; JX-0114C.01; JX-0115C.02. The cardio and motion monitoring module has [redacted]. CX-0012C (Young DWS) at Q/A 225.

[redacted]

JX-0114C.01; *see also* CX-755C.04 [redacted]

[redacted]. JX-0114C.0001; CX-0012C (Young DWS) at Q/A 225. [redacted]. CX-0012C (Young DWS) at Q/A 225; CX-0162C.0006, .0011-.0013; JX-0114C.0004. [redacted]. CX-0012C (Young DWS) at Q/A 225; CX-0162C.0006, .0011-.0013. [redacted] CX-0012C (Young DWS) at Q/A 236; CX-755C.0004; CX-0162C.0012; JX-114C.0008.

The Philips document "[redacted]" provides a detailed description of [redacted]. RX-0559C (Daft RWS) at Q/A 28. [redacted] JX-0114C.0004. [redacted]

[redacted]

JX-0114C.0004 (highlighting added).

[redacted]

[redacted]

**2. Discussion**

Philips contends that the Health Band practices claims 1 and 6 of the ’464 patent because

the Health Band "limit[s] the performance of certain measurements . . . to periods of reduced motion during which fewer motion artifacts are present." CIB at 172. As a preliminary matter, Garmin and Staff dispute Philips's contention that the Health Band does not monitor readings [redacted]. According to Garmin and Staff, the Health Band continually montiors heartrate readings [redacted] irrespective of the monitored body part's motion level.

The basis for the parties' dispute regarding "monitoring" is that [redacted]

Garmin and Staff argue that the [redacted] Philips counters that the processor [redacted]. Although this is a major point of contention between the parties, they provided no basis that would allow for a reasoned and supported determination. The parties have not proposed explicit constructions for the term "monitoring," as it would be understood in the context of the '464 patent, and they have not cited evidence that would allow a fact finder to understand the term's scope. Instead, the parties offer conclusory expert testmony [redacted]. *See, e.g.,* CX-0012C (Young DWS) at Q/A 263; RX-0559C (Daft RWS) at Q/A 76. Such conclusory expert opinion is entitled to little weight. *See Velander,* 348 F.3d at 1371; *Ashland,* 776 F.2d at 294; *Carella,* 804 F.2d at 138.

Ultimately, resolving whether the Health Band "monitors" [redacted] is unnecessary, as the device does not satfisfy claim 1's "predetermined range" limitation and, under Philips's interpretation of "monitoring," the preamble. Because the Health Band does not practice claim 1 of the '464 patent it does not practice claim 6, which depends from claim 1. *See, e.g., Wahpeton,* 870 F.2d at 1553.

**a. The Health Band does not satisfy the "predetermined range" limitation.**

Claim 1 requires a "predetermined range" that "includes indication of acceleration and deceleration" that "corresponds with a motion direction change of the body part in motion." '464 patent at 20:38-42. For this limitation, Philips points to [redacted] does not satisfy the claimed "predetermined range" limitation for the same reason that the accused Garmin product's [redacted]

does not satisfy requirements for the "predetermined range." Specifically, [redacted] does not "include[] indication of acceleration and deceleration" that "corresponds with a motion direction change of the body part" being monitored. [redacted] CX-0012C (Young DWS) at Q/A 251-252*; see also,* CX-0162C.0016-.0017; JX-0114C.0007-.0008. [redacted] CX-0012C (Young DWS) at Q/A 251-252; RX-0559C (Daft RWS) at Q/A 76. Like the accused products, the [redacted] As such, the range formed by the threshold value used in the Health Band does not provide an "indication of acceleration and deceleration."

In addition, the range formed by [redacted] does not correspond to a motion direction change of a body part in motion. First, as discussed below, one of ordinary skill in the art would not consider a body part with a motion level of [redacted] or less to be in motion. Second, even if a body part with [redacted] were considered to be in motion, the range formed by the [redacted] The Health Band monitors [redacted].[24]

Based on the foregoing, I find that Philips has not shown by a preponderance of the

[24] The parties' dispute regarding the claim term "monitoring" concerns whether the Health Band monitors [redacted]. There is no dispute that the Health Band monitors [redacted]

evidence that the Health Band satisfies the "predetermined range" limitation of claim 1.

**b. Under Philips's interpretation of "monitoring," the Health Band does satsify the preamble of claim 1**

As discussed above, the parties' agreed-upon construction of the preamble of claim 1 requires monitoring of a body part in motion. Order No. 26 at 35. Philips argues that the Health Band satisfies this requirement because the Health Band monitors [redacted] when the motion level of the monitored body part [redacted]. The [redacted]. As discussed above, Philips has not shown that one of ordinary skill in the art would consider a body part with a motion level of [redacted]. If a body part with a motion level of [redacted]

Moreover, even if [redacted] were found to be commensurate with a body part in motion, there is no basis for making the same finding with respect to [redacted] Other than the conclusory testimony of its expert that the Health Band satisfies the preamble's requirement of a body part in motion Philips has not pointed to any evidence that one of ordinary skill in the art would consider a motion-activity level of [redacted] to correspond with a body part in motion. As discussed above, even at rest a body part will generate detectable levels of acceleration and deceleration. The Garmin source code that Philips relies on to show infringement does not support Philips's contention that [redacted] CX-1148C.0057. Philips's own internal document describing [redacted] This

description indicates that Philips considered a body part to be in motion only if it had a motion activity level [redacted]

Based on the foregoing, under Philips's interpretation of "monitoring," I find that Philips has not shown by a preponderance of the evidence that the Health Band satisfies the preamble of claim 1.

### E. Domestic Industry—Economic Prong

#### 1. Background

Philips maintains that it satisfies the economic prong of the domestic industry requirement for the '464 patent based on its investments in the alleged domestic industry ("DI") product known as the Health Band, which was developed by Philips Motion Biosensor ("Philips MB") business unit.[25] Philips MB employs approximately 45 individuals. *Id.* at Q/A 7.

The Health Band is a wrist-worn device that uses sensors to monitors the wearer's movements and takes physiological readings like heart rate. The device processes the data so that it can be aggregated, displayed for the wearer, and stored. CX-0008C (Ridgway DWS) at Q/A 11. The Health Band initially was developed by another Philips entity, Philips Health Solutions ("PHS") in the Netherlands. *Id.* at Q/A 9. The underlying technology was transferred to Philips MB around 2016. CX-0006C (Slater DWS) at Q/A 11. After the transfer, Philips MB developed the DI product further, including developing application software that allows for remote acquisition of data from the Health Band. CX-0008C (Ridgway DWS) at Q/A 9. Philips

[25] Philips MB is located within the Philips Sleep and Respiratory Care ("Philips SRC") business groups of the Philips Connected Care reporting segment. CX-0006C (Slater DWS) at Q/A 2. Philips MB conducts research and development on wearable heart tracking devices at a facility in Bend, Oregon. *Id.* at Q/A 7.

MB prepared a product requirements document describing the features and functionality of the software, known as PASS 2.0, as well as a software requirements specification. *Id.* at Q/A 10.

According to Philips, development of the Health Band is "substantially complete" and the product was expected to be commercialized in the U.S. [redacted]. *Id*. at Q/A 6. The product will be manufactured [redacted]. CX-0006C (Slater DWS) at Q/A 10. The product is intended for use by health or research professionals to obtain data on research subjects. CX-0008C (Ridgway DWS) at Q/A 12). Philips MB will offer clinical trial services for the Health Band including consulting, training, project management, data analytics, and customer support. *Id.* at Q/A 12. Philips says it also expects to maintain sustaining engineering activities after commercial launch, with [redacted] engineers stationed at Philips SRC's facilities in Pittsburgh. *Id.* at Q/A 15. In addition, Philips SRC will perform warehousing and distribution. *Id.* Philips intends to employ about [redacted] individuals at the Bend, Oregon facility to provide customer service, product support, and a clinical trial operations team.

Philips tracks its research and development expenditures relating to the Health Band in the ordinary course of business. CX-0006C (Slater DWS) at Q/A 12. A summary of Philips MB's investment in U.S. labor and capital relating to the Health Band:

Philips MB Labor and Capital Expenses

| Year | 2016 | 2017 | 2018 | 2019 | Q1 2020 | Total |
|---|---|---|---|---|---|---|
| L&C Expenses | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |

*See* CX-0006C (Slater DWS) at Q/A 12-17; CX-0199C; CX-1392C (Akemann DWS) at Q/A 209-10. A summary of Philips MB's investment in U.S. research and development:

Philips MB Research and Development Expenses

| Year | 2016 | 2017 | 2018 | 2019 | Q1 2020 | Total |
|---|---|---|---|---|---|---|
| R&D Expenses | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |

*See* CX-0006C (Slater DWS) at Q/A 12-17; (Akemann DWS) at Q/A 232-33.

Philips's expert, Dr. Michael P. Akemann, testifies that Philips MB considers the Health Band "to be the platform that will drive future business and growth for the business unit and expects the product to expand its market." CX-1392C (Akemann DWS) at Q/A 212. Dr. Akemann recognizes that the absolute level of employment of labor and capital related to the Health Band is "not too large in absolute terms," but he states that the Health Band is Philips MB's most important product at present and "the primary focus of the business unit going forward." CIB at 227; CX-1392C (Akemann DWS) at Q/A 214. Dr. Akemann testifies that the Health Band device [redacted] of the product line of the Philips MB business." *Id.*

On this basis, Philips maintains that its domestic investments in labor and capital for the Health Band are quantitatively significant. Philips also contends that the Health Band is qualitatively significant, relying on Dr. Akemann's testimony that the product is innovative and "an important driver of expected growth and profitability for the Philips MB business." CIB at 228; CX-1392C (Akemann DWS) at Q/A 214, 114-159, 127:24-128:16).

Philips argues that its investment of approximately [redacted] in U.S. research and development related to the Health Band is quantitatively and qualitatively substantial under section 337(a)(3)(C). Philips says these expenditures are closely related to the technology of the '464 patent and, although expenditures for the Health Band are [redacted] the product is the most important one for Philips MB and represents [redacted] of its product lines. CIB at 229; CX-

1392C (Akemann DWS) at Q/A 235. The expenditures are qualitatively substantial, according to Philips, because the Health Band is a new product that is expected to drive growth and profitability.

Garmin argues that Philips MB's subsection (B) expenditures relate to a software program "*that does not even run on the Health Band device.*" RIB at 12. Garmin contends in addition that Philips MB's expenditures were incurred two years before Philips acquired the '464 patent, and they argue that these expenditures do not relate to the patent. Such expenditures should be excluded, Garmin asserts, "leaving Philips with less than [redacted] in expenditures up through the filing of the Complaint." *Id.*

Garmin state that, in any event, Philips's per-year labor expenditures amounted to the cost of employing [redacted] full-time engineers. Further, they compare Philips MB's expenditures with the business of which it is a part, and which employs more than [redacted] individuals in the U.S.

With respect to subsection (C), Garmin points to "at least [redacted]" paid to a [redacted], as well as [redacted] in expenditures relating to the software that Garmin says does not run on the Health Band device. *Id.* at 12-13. If these expenditures are removed, Garmin calculates that Philips's expenditures under subsection (C) are less than [redacted] over four years, "an insubstantial sum." *Id.* at 13.

Staff asserts that Philips cannot satisfy the economic prong with respect to the '464 patent because the Health Band was not available for sale in the United States as of the date that the complaint in this investigation was filed. Staff reasons that Philips must therefore satisfy the requirements for a domestic industry in the process of being established. Staff argues that Philips can demonstrate that it is taking the necessary and tangible steps to establish an industry in the U.S., but not that there is a significant likelihood that it will do so in the future.

Staff attaches significance to the fact that the Health Band is manufactured solely [redacted] and concludes that Philips has not presented sufficient evidence "to conduct a proper 'value added' analysis for the domestic contributions to the Health Band." SIB at 119. Staff maintains that Philips's expenditures for labor and capital of [redacted] since 2016 for the Health Band device are not quantitatively significant because those expenditures have not been compared to foreign expenditures. Staff focuses on the fact that there will be no [redacted] related to the Health Band.

Similarly, Staff notes that Philips's research and development costs from 2016 to 2020 total [redacted] or roughly [redacted] per year. Staff says Philips's non-labor investment in research and development of about [redacted] over several years is insubstantial. Staff alleges further that Philips has overstated its research expenditures by including a payment of [redacted] and nearly [redacted] from the time before Philips acquired the'464 patent. Staff also takes the view that expenditures on the PASS 2.0 are not sufficiently related to the technology claimed in the '464 patent because the "primary function of PASS 2.0 is to receive, display, and store data collected by the Health Band. SIB at 121. Staff rejects Philips's argument that PASS 2.0 is relevant to the recording element of claim 1 because it allows for remote acquisition of data from the Health Band. Staff says that expenditures on the PASS 2.0 do not have "qualitative significance either." *Id.*

Staff faults Philips for not comparing foreign to domestic expenditures under subsection (C) as under subsection (B), and states that Philips has not "demonstrated how the [redacted] domestic investment over several years is significant in context." SRB at 51-52. Staff maintains that, given that the Health Band was partly developed and will be [redacted]

[redacted], these foreign expenditures would be highly relevant to the context of the domestic expenditures.

Further, Staff argues that there is no showing of significant likelihood that a domestic industry will be established in the future because Philips does not substantiate future research and development expenditures, and such investments have "actually decreased." SIB at 123. Staff says Philips's claims for expected activities for customer and product support lack sufficient detail. Staff points to Philips's "meager" investment of [redacted] in labor (and R&D) for the first quarter of 2020. SRB at 54.

**2. Discussion**

**a. Domestic Industry Law**

In patent-based proceedings under section 337, a complainant must establish that an industry "relating to the articles protected by the patent . . . exists or is in the process of being established" in the United States. 19 U.S.C. § 1337(a)(2). Under Commission precedent, the domestic industry requirement of section 337 consists of an "economic prong" and a "technical prong." *See, e.g., Alloc, Inc. v. Intl Trade Comm'n,* 342 F.3d 1361, 1375 (Fed. Cir. 2003). To meet the technical prong, the complainant must establish that it practices at least one claim of the asserted patent. *Certain Point of Sale Terminals and Components Thereof*, Inv. No. 337-TA-524, Order No. 40 at 17-18 (Apr. 11, 2005). "The test for satisfying the 'technical prong' of the industry requirement is essentially [the] same as that for infringement, *i.e.*, a comparison of domestic products to the asserted claims." *Alloc*, 342 F.3d at 1375.

With respect to the "economic prong," subsection (3) of Section 337(a) provides:

> For purposes of paragraph (2), an industry in the United States shall be considered to exist if there is in the United States, with respect to the articles protected by the patent, copyright, trademark, mask work, or design concerned –

> (A) significant investment in plant and equipment;
>
> (B) significant employment of labor or capital; or
>
> (C) substantial investment in its exploitation, including engineering, research and development, or licensing.

19 U.S.C. § 1337(a)(3). A complainant can establish a domestic industry under subsection (A), (B), or (C) of section 337(a)(3). *Certain Optical Disc Drives, Components Thereof, and Prods. Containing the Same,* Inv. No. 337-TA-897, Order Remanding the Investigation at 4 (Sept. 4, 2014) (*citing Certain Electronic Devices, Including Wireless Communications Devices,* Inv. No. 337-TA-667/673, Order No. 49C at 4 (unreviewed) (Nov. 16, 2009)). Under subsections (A) and (B), the economic prong focuses on "articles protected by the patent." 19 U.S.C. § 1337(a)(3). Expenditures may be counted toward satisfaction of the domestic industry requirement "as long as those investments pertain to the complainant's industry with respect to the articles protected by the asserted IP rights." *Certain Television Sets, Television Receivers, Television Tuners, and Components Thereof*, Inv. No. 337-TA-910, Comm'n Op. at 68, 2015 WL 6755093, at *36 (Oct. 30, 2015); *accord, e.g., Certain Marine Sonar Imaging Devices, Including Downscan and Sidescan Devices, Prods. Containing the Same, and Components Thereof,* Inv. No. 337-TA-921 (Comm'n Op. at 61) ("Navico's allocation methodology reasonably approximates the warranty and technical customer support expenditures relating to the LSS-1 product.") (*citing Certain Ground Fault Circuit Interrupters and Prods. Containing Same,* Inv. No. 337-TA-739, Comm'n Op. at 74-75, 79-81 (June 8, 2012)).[26] To satisfy the "with respect to" requirement,

[26] As noted below, section 337(a)(3)(C) adds the requirement to show a nexus to the patent itself, whereas subparagraphs (A) and (B) require a nexus only to the articles protected by the patent. To satisfy the economic prong, a complainant can rely on investments or employment "directed to significant components, specifically tailored for use in an article protected by the patent." *Motorola Mobility, LLC v. Int'l Trade Comm'n*, 737 F.3d 1345, 1351 (Fed. Cir. 2013).

complainants may use some type of allocation methodology to separate expenditures on DI products from non-qualifying investments.

Also, under subsections (A) and (B), a licensing entity (one that does not manufacture articles for sale) can rely on the expenditures of its (manufacturing) licensees to establish a domestic industry. *Certain Variable Speed Wind Turbines and Components Thereof,* Inv. No. 337-TA-376, Remand Comm'n Op. at 7-8, (August 21, 1997). In that fact pattern, the licensee's expenditures allocable to the product or products that practice the patented technology count toward satisfaction of the economic prong.

Whether a complainant satisfies the economic prong is not analyzed according to a rigid mathematical formula. *Certain Male Prophylactic Devices*, Inv. No. 337-TA-546, Comm'n Op. at 39 (Aug. 1, 2007). The decision is made on a case-by-case basis and requires "an examination of the facts in each investigation, the article of commerce, and the realities of the marketplace." *Id.* Although Section 337(a)(3) describes the economic activities as "significant" and "substantial," a complainant does not need to show any "minimum monetary expenditure," and a complainant does not "need to define or quantify the industry itself in absolute mathematical terms." *Certain Stringed Musical Instruments,* Inv. No. 337-TA-586, 2009 WL 5134139, Comm'n Op. at 16. "A precise accounting [of the complainant's domestic investments] is not necessary, as most people do not document their daily affairs in contemplation of possible litigation." *Id*. at 17.

A domestic industry is in the process of being established if the complainant demonstrates that it is "'taking the necessary tangible steps to establish such an industry in the United States'" and there is a "'significant likelihood that the industry requirement will be satisfied in the future.'" *Certain Non-Volatile Memory Devices and Prods. Containing the Same*

("*Non-Volatile Memory*"), Inv. No. 337-TA-1046, Comm'n Op. at 29 (Oct. 9, 2018) (quoting *Stringed Musical Instruments,* Inv. No. 337-TA-586, 2009 WL 5134139, Comm'n Op. at *10 (May 16, 2008)).

Philips claims to satisfy the requirements of subsections (B) and (C) of section 337(a)(3). Objections raised by Garmin and Staff are discussed below.

### b. 337(a)(3)(B) – Labor and Capital

There is, perhaps, no more salient principle in the law governing satisfaction of the economic prong than this: numbers alone do not demonstrate significance or insignificance.[27] Thus, all the arguments raised by Garmin and Staff to the effect that the absolute amount of Philips's domestic investments in the Health Band is too low to be significant are futile. Similarly, arguments based on the small number of employees involved in activities related to the Health Band do not establish insignificance. Such factors are relevant, but only in the whole context of the alleged domestic industry.

#### i. Nexus Between Patented Technology and Domestic Industry

Under subsection (B) of section 337(a)(3), it is sufficient if the domestic industry product includes the patented technology. Costs may be included as domestic industry investment if they are associated with the domestic industry article. That article, in many instances, will be a larger unit than the patented article. A further showing of a nexus to the patent is required only under subparagraph (C) of section 337(a)(3). *Non- Volatile Memory,* Inv. No. 337-TA-1046, Comm'n

[27] The pertinent question is the significance of expenditures in context. *See Certain Carburetors & Prod. Containing Such Carburetors,* Inv. No. 337-TA-1123, Comm'n Opinion, 2019 WL 5622443 at *12 (Oct. 28, 2019) ("Walbro has cited no case in which the Commission determined the quantitative significance of a complainant's domestic industry investments based solely on the absolute value of those investments.").

Op. at 41 (citing 19 U.S.C. § 1337(a)(3)(C); *Certain Integrated Circuit Chips,* Inv. No. 337-TA-859, Comm'n Op., 2014 WL 12796437, at *21 (Aug. 22, 2014)).

Because the Health Band functions along with the PASS 2.0 software, domestic activities in connection with the development of the software may appropriately be counted toward satisfaction of the economic prong under subparagraph (B). "The Commission has defined the domestic industry to include investments necessary to bring to market the patented technology as embodied in the asserted domestic industry products." *Certain Magnetic Tape Cartridges and Components Thereof* ("*Maganetic Tape*"), Inv. No. 337-TA-1058, Comm'n Op. at 53 (citing *Certain Video Game Sys. and Wireless Controllers and Components Thereof,* Inv. No. 337-TA-770*,* Comm'n Op. at 70 (Oct. 28, 2013) (including investments "central to enabling [the complainant] to exploit the technology of the claimed toy wands"); *Sleep-Disordered Breathing,* Inv. No. 337-TA-890*,* ID at 147 (finding "that the S9 flow generator is central to enabling [the complainant] to exploit the patented technology of the H5i humidifier")). The product incorporating the patent does not need to be "a closed, proprietary" system, as in *Magnetic Tape*. *Id.* The important fact is that, given "the realities of the marketplace," the patented product cannot be used as intended without the additional device. *Id.* [28]

[28] Philips argues that Garmin and Staff waived this argument, citing Ground Rules 8.2 and 11.1. I find no evidence of waiver. *See* SPHB at 121 ("Philips' R&D estimate includes R&D expenditures related to development of the mobile application and web product ('PASS 2.0') associated with the Health Band device. (*Id.* at Q/A 234). As the primary function of PASS 2.0 is to receive, display, and store data collected by the Health Band, PASS 2.0 does not contextually appear to be directly related to the exploitation of any specifically claimed element of the '464 Patent, and therefore these R&D expenditures related to PASS 2.0 do not appear to reflect a nexus to the patented invention, or to have qualitative significance either. (*Id*. at Q/A 70)".).

### ii. Expenditures Incurred Before the Patent Was Acquired

Garmin argues that Philips MB's expenditures were incurred two years before Philips acquired the '464 patent at auction. Expenditures made before a complainant obtains a patent count as domestic industry investments under subsection (B) so long as the Commission's investigation shows the expenditures are related to the alleged domestic industry product. *Cf. Certain Video Game Systems and Controllers*, Inv. No. 337-TA-743, Comm'n Op. at 6 (April 13, 2011) ("As an initial matter, we find that the ALJ erred in declining to consider Motiva's activities that occurred before the issuance of the asserted patents. . . . We find that the language of sections 337(a)(2) and 337(a)(3) is broad enough to cover 'investments' made before issuance of the patent."). "[S]o long as these investments relate to the invention claimed in the later-granted patent(s)," they are cognizable. *Id.* at 7-8.

I see no reason why expenditures cannot relate to a product and therefore be cognizable under subparagraph (B) simply because the activities that gave rise to those expenditures occurred before the patent that protects the DI products was acquired. Similarly, if the investigation shows such expenditures are related to the patented technology at issue, they count under subsection (C). Garmin has cited no case law supporting the notion that a complainant must own the patent at issue when the expenditures are made to satisfy the economic prong, and I find some precedent to the contrary. As the Commission expressly stated in *Certain Optical Disc Drives, Components Thereof, and Prods. Containing the Same,* Investigation No. 337-TA-897, Corrected Order Remanding the Investigation at 4 (Sept. 29, 2014), "the statute requires only that 'an industry in the United States shall be considered *to exist[,]*' but does not specify that such industry must be comprised of one particular entity, *i.e.,* the complainant . . . ."

Hypothetically, a domestic industry could be comprised of activities and investments made by an entity that no longer owns the asserted patent.

#### iii. Comparison with Other Philips Components

Garmin maintains that Philips is required to compare Philips MB with other components of the Philips corporate organization, including the unit of which it is a part. Philips MB is the only component involved in developing the Health Band product for the market, however. The Commission has not required a comparative analysis of a complainant's unrelated business operations as part of establishing the context of a domestic industry.

#### iv. Domestic v. Foreign Investments

Where a product is manufactured overseas, there may be a question about the significance of the domestic investments. *Certain Printing Devices and Imaging Devices and Components Thereof* ("*Printing Devices*"), Inv. No. 337-TA-690, Comm'n Op. (Feb. 17, 2011), 2011 WL 7628059, at *20 ("Aside from acknowledging that the C200 series printers and MFPs were manufactured entirely abroad, Ricoh has provided no evidence regarding its foreign *product-related* investment and/or employment activities.") (emphasis added). It is well established, however, that a comparison of domestic to foreign expenditures is not necessary in every case to satisfy the economic prong. "Thus, while foreign manufacturing costs may be relevant to proving that a complainant's investments are significant or substantial, [the respondent] has provided no authority that compels a finding that domestic investments cannot satisfy the domestic industry requirement in the absence of presenting a comparison of foreign manufacturing costs to a complainant's U.S. investments." *Certain Movable Barrier Operator Systems and Components Thereof* ("*Movable Barrier*"), Inv. No. 337-TA-1118, Comm'n Op. at 24 (Jan. 12, 2021). In *Movable Barrier*, the Commission explained that while "the complainant

in *Printing Devices* had presented no evidence or contextual analysis to determine whether its service and repair activities were significant," in other cases a contextual analysis demonstrated that a complainant's service, repair, and other post-sale activities were . . . significant and satisf[y] the economic prong requirement, based on the facts of those cases." *Id.* (citing *Printing Devices* at *16).

In this case, however, where the product is not yet on sale and there exists, as a result, no basis to conclude that domestic expenditures in connection with product sales and services are significant, a comparison of domestic to foreign expenditures is one of the few available methods to establish the full context of claimed expenditures. Such a comparison is particularly important in this case because it is undisputed that development of the Health Band began overseas and was later transferred to Philips's U.S. facility. Philips states: "Development of the device, which at the time was called Health Watch, began by Philips Health Solutions ('PHS') in Eindhoven, Netherlands." CIB at 220 (citing CX-0008C (Ridgway DWS) at Q/A 9). "PHS abandoned development of, and did not launch, the product, and design documentation for the device was transferred to the Philips MB business unit for further development and commercialization in the United States." *Id*. Philips has not provided information regarding foreign expenditures that would provide additional context for the domestic investment in development of the Health Band. Because the Health Band was partly developed in a foreign country, it is necessary to evaluate the relationship between the research and development costs incurred abroad compared to the costs incurred in the U.S. to determine whether the domestic R&D expenditures are significant. Foreign expenditures are particularly relevant to the economic prong in this case because the DI product [redacted] and the only asserted costs

going forward are a minimal amount of engineering activity as well as product and customer support.

#### v. No Value-Added Analysis

Value-added analysis is not strictly required to demonstrate a significant domestic industry, but may be useful. *Movable Barrier,* Remand Order at 6 (May 4, 2020) ("Among the analyses that may be helpful to the Commission in ascertaining significance are a comparison of domestic and foreign investments or expenditures in relation to the DI products or a value-added analysis."). Philips should have provided information on the expenditures that were made in the Netherlands on the Health Band before development of the product was moved to the United States. This information would provide a useful perspective on the significance of the amounts invested in the United States. It also would be helpful to know which aspects of the alleged DI product were designed in the Netherlands. Garmin states, for example, that the "functionality that was developed in Europe" includes the heart rate monitoring and accelerometer. RIB at 243 (citing RX-0562C (Milani RWS) at Q/A 46; RX-0687C (Ridgway Tr.) at 74:16–76:23). Knowing this kind of information permits an assessment of the context in which the alleged DI expenditures were made and their significance. Without this information, it is diffficult to conclude that the expenditures presented are significant in themselves, and I find that Philips has failed to carry its burden under subparagraph (B).

### c. 337(a)(3)(C) – Research and Development

Garmin and Staff make many of the same arguments discussed above with respect to subparagraph (B) investments. Among other items, Garmin challenges a payment of [redacted] that appears to have been made to [redacted] and was wrongly included as part of Philips's domestic investment. Philips essentially concedes that it allocated about [redacted] to

expenditures that were paid to [redacted]. *See* CRB at 120. The alleged domestic industry investment should be reduced by that amount. But the balance of expenditures is not, as Garmin contends, *per se* insignificant.

Garmin also asserts that Philips's expenditures of nearly [redacted] for the PASS 2.0 software fail the special nexus requirement under subsection (C). *See, e.g., Certain Solid State Storage Drives*, Inv. No. 337-TA-1097, Comm'n Op. at 13. *See* CX-200C (listing expenditures relating to Health Band and PASS 2.0 software). According to Garmin: "the PASS 2.0 software simply allows for *remote acquisition* of data from the Health Band device." RIB at 247 (citing CX-1392 (Akemann DWS) at Q/A 69; CX-0012C (Young DWS) at Q/A 270). Garmin notes that the PASS 2.0 and the Health Band device [redacted], *id.* (citing Tr. (Akemann) at 115:4-116:5), and that the PASS 2.0 expenditures are "*entirely unrelated* to the Health Band device's heart rate monitoring and accelerometer functionality." Garmin asserts that, "at most," the PASS 2.0 software "just repeats a single claimed step—recording in a memory device the monitored plurality of readings from the sensor'—that is already performed by the Health Band device." *Id.* (citing CX-0012C (Young DWS) at Q/A 270). Garmin argues that, as a result, the PASS 2.0 software is "irrelevant" and unrelated to the patent. *Id.*

I agree with Garmin that the heart rate data is first recorded on the Philips Health Band before being recorded on the PASS 2.0 database. This means that the claimed method of the '464 patent already has been fully performed by the time that the data is recorded on the PASS 2.0. While it is true that the PASS 2.0 permits remote acquisition of data from the Health Band, CX-0008C (Ridgway DWS) at Q/A 9, and the PASS 2.0 is sufficiently related to the patented invention to qualify as part of the domestic industry under subparagraph (B), it does not have a

sufficient nexus to the patent to permit expenditures for the PASS 2.0 to be counted as part of the domestic industry under subparagraph (C).

In addition, Philips's showing fails under subparagraph (C) for the same reason as under subparagraph (B)— the facts of this case necessitate a comparison of domestic to foreign expenditures for research and development, or a value-added type of analysis. Since research and development accounts for most of Philips's alleged domestic industry investment, it is important to know whether the domestic investments in research and development were quantitatively and qualitatively significant. The necessary comparison of domestic to foreign expenditures for research and development is missing under subparagraph (C) as under subparagraph (B). *See supra.*

**d. DI in the Process of Being Established**

As stated above, "[i]n a patent-based investigation, the complainant must show that an industry in the United States 'relating to the articles protected by the patent . . . exists or is in the process of being established.'" *Non-Volatile Memory*, Comm'n Op. at 29 (quoting 19 U.S.C. § 1337(a)(2)). "The Commission has held that a domestic industry is in the process of being established when (1) a patent owner takes 'the necessary tangible steps to establish such an industry in United States,' and (2) there is a 'significant likelihood that the industry requirement will be satisfied in the 'future.'" *Id.* (quoting *Stringed Musical Instruments,* 2008 WL 2139143, at *7). "'The owner of the intellectual property right must be actively engaged in steps leading to the exploitation of the intellectual property, including application engineering, design work, or other such activities.'" *Id.* (quoting H. Rep. 100-40 at 157).

The "dwindling" of research and development expenditures related to the Health Band is to be expected, because that phase of the domestic industry project is ending. Therefore, this is

not a factor indicating lack of a domestic industry in the process of being established. Philips asserts that a new phase of commercialization is beginning, and there is nothing in the record that persuades me that this assertion is untrue. Moreover, Philips submits that the commercialization of the Health Band is qualitatively and quantitatively significant because it is an innovative new commercial product that is an important driver of expected growth and profitability for the Philips MB business. CIB at 227-29.[29]

Staff objects that there is insufficient substantiation of the likelihood that a domestic industry will be established, but Staff does not consider the circumstantial evidence of a future domestic industry. Philips MB says it plans to continue some engineering activities in the U.S. and, more importantly, to establish customer service and product support operations to facilitate the sale and distribution of the Health Band to academic and other research entities. *See* CX-0008C (Ridgway DWS) at Q/A 15. Indeed, the fact that Philips MB has invested in development of the Health Band product in order to distribute and sell it, *see* CX-0008 (Ridgway DWS) at Q/A 7, constitutes circumstantial evidence that Philips MB will establish the necessary infrastructure to carry out its plans. As outlined by the testimony of Peter Ridgway, the Philips project manager, *see* CX-0008C at Q/A 14-15, commercialization of the Health Band will

[29] Dr. Akemann identifies several factors establishing the significance of these investments:

- The Health Band device is an innovative new commercial product that is an important driver of expected growth and profitability for the Philips Motion Biosensor business.
- The absolute level of the Health Band R&D investment is not too large, but the product is the most important product for Philips Motion Biosensor and is its primary focus going forward.
- The Health Band device is a large fraction [redacted] of the product lines of Philips Motion Biosensor.

CX-1392C (Akemann DWS) at Q/A 214, 235.

require maintaining a force of employees of approximately [redacted] individuals.[30] Philips even has established a pricing structure for the Health Band. *Id.* at Q/A 14 ("[T]he Health Band device itself will sell for [redacted], and a license for PASS will cost [redacted] for one year or [redacted] for five years."). These activities certainly indicate a "'significant likelihood that the industry requirement will be satisfied in the 'future.'" *Non-Volatile Memory*, Comm'n Op. at 29 (quoting *Stringed Musical Instruments,* 2008 WL 2139143, at *7).

In sum, I find that Philips has failed to establish a domestic industry as of the date of filing the complaint because it has presented insufficient context for its domestic expenditures, as compared to its overseas expenditures, under subsections (B) and (C). In addition, under subsection (C), it has failed to demonstrate an adequate nexus between the PASS 2.0 and the patented technology. On the other hand, Philips has established that a domestic industry is in the process of being established. Accordingly, the economic prong is satisfied for the '464 patent.

### F. Patent Eligibility

#### 1. Background

Philips asserts independent claim 1 and dependent claim 6 of the '464 patent. As stated by Philips: "In the asserted claims, the movement of a body part is monitored by determining whether the output signal from an accelerometer falls within a predetermined range. Readings from the transdermal monitoring sensor on that body part may then be monitored by a processor over a time window that coincides with the output signal from the accelerometer remaining

[30] "[S]ustaining engineering activities to continue to meet ongoing customer demand and technology improvement will continue, which will comprise [redacted] engineers stationed at SRC's facilities in Pittsburgh, Pennsylvania." CX-0008C (Ridgway DWS) at Q/A 15. In addition, Philips Motion Biosensor will also staff customer service, product support, and a clinical trial operations team on an ongoing basis out of its Bend, Oregon facility. These operations will comprise approximately [redacted] Philips Motion Biosensor employees." *Id*.

within the predetermined range." CIB at 13.

Claim 1 of the '464 patent recites:

> 1. A method for minimizing the effects of motion artifact on sensor readings taken during continuous transdermal monitoring of a body part in motion, the method comprising:
>
> monitoring, with a processor, an output signal from an accelerometer, wherein the output signal indicates acceleration and deceleration of the body part of a user as the body part is in motion;
>
> determining, with the processor, that the output signal is within a predetermined range that includes indication of acceleration and deceleration, wherein indication of acceleration and deceleration corresponds with a motion direction change of the body part in motion;
>
> based on the determination that the output signal is within the predetermined range, monitoring, with the processor, a plurality of readings from a sensor, wherein monitoring the plurality of readings from the sensor occurs over a time window that coincides with the output signal remaining within the predetermined range; and
>
> recording in a memory device the monitored plurality of readings from the sensor.

'464 patent at 20:30-51. Claim 6 adds to the method of claim 1 the limitation that "the accelerometer is a 3-axis accelerometer." *Id.* at 66-67.[31]

Garmin maintains that the claims are directed to patent-ineligible subject matter under section 101 and *Alice*. It says the claims utilize conventional data monitoring functions that could be performed by a human being observing an accelerometer's output signal on an oscilloscope display. It argues further that, if the signal is within a predetermined range, the person could record the sensor's signal readings with a pen on a piece of paper. By this means, Garmin asserts, the goal of the claim 1, to minimize inaccuracies attributable to motion artifacts

[31] Philips does not suggest that the addition in claim 6 of a 3-axis accelerometer saves the patent from ineligibility.

by improving the timing of measurements taken during monitoring, could be realized without the use of electronic media.

Philips maintains that the asserted claims affect the functionality of pulse oximeters, improving their accuracy by monitoring readings only during periods in which an output signal from an accelerometer is within a predetermined range of acceleration and deceleration. This method overcomes a problem arising in the realm of computer processing and is therefore patentable, Philips states.

Philips argues that, even if the claims are directed to an abstract idea, they are saved under step two of *Alice* because they solve a technological problem by minimizing motion artifacts. An improvement in computer functionality results, Philips argues, from the "non-routine elements of monitoring an output signal from an accelerometer that indicates acceleration and deceleration, monitoring readings from a sensor based on the determination that the output signal is within a predetermined range, and monitoring over a time window that coincides with the output signal of the accelerometer remaining within the predetermined range." CIB at 218. Philips asserts that the claims are narrower than the ones that resulted in findings of ineligibility of other patents claiming fitness tracking devices, and that the claimed invention does not pre-empt any field.

Staff agrees that under step one of *Alice* the claims are ineligible, stating: "[b]ecause the '464 Asserted Claims are directed to monitoring and recording data, they are indisputably directed to abstract ideas." SIB at 112 (citing *Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350, 1353 (Fed. Cir. 2016) (claims to "real-time performance monitoring . . . by collecting data from multiple data sources" were ineligible because they "d[id] not go beyond requiring the collection, analysis, and display of available information in a particular field")). Staff says the

claims fail under step two as well because they are simply directed to conventional computer functionality. Staff notes that the Commission has affirmed several rulings finding that activity trackers that essentially perform similar functions as the inventions in this case have failed the *Alice* test. "In *Certain Activity Tracking Devices*, for instance, [the Commission] held that the claims of two patents (and later an additional two patents) were directed to ineligible subject matter. One of the patents was directed to "'using wearable sensors to collect data for transmission to a computer,'" and the claims were found to be directed to ineligible subject matter because they claimed a method performed by an activity device that "'generally can be performed by human beings without computers.'" *Id.* at 113 (quoting *Certain Activity Tracking Devices,* Inv. No. 337-TA-963, Order No. 40 at 29 (Mar. 3, 2016), reviewed and aff'd with modification, Comm'n Notice (April 4, 2016)); *see also Certain Activity Tracking Devices,* Inv. No. 337-TA-963, Order No. 54 at 24 (April 27, 2016), unreviewed, Comm'n Notice (June 2, 2016).

**2. Discussion**

*Alice* requires at the first step of the analysis that an abstract idea be identified. The idea of minimizing movement to record data more accurately is abstract. This is the idea of the '464 patent. The idea is no different than a photographer pressing the shutter release during a pause between inhalation and exhalation. By timing the shutter release to coincide with the pause, the photographer reduces movement of the camera (sensor) to capture a better image (data).[32]

[32] The accused method employs the concept behind the words "hold still so I can take your picture," a method that has been employed for well over a hundred years in the field of photography and many centuries before that in the art of portrait painting.

The human eye and mind have performed the functions described in the '464 patent for ages. "The greater efficiency and accuracy that automation offers have not been recognized as features that make an abstract idea patentable." *Certain Road Constr. Machines and Components Thereof,* Inv. No. 337-TA-1088, Order No. 18, 2018 WL 2459016, at *10 (May 24, 2018) (citing *Smart Systems Innovations, LLC v. Chicago Transit Authority,* 873 F.3d 1364, 1372 (Fed. Cir. 2017) rejecting argument of patent eligibility based on "speeding up the process.")), *aff'd*, Comm'n Determination, 2019 WL 6003332 (July 15, 2019); *Bancorp. Servs., LLC v. Sun Life Assurance Co. of Canada,* 687 F.3d 1266, 1278 (Fed. Cir. 2012) ("[T]he fact that the required calculations could be performed more efficiently via a computer does not materially alter the patent eligibility of the claimed subject matter.").

Philips says the method of the '464 patent is drawn narrowly and does not raise the concerns underlying *Alice*. Examination of the patent specification refutes Philips's assertion. While the subject of the patent ostensibly is limited to pulse oximetry, the specification states repeatedly that the patent has numerous and wide-ranging applications. '464 patent at 3:1-3 ("[T]he described CTM [continuous transdermal monitoring] embodiments provided herein are illustrative only and not limiting, having been presented by way of example only."). *See also, e.g., id.* at 4:33-40 ("Certain CTM embodiments may also monitor via one or more sensors any number of physiological and/or non-physiological parameters associated with the subject including, but not limited to, pulse rate, blood oxygen saturation, transdermal core temperature, Global Positioning System ('GPS') coordinates, 3-axis accelerometer outputs, skin and ambient temperature readings, hydration levels, and barometric readings."), 5:21-28 ("Using one or more readings generated by the sensors, a user's blood pressure may be estimated using linear regression. The accelerometer may also be used to determine the amount of time the user sleeps

by tracing movement. All of these readings may be taken in real time and relayed wirelessly to a portable computing device, or other computing device, such as a Smartphone or computer."), 5:44-50 ("Certain CTM embodiments may store data collected by a sensor package, output data to a user in real time, transmit collected data to a remote device such as a server, or any combination thereof. The collected data may be leveraged by certain CTM embodiments to generate a general fitness factor from a weighted computation of multiple sensor outputs."), 5:62-67 ("Moreover, individual metrics such as metabolic expenditure, resting heart rate, maximum heart rate, gender, age, heart rate variability, heart rate recovery, height, weight, and other metrics may also be tracked and incorporated into the fitness factor in some embodiments."), 6:7-11 ("For instance, a football team using a CTM embodiment may determine how demanding practice should be for a given week based on the players' average fitness level according to outputs generated by a fitness factor algorithm."). What these instances show is that the scope of the patent is broad because its premise—"minimizing the effects of motion artifacts errors when the [CTM] reading(s) is taken"—is abstract. *Id.* at 6:32-33. This conclusion is reinforced by the highly generalized description of the invention in the claim language. *See* '464 patent at 20:34 ("monitoring, with a processor"), 20:38 ("determining, with the processor"), 20:50 ("recording in a memory device").

The lack of any technological innovation is evident from the fact that the invention is simply another way of using existing technology. Philips does not claim to have invented sensors, processors, accelerometers, or any other electronic devices that make transdermal monitoring possible. It describes no innovative arrangement of the existing technology that transforms their abstract idea into a patentable invention.

Accordingly, for the reasons discussed by Garmin and Staff, claims 1 and 6 of the '464 patent are ineligible under *Alice* and the Commission' decisions in *Certain Activity Tracking Devices*. Garmin and Staff have carried their burden to demonstrate by clear and convincing evidence that the claims of the '464 patent are invalid under section 101.

### G. Anticipation and Obviousness

Garmin and Staff contend that the PCT Application WO 2011/0102044 to Marcus Schwenk *et al.* ("Schwenk;" JX-0141) anticipates claims 1 and 6 of the '464 patent.[33] Although Garmin and Staff contend that Schwenk discloses every element of the asserted claims, they argue in the alternative that if Schwenk "does not explicitly disclose an element, that element would have been obvious in view of the knowledge of a person of ordinary skill in the art." RIB at 236; *see also* SIB at 109 ("To the extent that Schwenk does not explicitly disclose the claimed '3-axis accelerometer' in dependent claim 6, that element would likely have been obvious in view of the knowledge of a person of ordinary skill in the art.").

#### 1. Overview of Schwenk

Schwenk was published on January 27, 2011. JX-0141.0001. The earliest alleged priority date of the '464 patent is April 15, 2014. Accordingly, as a printed publication available

[33] In addition, Garmin contends that "under Philips's understanding of the claim scope, the '464 Asserted Claims are invalid based on the Mannheimer (JX-0162), Sun (JX-0140), and Venkatraman (JX-0150) references." RIB at 193. In particular, Garmin contends that that the three references invalidate the asserted claims if the "predetermined range" limitation is interpreted consistent with Philips's infringement and domestic contentions, such that the limitation "is met by determining an accelerometer output's magnitude value and subsequently comparing it with a threshold value." RIB at 194. As discussed above, the accused products and domestic industry products do not satisfy the "predetermined range" limitation. Accordingly, the Mannheimer (JX-0162), Sun (JX-0140), and Venkatraman (JX-0150) references also do not satisfy the limitation.

to the public before the priority date of the '464 patent, Schwenk is prior art under 35 U.S.C. § 102(a)(1) (AIA).

Schwenk discloses "a method for operating a monitoring system for monitoring physiological data of a patient." JX-0141.0001 (Abstract). In addition to monitoring a patient's physiological data, the method monitors the patient's motion activity. *Id.* at .0003. In order to save power, Schwenk teaches that the monitoring system should not initiate the measurement of physiological data if the patient's motion activity is zero. *Id.* at .0004. A motion activity level of zero means that there is no detectable motion, which indicates that the monitoring system is not attached to a user. *Id.* at .0003-.0004. Schwenk further teaches that motion artifacts can be reduced if physiological measurements, such as pulse oximetry readings, are made during periods of low motion activity on the part of the patient. *Id.*

To allow for physiological readings to be taken during periods of the low motion activity, but not when the motion activity is zero, Schwenk teaches that "a measurement of physiological data of the patient can be initiated/activated/started, if the motion activity is non-zero or rather greater/above zero, and below a selected threshold." *Id.* Schwenk further teaches that "an ongoing measurement of physiological data is shut down/deactivated/stopped, if the motion activity is above or equal to a selected threshold." *Id.* As a further improvement, Schwenk discloses that the method can include the step of "analyzing . . . the motion activity pattern, for one or more motion situations." *Id.* at 8. With this additional step, "the measurement of physiological data of the patient can be initiated, and for example subsequently switched off, at a point in time, which is estimated to have a low motion activity according to the analyzed motion characteristics and/or motion situation." *Id.* Schwenk provides the following example of how this improvement could be applied: "For example, in the motion situation 'reading a book' the

measurement of physiological data of the patient could be initiated, and preferably subsequently switched off, within the long intervals with low motion activity between the short intervals for page turning." *Id.*

**2. Discussion**

Schwenk discloses a method in which pulse oximetry readings and other physiological readings are taken if the user's activity level falls between two predetermined, non-zero thresholds. Consistent with the analysis of the accused and domestic industry products, such thresholds form a "predetermined range." The range, however, would not include the required "indication of acceleration and deceleration" that "corresponds to a motion direction change of the body part in motion."

As pointed out by Dr. Young, a "'predetermined range that includes indication of acceleration and deceleration' in reference to an accelerometer signal necessarily includes a point of zero acceleration (which would correspond to an accelerometer output signal value of zero)" because, "for an accelerometer signal, acceleration corresponds to a positive value along a particular axis, whereas deceleration corresponds to a negative value along that axis." CX-0014C (Young RWS) at Q/A 100. In other words, according to Dr. Young, in order to provide an indication of acceleration and deceleration a range must include positive and negative values. Such a range would necessarily include zero, which Schwenk explicitly teaches should be excluded from any range. *See, e.g.,* JX-0141.0001 (Abstract) ("For saving power, motion activity data of the patient is obtained and the measurement of physiological data of the patient is initiated, if the motion activity is non-zero and below a selected threshold."), .0004 ("In particular, a measurement of physiological data of the patient can be initiated/activated/started, if the motion activity is non-zero or rather greater/above zero, and below a selected threshold.").

Dr. Young's interpretation of "predetermined range" limitation with respect to Schwenk appears to mirror Dr. Daft's interpretation of the limitation for non-infringement. For infringement and domestic industry, Dr. Daft used a demonstrative to illustrate the parties' competing interpretations of the claimed "predetermined range."



RDX-0002C.4. RX-0559C (Daft RWS) at Q/A 49.

Dr. Daft's exemplary "predetermined range" shown on the left stretches from negative five to positive five and encompasses zero. As explained by Dr. Daft, to provide an indication of acceleration and deceleration a range must have both negative and positive values: "The left side of RDX-0002C.4 illustrates a predetermined range from negative 5 to positive 5. As I explained earlier, the negative value corresponds with deceleration, and the positive value corresponds with

acceleration. Also, the two numbers—negative 5 and positive 5—define a *range* of acceleration and deceleration." *Id.*

The range formed by the threshold shown on the right of Dr. Daft's demonstrative extends from zero to five and contains only positive values. According to Dr. Daft, the range created by such a threshold would not include an indication of acceleration and deceleration because it does not encompass any negative values. RX-0559C (Daft RWS) at Q/A 49. The range in Schwenk, [redacted]. The only difference between the ranges is that the range in Schwenk extends between two non-zero thresholds, while [redacted] For example, the range created by the threshold shown on the right of Dr. Daft's demonstrative extends from zero to five. In accordance with Schwenk, a second non-zero threshold, such as one, could be added, so that measurements are not taken when the motion level is zero. The resulting range—*e.g.,* one to five—would still be comprised of only positive values. Neither Garmin and Staff explain why a range composed solely of positive values does not provide an "indication of acceleration and deceleration" in the context of infringement and domestic industry but provides such an indication in the context of Schwenk. *Source Search Techs., LLC v. LendingTree, LLC,* 588 F.3d 1063, 1075 (Fed. Cir. 2009) ("As this court has repeatedly instructed in the past, '[i]t is axiomatic that claims are construed the same way for both invalidity and infringement.'") (quoting *Amgen Inc. v. Hoechst Marion Roussel, Inc.,* 314 F.3d 1313, 1330 (Fed. Cir. 2003)).

Although Garmin and Staff contend that if Schwenk "does not explicitly disclose an element, that element would have been obvious in view of the knowledge of a person of ordinary skill in the art," they do not address why a "predetermined range that includes indication of

acceleration and deceleration" would have been obvious. The only evidence cited by Garmin and Staff with respect to their contention that Schwenk renders the claims obvious is Dr. Daft's opinion that the "recording" limitation—"recording in a memory device the monitored plurality of readings from the sensor"—would have been obvious to one of ordinary skill in the art. RIB at 236 (citing RX0558C (Daft DWS) at Q/A 68, 69); SIB at 109 (same). To modify the range disclosed in Schwenk to provide the required indication of acceleration and deceleration, the disclosed range would have to be expanded to encompass negative as well as positive values. Such an expanded range would necessarily encompass zero acceleration. Schwenk explicitly teaches against using a range that includes zero acceleration. *See, e.g.,* JX-0141.0001 (Abstract); .0004.

Based on the foregoing, I find that Garmin and Staff have not met their burden of showing that Schwenk renders the asserted claims obvious.

### H. Misjoinder

Garmin asserts that the '464 patent "is not enforceable because it misjoins Robert Andrew Taylor as an inventor of the '464 patent." RIB at 239. Both Philips and Staff argue that Garmin has not shown by clear and convincing evidence that Mr. Taylor was misjoined as an inventor. As a preliminary matter, the issue is not well developed either factually or legally. For example, Garmin devotes less than two pages of its initial post-hearing brief to the issue. CIB at 239-240. The paucity of briefing and evidentiary and legal support undermines Garmin, which carries a heavy burden. Mr. Taylor's identification as a named inventor is "presumed to be correct," and his alleged misjoinder as an inventor must be proven by clear and convincing evidence. *Hess v. Advanced Cardiovascular Sys., Inc.*, 106 F.3d 976, 979-80 (Fed. Cir. 1997); *see also Vanderbilt University v. ICOS Corp.*, 601 F.3d 1297, 1305 (Fed. Cir. 2010) ("Our

precedent has long required proof of misjoinder or nonjoinder of co-inventors by clear and convincing evidence.").

Philips does not present an invention story clearly explaining the contributions of each named inventor. Philips, however, is not obligated to present such details; it is entitled to rely on the presumption that Mr. Taylor was correctly identified as a named inventor. *Canon Computer Sys., Inc. v. Nu-Kote Int'l, Inc.*, 134 F.3d 1085, 1088 (Fed. Cir. 1998) (holding that the patentee is "under no obligation to substantiate each inventor's contribution" unless the party alleging misjoinder of inventorship makes a "showing to rebut the presumption" that inventorship is correct).

According to Garmin, none of the other named inventors "were able to indicate any particular contribution that Mr. Robert Andrew Taylor made to the '464 patent," and that "two of the other named inventors (James Tyler Frix and James Mitchell Frix) had never even met or spoken with Mr. Robert Andrew Taylor in person." *Id.*[34] Although Mr. Taylor was not deposed in this investigation [redacted], CRB at 109, the other three named inventors were deposed. The deposition testimony of Mr. Taylor's co-inventors shows that Mr. Taylor had the technical knowledge to make an inventive contribution to the claimed invention and collaborated with the other co-inventors during the relevant time.

Mr. Taylor's background would have allowed him to make an inventive contribution the claimed invention. With regard to Mr. Taylor's technical background, Mr. Taylor was an engineer having been a NASA engineer and the Chairman of the International Society of Near

[34] Garmin suggests that Mr. Taylor was named as an inventor not because of any inventive contributions, but because of his age. CIB at 239-40. At the time that the application for the '464 patent was filed, Mr. Taylor was over 65 years old. On the basis of Mr. Taylor's age, the applicants were able to receive expedited examination at the PTO. *Id.* at 240.

Infrared Spectroscopy. RX-0537C (A. Johnson Dep.) at 44:2-20. James Mitchell Frix testified that Mr. Taylor "had a lot of expertise through his career in—in plethysmography, transdermal monitoring." RX-0545C (J. M. Frix Dep.) at 15:5-15; *see also* RX-0536C (J. T. Frix Dep.) at 47:21-23 (testifying that Mr. Taylor "brought years of groundbreaking engineering to the table").

Mr. Taylor had the opportunity to make an inventive contribution. According to his co-inventor Mr. Johnson, during the "entire time" that named inventors were working on the subject matter that led to the '464 patent, Mr. Johnson and Mr. Taylor were "constantly talking" about the subject matter. RX-0537C (A. Johnson Dep.) at 43:7-20. James Tyler Frix also confirmed that the named inventors worked together to develop the claimed subject matter of the '464 patent. *See, e.g.,* RX-0536C (J.T. Frix Dep.) at 43:24-44:12 ("We—all of us, basically, bounced ideas off each other. Talked through the whole process. How it worked. Mechanically, how it would work. Electronically, how it would work. What needed to work. What values needed to be looked at. You know, what applications."). Given Mr. Taylor's background and collaboration with his co-inventors on the claimed subject matter, it is plausible he made an inventive contribution.

Garmin points out that, at their depositions, Mr. Taylor's co-inventors were unable to identify the specific contributions made by Mr. Taylor. Representative of this testimony is the testimony of James Tyler Frix, who was unable to identify specific contributions by anyone on the team, including himself:

> Q. But, sitting here today, you cannot tell us, with any degree of specificity, what contribution Mr. Robert Andrew Taylor made to the inventions that resulted in the '464 Patent; nor explain why he is not listed on the Provisional Application that was filed on April 15th 2014.
>
> Is that correct?

> A. Yeah. I—I can't point to a specific—you know, a specific part of it that I did, or a specific part of it that dad [James Mitchell Frix] did, et cetera. And it was kind of my understanding that we—we all worked together on it.
>
> But, yes. There is not a—there is not a specific part that I can point to and say, "He did this." Just like there is not a specific thing that I can point to and say, "This was me. And I did this. And, you know, X, Y, Z."

RX-0536C (J.T. Frix Dep.) at 195:6-25; *see also* RX-0536C (J.T. Frix Dep.) at 43:24-44:12 ("We—all of us, basically, bounced ideas off each other. Talked through the whole process. How it worked. Mechanically, how it would work. Electronically, how it would work. What needed to work. What values needed to be looked at. You know, what applications. I guess—I understand—I understand what you're getting at, and I just have to respectfully tell you that it would be—I couldn't answer you truthfully and tell you, specifically, which part any of us had anything to do with, including myself.").

The testimony of Mr. Taylor's co-inventors is similar to that considered by the Federal Circuit in *Canon*. In *Canon*, the party alleging misjoinder pointed to the deposition testimony of the named inventors. 134 F.3d at 1088. As described by the Federal Circuit, "[i]n deposition after deposition, the named inventors . . . . were incapable of recalling each individual's specific contribution." *Id.* The Federal Circuit found, however, that the named inventors' inability to recall "each individual's specific contribution" to the conception of the claimed invention was not "persuasive evidence" of misjoinder. *Id.* The Federal Circuit noted that, although the named inventors were unable to recall the specific contributions of individual inventors, "they all generally recalled collaborating together in a series of meetings to produce the patented invention. As any member of a large discussion group well knows, it is often difficult to remember who first said what. Significantly, none of the inventors testified that any named inventor was not involved in that collaborative effort." *Id.* Like the named inventors in *Canon*,

Mr. Taylor's co-inventors testified that Mr. Taylor collaborated with them to produce the patented invention. Accordingly, for the reasons set forth in *Canon*, I find that the inability of Mr. Taylor's co-inventors to recall specific contributions by Mr. Taylor falls short of persuasive misjoinder.

In support of its argument that Mr. Taylor is not a named inventor, Garmin also mentions the apparent inconsistency between Mr. Taylor's identification as an inventor and Philips's contention that the '464 patent is entitled to a priority date of at least April 15, 2014. Garmin states:

> U.S. Application No. 15/131,130, which issued as the '464 patent, was filed on April 18, 2016. JX-0002 ('464 patent). The '464 patent lists two provisional applications: (i) U.S. Provisional Application No. 61/979,570, filed on April 15, 2014 (CX-0050) ("the '570 Provisional Application") and (ii) U.S. Provisional Application No. 61/843,111, filed on July 5, 2013. *Id*. For purposes of this Investigation, Philips relies solely on the April 2014 provisional.
>
> . . . . The '570 Provisional Application lists three inventors: James Tyler Frix, James Mitchell Frix, and Andrew Johnson. CX-0050.0001. The non-provisional application, however, added Mr. Taylor. JX-0005 at PNA-ITC00000377; JX-0002 at face (item 72).

RIB at 28 (footnotes omitted).[35] From this evidence, Garmin argues: "As a result, one set of inventors is correct, and one is incorrect. And this has consequences: either the '570 Provisional Application's list is correct and the '464 patent is unenforceable for misjoinder, or the '464 patent's list is correct, and the Provisional's list is incorrect and thus not available for priority purposes." *Id.*

[35] Garmin notes that, on September 29, 2020, counsel for Philips sent an email to the parties indicating that, [redacted] The context of this email is not explored.

Evidence of misjoinder must be clear and convincing. Mr. Taylor's identification as a named inventor is presumed to be correct, and Garmin's skeletal argument based on the priority dates does not overcome the clear and convincing evidentiary burden.

## VII. REMEDY AND BONDING

### A. Limited Exclusion Order

In the event the Commission finds a violation of section 337, Complainants seek a limited exclusion order ("LEO") directed to Respondents' infringing products. 19 U.S.C. § 1337(d). Section 1337(d) provides in pertinent part that if the Commission determines that there is a violation, "it shall direct that the articles concerned . . . be excluded from entry into the United States." 19 U.S.C. § 337(d)(1). The Commission has broad discretion to select the form, scope and extent of the remedy imposed for violation of section 337. *E.g., Hyundai Elecs. Indus. Co. v Int'l Trade Comm'n,* 899 F.2d 1204, 1208-09 (Fed. Cir. 1990).

Long-standing Commission precedent supports issuance of remedial orders extending to "all products covered by the patent claims as to which a violation has been found, rather than limiting its orders to only those specific models selected for the infringement analysis." *Certain Hardware Logic Emulation Systems and Components Thereof* ("*Hardware*"), Inv. No. 337-TA-383, Comm'n Op., 1998 WL 307240 at *9 (Mar. 1998) (citations omitted). This approach is consistent with the remedial purpose of the statute. "The central purpose of remedial orders is to ensure complete relief to the domestic industry," the Commission has stated, and an "exclusion order covering only specific models of an accused device could easily be circumvented, thereby denying complete relief." *Id. Accord, Certain Graphics Systems, Components Thereof, and Consumer Products Containing the Same,* Inv. No. 337-TA-1044, Comm'n Op. at 66 (Sept. 18,

2018) ("The LEO is not limited to any particular GPU model, however, but also extends to cover other GPUs of the named respondents that infringe the asserted claims of the '506 patent.").

Complainants seek a LEO against the Garmin Respondents, including Garmin International, Inc. ("GI"), Garmin USA, Inc. ("GUSA"), and Garmin Ltd ("GL")., as well as "related" Garmin entities and affiliates, including Garmin Corporation ("GC") and Garmin Canada, Inc. ("GCAN"). Complainants allege that GI is a subsidiary of GL and is primarily responsible "for the research, development, engineering, design, importation and direct sale of the Accused Garmin Products." CIB at 236. Complainants say GI buys the Accused Garmin Products from GL and imports them into the U.S. GUSA sells the products after importation, according to Complainants. Complainants assert that GC is a subsidiary of GL and is responsible for manufacture of the accused Garmin products in Taiwan. GCAN, Complainants say, is a subsidiary of GL engaged in research, development, engineering and testing of the accused Garmin products. GL is alleged of buying accused Garmin products from GC and then selling them to GI for importation into the U.S.

Complainants further seek a LEO covering the Fitbit Respondents, including Fitbit, Inc., Ingram Micro Inc., Maintek Computer (Suzhou) Co., Ltd., and Inventec Appliances (Pudong). Fitbit has stipulated to importation. CX-0409C at ¶¶ 7, 8. Maintek assembles the accused Versa Lite and Ionic devices in China. Inventec assembles the accused Charge 3 and Versa 2 devices in China. *Id.*; CIB at 239. Complainants also seek a LEO covering Ingram Micro, which sold accused Fitbit products after importation into the U.S. *See* CX-0409C at ¶ 9. Complainants also seek a LEO covering non-respondent Goertek, which [redacted] and non-respondent Sunlite Electronic (Malaysia), which [redacted] *Id.*

Respondents argue that Complainants have not identified evidence of importation of an accused product imported by Garmin Ltd., Maintek Computer (Suzhou) Co., Ltd., Inventec Appliances (Pudong) Corp., Ingram Micro, Inc., Goertek, or Sunlite Electronic (Malaysia). They say the stipulation with Fitbit states that Fitbit Inc. "is the importer of record for the Accused Fitbit Products [redacted] and, moreover, that neither Inventec, Maintek, nor Ingram Micro imports any of the Fitbit accused products. CIB at 55. Respondents say no LEO should be issued against Garmin Ltd., Maintek Computer (Suzhou) Co., Ltd., Inventec Appliances (Pudong) Corp., Ingram Micro, Inc., Goertek, or Sunlite Electronic (Malaysia).

Respondents assert that Complainants' requested LEO also is improper with respect to GC and GCAN. They point out that section 337 "'permits LEOs to exclude only the violating products of *named respondents*.'" RRB at 121 (quoting *Kyocera Wireless Corp. v. ITC*, 545 F.3d 1340, 1358 (Fed. Cir. 2008) (emphasis added)). Respondents say GC, GCAN, Goertek, and Sunlite Electronic (Malaysia) were not named as respondents. *See* Complaint at ¶ 2 (identifying the Garmin respondents as GI, GUSA, and GL). Respondents contend that no LEO should be issued against GC and GCAN.

Respondents also argue that a LEO should be limited to infringing products, and that a verification provision be included to minimize the possibility that noninfringing products would be excluded from entry. Respondents point out that the functionalities alleged to infringe the '228 and '464 patents are performed by accused software algorithms or hardware. If those elements have been modified or removed, the products do not infringe, Respondents maintain, and should not be excluded.

Should a violation be found, the Staff recommends that a limited exclusion order issue to Respondents directed to wearable monitoring devices, systems, and components that infringe one or more of the asserted claims of the asserted patents.

"[S]ection 337 permits exclusion of the imports of non-respondents only via a general exclusion order, and then too, only by satisfying the heightened requirements of 1337(d)(2)(A) or (B). The statute permits LEOs to exclude only the violating products of named respondents." *Kyocera,* 545 F.3d at 1358. Consistent with the Federal Circuit's direction in *Kyocera*, I recommend that in the event a violation is found a LEO be issued against the named Respondents: Fitbit, Inc., Ingram Micro Inc., Maintek Computer (Suzhou) Co., Ltd., Inventec Appliances (Pudong), Garmin International Inc., Garmin USA, Inc., and Garmin Ltd d/b/a/ Garmin Switzerland GmbH. I do not find adequate precedent to direct a LEO against entities not named as respondents.[36]

Although Respondents assert that Garmin Ltd., Maintek Computer (Suzhou) Co., Ltd., Inventec Appliances (Pudong) Corp., and Ingram Micro, Inc. have not been identified as importers, there is ample evidence that these entities are engaged in "the importation into the United States, the sale for importation, or the sale within the United States after importation" of the accused products. 19 U.S.C. § 1337 (a)(1)(B). Therefore, I recommend that any LEO include these entities.

With respect to Respondents' request for a certification provision: in the absence of any objection, I recommend that, if a violation is found, a certification provision be included to

[36] In support of naming additional entities in a LEO, Complainants cite only an ALJ's recommendation in an investigation in which, ultimately, the Commission found no violation. *See Certain Semiconductor Integrated Circuits & Prods. Containing Same*, Inv. No. 337-TA-665, Commission Determination, 2011 WL 6166337 at *3 (Oct. 1, 2011).

minimize the possibility of excluding noninfringing products. Such provisions are common in LEOs issued by the Commission. *See, e.g., Certain Marine Sonar Imaging Devices, Including Downscan and Sidescan Devices, Products Containing the Same and Components Thereof,* 2016 WL 11603660 (Modification Proceeding) (Aug. 29, 2016).

### B. Cease and Desist Order

Complainants seek a recommendation for entry of a cease and desist order ("CDO") against all Respondents. Complainants note that the Commission commonly issues CDOs when respondents maintain a commercially significant inventory of infringing imported product in the United States, but assert further that: "Notably, the statute does not require a 'commercially significant' amount of inventory for issuance of a CDO and [*sic*] has actually concluded that any amount of inventory provides a basis to issue a CDO. *Certain Table Saws Incorporating Active Injury Mitigation Technology and Components Thereof*, Inv. No. 337-TA-965, Comm'n Op. at 6-7 n.2 (Feb. 1, 2017)." CIB at 240. Complainants maintain that a CDO is necessary in this case to afford Complainants complete relief.

Specifically, Complainants seek a CDO against the Garmin Respondents and related entities and affiliates, including GC and GCAN. They state that, after importation, Garmin stores its inventory, including its inventory of accused Garmin products, at its facilities in Olathe, Kansas, United States. CX-1190C (Vallad Dep. Desig.) at 9:12-24, 11:19-24 ("Our main distribution point is in Olathe, Kansas on campus like where I'm working at the headquarters. So that's where we warehouse and distribute our inventory from in the U.S."); CX-0378C (Preis Dep. Desig.) at 35:25-36:17 ("And they'll clear at the port in Chicago, and then move to our facility in Olathe. Or they could clear in MCI, in Kansas, and then they'll move to Olathe.").

Complainants state that Garmin admits that its inventory of accused Garmin products stored at its Kansas facility is commercially significant. CX-207C.0046 ("Garmin's current inventory of products alleged to infringe the '228, '464, and '698 patents is commercially significant."); *see* CX-0378C (Preis Dep. Desig.) at 40:7-42:21 ("It's a big facility, so it's a good amount of inventory."); CX-0128C; CX-1190C (Vallad Dep. Desig.) at 20:17-21:13, 22:15-25).

With respect to the Fitbit Respondents, including Fitbit, Inc., Ingram Micro Inc., Maintek Computer (Suzhou) Co., Ltd., and Inventec Appliances (Pudong), Complainants cite a stipulation regarding Fitbit's maintenance of a commercially significant inventory [redacted] CX-0409C at ¶ 1; CX-1396C.

Respondents argue that Philips has not identified evidence of any U.S. inventory of an accused product held by Garmin Ltd., Maintek Computer (Suzhou) Co., Ltd., Inventec Appliances (Pudong) Corp., Ingram Micro, Inc., Goertek, or Sunlite Electronic (Malaysia), and that no CDO should be issued against these entities.

Staff says a CDO is appropriate against the domestic Respondents, all of whom maintain a significant amount of inventory.

In addition to, or in *lieu* of, an exclusion order, the Commission may issue cease and desist orders to respondents found to be in violation. *See* 19 U.S.C. § 1337(f)(1). The "well-established purpose of cease and desist orders is to ensure complete relief to complainants when infringing goods are held in inventory in the United States and, therefore, beyond the reach of an exclusion order." *Certain Condensers, Parts Thereof and Prods. Containing Same, Including Air Conditioners for Automobiles Condensers,* Inv. No. 337-TA-334 (Remand), Comm'n Op. at 27 (Sept. 10, 1997).

Philips requests entry of a cease and desist order against each Respondent in the event a violation of Section 337 is found. Under Commission precedent, such orders are traditionally issued to respondents that maintain commercially significant U.S. inventories of infringing products or have significant domestic operations that could undercut the remedy provided by an exclusion order. *See, e.g., Certain Stainless Steel Products, Certain Processes for Manufacturing or Relating to Same, and Certain Products Containing Same*, Inv. No. 337-TA-933, Comm'n Op. at 40 (June 9, 2016).[37]

If a violation is found in this investigation, cease and desist orders should be issued against the domestic Garmin Respondents and Fitbit, which is the only additional respondent that maintains inventory in the United States. The evidence shows that the domestic Garmin Respondents maintain commercially significant inventories of infringing products in the U.S. or have established domestic operations that are used to fulfill sales to their U.S. customers. For example, Garmin admits that its inventory of accused products stored at its Olathe, Kansas facility is commercially significant. CX-0207C at .0046 ("Garmin's current inventory of products alleged to infringe the 228, 464, and 698 patents is commercially significant. . . .").

As for Fitbit, Philips and Fitbit entered into a stipulation regarding inventory. (*See* CX-0409C). Fitbit has stipulated that it maintains a commercially significant inventory of the

[37] Complainants' assertion regarding "commercially significant" inventory is not consistent with Commission precedent. CIB at 240 ("Notably, the statute does not require a 'commercially significant' amount of inventory for issuance of a CDO and has actually concluded [*sic*] that any amount of inventory provides a basis to issue a CDO."). In the opinion Complainants cite, it was noted that Commissioner Schmidtlein takes the view that a commercially significant inventory is not required. *Certain Table Saws Incorporating Active Injury Mitigation Technology and Components Thereof*, Inv. No. 337-TA-965, Comm'n Op. at 6-7 n.2 (Feb. 1, 2017) (explaining that this is Commissioner Schmidtlein's view). *See Certain Automated Teller Machines, ATM Modules, Components Thereof, and Products Containing the Same,* Comm'n Op. at 28 n. 19 (May 19, 2017) (again noting that this is the view of Commissioner Schmidtlein, not the Commission).

Accused Fitbit Products in the United States at or near [redacted] (CX-0409C, ¶¶10-11).

**C. Bond**

If the Commission issues a remedy after considering the statutory public interest factors, the President of the United States may, within 60 days, disapprove the Commission's determination "for policy reasons;" if he does so, any remedy issued by the Commission "shall have no force or effect." 19 U.S.C. § 1337(j)(2). During the 60-day period of Presidential review, imported articles otherwise subject to remedial orders are entitled to conditional entry under bond. 19 U.S.C. § 1337(j)(3). The amount of the bond is specified by the Commission and must be an amount sufficient to protect the complainant from injury. *Id.*; 19 C.F.R. § 210.50(a)(3). The Commission frequently sets the bond by calculating the difference in sales prices between the patented domestic industry product and the infringing product or based upon a reasonable royalty. *Certain Table Saws Incorporating Active Injury Mitigation Tech. and Components Thereof,* Inv. No. 337-TA-965, Comm'n Op. at 13 (Feb. 1, 2017). However, "[w]here there is neither information on the price of the subject merchandise nor information which would allow one to determine a reasonable royalty, the Commission has set the bond at 100% of the entered value of the imported infringing products." *Certain Inkjet Ink Supplies & Components Thereof,* Inv. No. 337-TA-691, 2011 WL 7464367 at *16 (Nov. 2011) (citing *Certain Energy Drink Products*, Inv. No. 337-TA-678, Comm'n Op. on Remedy, the Public Interest, and Bonding (Sept. 8, 2010)). Complainants bear the burden of establishing the need for a bond, and the failure to carry that burden may result in no bond being imposed. *Certain Personal Data and Mobile Communication Devices and Related Software,* Inv. No. 337-TA-710, Comm'n Op. at 85 (Dec. 29, 2011).

Complainants argue that there is no dispute that a price differential is not appropriate, and that the bond should therefore be set at 100% of the entered value of the accused products.[38] Respondents say no bond is appropriate because Philips's products do not compete with the Respondents'. Philips sells medical devices for clinical applications, Respondents maintain, *see, e.g.*, CX-0008C (Ridgway DWS) at Q/A 12; CX-0009C (Thiagarajan DWS) at Q/A 6, while Garmin and Fitbit sell watches for use by the general public, products that cannot be used to diagnose or treat a patient. Staff agrees with Respondents, citing *Certain Elec. Devices, Including Wireless Commc'n Devices, Portable Music & Data Processing Devices, & Tablet Computers*, Inv. No. 337-TA-794, Comm'n Op. at 118-19, 2013 WL 12410037, at *73 (Jul. 5, 2013) (determining a bond rate of zero percent where Complainant "presented no evidence of a competing product that needs protection from injury during the Presidential review period[,]" and therefore "has not shown a need for protection by bond"); *Dynamic Random Access Memories*, Comm'n Op. at 95 (holding that a full value bond would be an improper deterrent to importation where it would more than offset the competitive advantage).

Philips has not requested or proposed a bond based on a reasonable royalty. Accordingly, in the event that a violation is found, I recommend that no bond be required during the Presidential review period. *See Certain Silicone Microphone Packages*, Inv. No. 337-TA-629, Initial Determination at 222, 2009 WL 389263, at *134 (Feb. 10, 2009) (setting no bond and finding "no evidence in the record to support any bond to offset any competitive advantage resulting from the unfair acts of [respondents] from their importations.").

[38] Complainants cite their expert's opinion that a 100% bond is "economically appropriate," but there is no precedent for using an opinion on economic "appropriateness" to determine the amount of a bond. CIB at 244.

## VIII. CONCLUSIONS OF LAW

Based on the foregoing, and the record as a whole, it is my final initial determination that there is no violation of section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337, in the importation into the United States, the sale for importation, and/or the sale within the United States after importation of certain wearable monitoring devices, systems, and components thereof, with respect to the ’228 patent or the ’464 patent.

This determination is based on the following conclusions of law:

1. The Commission has subject matter jurisdiction over this investigation, *in personam* jurisdiction over Respondents, and *in rem* jurisdiction over the accused wearable monitoring devices, systems, and components thereof.

2. There has been an importation into the United States, sale for importation, or sale within the United States after importation of the accused products by each of the Respondents.

3. No accused products have been shown to infringe claim 2 of the ’228 patent.

4. The domestic industry requirement has been satisfied with respect to claim 2 of the ’228 patent.

5. Claim 2 of the ’228 patent is invalid as anticipated.

6. Claim 2 of the ’228 patent is directed to ineligible subject matter.

7. No accused products have been shown to infringe claims 1 or 6 of the ’464 patent.

8. The domestic industry requirement has not been satisfied with respect to claims 1 or 6 of the ’464 patent.

9. Claims 1 and 6 of the ’464 patent have not been shown to be invalid or unenforceable.

10. Claims 1 and 6 of the ’464 patent are directed to ineligible subject matter.

I hereby certify the record in this investigation to the Commission with my final initial determination. Pursuant to Commission Rule 210.38, the record further comprises the Complaint and exhibits thereto filed with the Secretary, and the exhibits attached to the parties’ summary determination motions and the responses thereto. 19 C.F.R. § 210.38(a).

Pursuant to Commission Rule 210.42(c), this initial determination shall become the determination of the Commission 45 days after the service thereof, unless a party files a petition for review pursuant to Commission Rule 210.43(a), the Commission orders its own review pursuant to Commission Rule 210.44, or the Commission changes the effective date of the initial determination. 19 C.F.R. § 210.42(h)(6).

This initial determination is being issued with a confidential designation pursuant to Commission Rule 210.5 and the protective order in this investigation. Within ten (10) days of the date of this initial determination, each party shall submit to the Administrative Law Judge a statement as to whether or not it seeks to have any portion of this document deleted from the public version. *See* 19 C.F.R. § 210.5(f). A party seeking to have a portion deleted from the public version must attach to its submission a copy of the order with red brackets indicating the portion(s) asserted to contain confidential business information. The parties' submissions shall not be filed with the Commission Secretary but shall be submitted by e-mail to the Administrative Law Judge's attorney advisor.

Redactions should be limited to avoid obscuring the reasoning underlying the decision. Parties who submit excessive redactions may be required to provide an additional written statement, supported by declarations from individuals with personal knowledge, explaining why each proposed redaction meets the definition for confidential business information in 19 C.F.R. § 201.6(a).

**SO ORDERED.**

Dee Lord

Dee Lord
Administrative Law Judge

**CERTAIN WEARABLE MONITORING DEVICES, SYSTEMS, AND COMPONENTS THEREOF** **Inv. No. 337-TA-1190**

## PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **INITIAL DETERMINATION** has been served via EDIS upon the Commission Investigative Attorney, **John Shin, Esq.**, and the following parties as indicated, on **March 2, 2021.**

Lisa R. Barton, Secretary
U.S. International Trade Commission
500 E Street, SW, Room 112
Washington, DC 20436

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**UNITED STATES INTERNATIONAL TRADE COMMISSION**
**Washington, D.C.**

| | |
|---|---|
| **In the Matter of**<br><br>**CERTAIN WEARABLE MONITORING DEVICES, SYSTEMS, AND COMPONENTS THEREOF** | **Investigation No. 337-TA-1190** |

# NOTICE OF A COMMISSION DETERMINATION TO REVIEW TWO INITIAL DETERMINATIONS

**AGENCY**: U.S. International Trade Commission.

**ACTION**: Notice.

**SUMMARY**: Notice is hereby given that the U.S. International Trade Commission has determined to review: (1) an initial determination ("ID") (Order No. 34) granting Complainants' motion for partial summary determination as to whether the economic prong of the domestic industry requirement is satisfied with respect to U.S. Patent No. 7,845,228 ("the '228 patent"); and (2) an ID (Order No. 35) granting in part Respondents' motion for summary determination of non-infringement with respect to U.S. Patent Nos. 9,820,698 ("the '698 patent") and 9,717,464 ("the '464 patent").

**FOR FURTHER INFORMATION CONTACT**: Clint Gerdine, Esq., Office of the General Counsel, U.S. International Trade Commission, 500 E Street SW., Washington, D.C. 20436, telephone (202) 708-2310. Copies of non-confidential documents filed in connection with this investigation may be viewed on the Commission's electronic docket (EDIS) at https://edis.usitc.gov. For help accessing EDIS, please email EDIS3Help@usitc.gov. General information concerning the Commission may also be obtained by accessing its Internet server at https://www.usitc.gov. Hearing-impaired persons are advised that information on this matter can be obtained by contacting the Commission's TDD terminal, telephone 202-205-1810.

**SUPPLEMENTARY INFORMATION**: The Commission instituted this investigation on January 15, 2020, based on a complaint filed on behalf of Philips North America, LLC of Andover, Massachusetts and Koninklijke Philips N.V. of Eindhoven, Netherlands (collectively, "Complainants"). 85 FR 2440-41 (Jan. 15, 2020). The complaint, as supplemented, alleges violations of section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. 1337, based upon the importation into the United States, the sale for importation, and the sale within the United States after importation of certain wearable monitoring devices, systems, and components thereof by reason of infringement of certain claims of the '228, '698, and '464 patents and U.S. Patent No. 9,961,186 ("the '186 patent"). The Commission's notice of investigation named the following Respondents: Fitbit, Inc. of San Francisco, California; Garmin International, Inc. and Garmin

USA, Inc., both of Olathe, Kansas; Garmin Ltd. d/b/a Garmin Switzerland GmbH of Schaffhausen, Switzerland; Ingram Micro Inc. of Irvine, California; Maintek Computer (Suzhou) Co., Ltd. of Jiangsu Province, China; and Inventec Appliances (Pudong) of Shanghai, China (collectively, "Respondents"). The Office of Unfair Import Investigations ("OUII") is participating in the investigation. The '186 patent was previously terminated from the investigation. Order No. 25 (July 17, 2020), *unreviewed by* Comm'n Notice (Aug. 4, 2020).

On October 1, 2020, the presiding administrative law judge issued the subject IDs (Order Nos. 34 and 35). Specifically, Order No. 34 grants Complainants' motion for partial summary determination that complainants have satisfied the economic prong of the domestic industry requirement with respect to the '228 patent. Order No. 35 grants Respondents' motion for summary determination that Respondents' accused products do not infringe (i) claims 1 and 6 of the '698 patent, and (ii) claims 1 and 6 of the '464 patent with respect to the accused heart rate monitoring functionalities.

On October 8, 2020, Complainants filed a petition for review of Order No. 35. On October 16, 2020, OUII and Respondents each filed a response in opposition to Complainants' petition for review. No party petitioned for review of Order No. 34.

The Commission has determined to review the subject IDs. The Commission is not requesting additional briefing.

The Commission vote for this determination took place on November 16, 2020

The authority for the Commission's determination is contained in section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. 1337, and in Part 210 of the Commission's Rules of Practice and Procedure, 19 CFR part 210.

By order of the Commission.



Lisa R. Barton
Secretary to the Commission

Issued: November 16, 2020

**CERTAIN WEARABLE MONITORING DEVICES, SYSTEMS, AND COMPONENTS THEREOF** **Inv. No. 337-TA-1190**

## PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **NOTICE** has been served via EDIS upon the Commission Investigative Attorney, **John Shin, Esq.**, and the following parties as indicated, on **November 16, 2020.**

Lisa R. Barton, Secretary
U.S. International Trade Commission
500 E Street, SW, Room 112
Washington, DC 20436

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**PUBLIC VERSION**

**UNITED STATES INTERNATIONAL TRADE COMMISSION**

**Washington, D.C.**

| **In the Matter of** | |
|---|---|
| **CERTAIN WEARABLE MONITORING DEVICES, SYSTEMS, AND COMPONENTS THEREOF** | **Inv. No. 337-TA-1190** |

**ORDER NO. 35: INITIAL DETERMINATION GRANTING-IN-PART AND DENYING-IN-PART RESPONDENTS' MOTION FOR SUMMARY DETERMINATION OF NON-INFRINGEMENT**

(October 1, 2020)

On August 20, 2020, Respondents Garmin International, Inc., Garmin USA, Inc., and Garmin Ltd. ("the Garmin Respondents" or "Garmin") and Respondents Fitbit, Inc., Ingram Micro Inc., Maintek Computer (Suzhou) Co., Ltd., and Inventec Appliances (Pudong) ("the Fitbit Respondents" or "Fitbit") filed a motion for summary determination of non-infringement (Motion Docket No. 1190-027), attaching a memorandum of points and authorities ("Motion Memo."). Complainants Philips North America, LLC and Koninklijke Philips N.V. ("Philips") filed a memorandum in opposition to the motion ("Philips Opp.") on August 31, 2020.[1] The Commission Investigative Staff ("Staff") filed a combined response to the parties' motions for summary determination ("Staff Resp.") on August 31, 2020, supporting Respondents' motion in part. Respondents filed a reply brief ("Reply") on September 3, 2020.

[1] Complainants filed certain exhibits to their opposition out of time pursuant to Order No. 31 (Sept. 3, 2020).

## I. BACKGROUND

Philips asserts three patents in this investigation: U.S. Patent No. 7,845,228 ("the '228 patent"); U.S. Patent No. 9,820,698 ("the '698 patent"); and U.S. Patent No. 9,717,464 ("the '464 patent").[2] Several claim terms from these patents were construed in a *Markman* order, Order No. 26 (July 27, 2020). The products accused of infringing each of these patents are Garmin and Fitbit activity trackers.

## II. LEGAL STANDARDS

### A. Summary Determination

In section 337 investigations, Commission Rule 210.18 governs motions for summary determination:

> The determination sought by the moving party shall be rendered if pleadings and any depositions, answers to interrogatories, and admissions on file, together with the affidavits, if any, show that there is no genuine issue as to any material fact and that the moving party is entitled to a summary determination as a matter of law.

19 C.F.R. § 210.18(b). The rule is patterned on Fed. R. Civ. P. 56. *See Certain Carbon and Alloy Steel Products*, Inv. No. 337-TA-1002, Initial Determination, 2017 WL 5167413 at *11 (Oct. 2, 2017), *not reviewed by* Commission Notice, 2017 WL 6434923 (Nov. 1, 2017).

### B. Infringement

Section 337(a)(1)(B)(i) prohibits "the importation into the United States, the sale for importation, or the sale within the United States after importation by the owner, importer, or consignee, of articles that – (i) infringe a valid and enforceable United States patent or a valid and enforceable United States copyright registered under title 17." 19 U.S.C. §1337(a)(1)(B)(i). The Commission has held that the word "infringe" in Section 337(a)(1)(B)(i) "derives its legal

[2] U.S. Patent No. 9,961,186 was previously asserted in this investigation but was terminated pursuant to Order No. 25 (July 17, 2020), *not reviewed by* Comm'n Notice (Aug. 4, 2020).

meaning from 35 U.S.C. § 271, the section of the Patent Act that defines patent infringement." *Certain Electronic Devices with Image Processing Systems, Components Thereof, and Associated Software*, Inv. No. 337-TA-724, Comm'n Op. at 13-14 (December 21, 2011).

"An infringement analysis entails two steps. The first step is determining the meaning and scope of the patent claims asserted to be infringed. The second step is comparing the properly construed claims to the device accused of infringing." *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 976 (Fed. Cir. 1995) (*en banc*), *aff'd*, 517 U.S. 370 (1996) (citation omitted). Literal infringement requires the patentee to prove that the accused device meets each and every limitation of the asserted claim(s). *Frank's Casing Crew & Rental Tools, Inc. v. Weatherford Int'l, Inc.*, 389 F.3d 1370, 1378 (Fed. Cir. 2004).

## III. U.S. PATENT NO. 9,820,698

Respondents argue that the accused products do not infringe the asserted claims of the '698 patent because accelerometer-based data is used to generate the claimed "actigraphy signals." Motion Memo. at 3-8. Staff agrees with Respondents that the *Markman* order precludes the use of accelerometer-based data in the claims of the '698 patent. Staff Resp. at 3-6. Philips argues that the claim only precludes the use of accelerometer-based data in the step for "computing a body motion artifact (BMA) signal," and that the *Markman* order does not mandate a finding of non-infringement. Philips Opp. at 33-37.

### A. Background

Philips asserts claims 1 and 6 of the '698 patent. Notice of Investigation, 85 Fed. Reg. 2440 (Jan. 15, 2020). Claim 1 of the '698 patent recites:

> 1. A physiological monitoring device comprising:
>
> a sensor configured to generate a non-body motion physiological parameter signal as a function of time for a physiological parameter other than velocity, displacement, and acceleration; and

> an electronic digital signal processing (DSP) device configured to perform operations including:
>
> computing a body motion artifact (BMA) signal as a function of time from the non-body motion physiological parameter signal, and
>
> computing an actigraphy signal as a function of time from the BMA signal.

'698 patent, col. 11:21-32.[3] Claim 6 depends from claim 1. *Id*., col. 11:48-52.

In the *Markman* order, the "electronic digital signal processing (DSP) device" was construed to be subject to 35 U.S.C. § 112(f). Order No. 26 at 21-27. With respect to the limitation "computing a body motion artifact (BMA) signal as a function of time from the non-body motion physiological parameter signal," the *Markman* order found "no disclosure in the specification that is consistent with using accelerometer-based data for computing the BMA signal." *Id*. at 29. After reviewing the embodiments disclosed in the specification, the *Markman* order held that "in accordance with § 112(f), the claim thus excludes the use of accelerometer-based data." *Id*. at 28. With respect to the limitation "computing an actigraphy signal as a function of time from the BMA signal," the *Markman* order identified corresponding structure in the specification of the '698 patent for computing a "body movement estimate (BME)." *Id*. at 27 ("The algorithms that may be used to compute an actigraphy signal from the BMA signal include scaling and translation using parameters determined through linear regression or non-linear regression, or qualitative classification of body movements, as described in the specification at cols. 8:58-9:52 and Figs. 13 and 14.").

**B. Discussion**

The parties do not dispute that the accused products use accelerometer-based data to generate the claimed "actigraphy signals." *See* Philips Opp. at 2; Reply at 2. The only dispute

[3] The '698 patent is attached as exhibit 1 to Respondents' motion.

on this motion is one of claim construction—whether claim 1 of the '698 patent excludes the use of accelerometer-based data in the step of computing an actigraphy signal. A determination of claim scope is a legal conclusion that is appropriate for summary determination. *See Teva Pharm. USA, Inc. v. Sandoz, Inc.,* 574 U.S. 831, 841 (2015) (holding that the "ultimate interpretation [of a claim] is a legal conclusion"); *see also Certain Toner Cartridges and Components Thereof*, Inv. No. 337-TA-1106, Order No. 40 (Mar. 13, 2019), (granting summary determination of non-infringement based on claim construction), *affirmed by* Commission Determination (May 20, 2019).

Respondents and Staff rely on a statement in the *Markman* order that "in accordance with § 112(f), the claim thus excludes the use of accelerometer-based data." Order No. 26 at 28. I agree with Philips, however, that this finding does not permit summary determination of non-infringement without further analysis. Philips Opp. at 35-36. The exclusion of accelerometer-based data was recognized in the context of the "computing a body motion artifact (BMA) signal" limitation, and the *Markman* order does not extend this finding to the "computing an actigraphy signal" limitation. Order No. 26 at 27-31. Notably, the claim language specifies that the "body motion artifact (BMA) signal" is computed from "the non-body motion physiological parameter signal" while there is no specific reference to a "non-body motion" parameter in the "actigraphy signal" limitation. '698 patent, col. 11:28-32. It is not clear from the claim language whether the exclusion of accelerometer-based data from the computation of a body motion artifact (BMA) signal extends to the computation of an actigraphy signal from the BMA signal. Making this determination requires further consideration of the intrinsic evidence, as discussed below.

In the *Markman* briefing, Respondents and Staff identified disclosures in the specification that describe the invention as being directed to situations where "body movements cannot be measured using displacement, velocity or acceleration sensors placed on the person's body." '698 patent at 1:24-27. The specification provides that "[t]he disclosed actigraphy techniques are suitably employed in monitoring devices or situations in which 'real' actigraphy (e.g. with Actiwatch or another accelerometer-based actigraphy device) is not possible, or convenient." *Id*. at 10:27-31. As discussed in the *Markman* order, none of the disclosed embodiments for computing the BMA signal involve the use of accelerometer-based data. Order No. 26 at 28-29. With respect to computing an actigraphy signal, however, the *Markman* order identifies different disclosures in the specification. *Id*. at 26-27 (identifying the corresponding structure as cols. 8:58-9:52 and Figs. 13 and 14). This portion of the specification includes one embodiment where accelerometer-based data is used to obtain scaling and translation factors to generate actigraphy signals from the BMA signal, describing "minimization of a given criteria in respect to a reference measure of body movements (e.g. obtained by simultaneous recording of accelerometer-based actigraphy)." '698 patent, col. 9:3-7. Accordingly, although there are statements in the specification that support the exclusion of accelerometer-based data from the invention, one of the disclosed embodiments for the "computing an actigraphy signal" step explicitly describes the use of accelerometer-based data.[4]

The prosecution history of the '698 patent addresses this issue more directly. As recognized in the *Markman* order, claim 1 was amended during prosecution to require a "non-body motion" physiological parameter signal. Order No. 26 at 28. This amendment was made

[4] Complainants identify another part of the specification describing an example where "the movement signals are derived and then the original signals are enhanced using this movement signal." '698 patent, col. 10:21-26. This part of the specification does not describe the "computing an actigraphy signal" step, however; these are "post-processing" steps that occur after the actigraphy signal is generated. *Id*., col. 9:53-10:26.

in connection with an examiner interview, after the examiner had repeatedly rejected the claims as anticipated by U.S. Patent App. No. 2007/0213620 A1, which issued as U.S. Patent No. 7,674,230, naming inventor Daniel Reisfeld ("Reisfeld"). Respondents' Opening *Markman* Brief, Exhibit 6 at PNA-ITC0000929 (December 9, 2016 non-final Office Action at 4). The examiner found that Reisfeld disclosed a sensor that generated photoplethysmography (PPG) signals, which were non-body motion signals. *Id*. at PNA-ITC0000929-30 (December 9, 2016 non-final Office Action at 4-5). The applicant distinguished Reisfeld by arguing that "Reisfeld discloses measuring a PPG signal with a pulse oximeter 31, and then separately measuring movement with an actigraph 39 . . . . Accordingly, Riesfeld does not disclose computing an actigraphy signal as a function of time from a body motion artifact signal, as recited in claim 1." *Id*. at PNA-ITC0000960 (March 8, 2017 Amendment at 7). In a subsequent response, applicants argued that "Reisfeld's movement data must be measured separately from the PPG data and then combined for a subsequent analysis." *Id*. at PNA-ITC0000996 (June 23, 2017 Response after Final Office Action at 7). These arguments suggest that combining non-body motion data with accelerometer-based data is outside the scope of the invention.

When amending the claims to add the "non-body motion" language, the applicant distinguished claim 1 from prior art that did not disclose or suggest "a sensor [] configured to generate a non-body motion physiological parameter signal . . . which is then used by an electronic digital signal processing (DSP) device to perform operation including computing a body motion artifact (BMA) as a function of time from the non-body motion physiological parameter signal." Respondents' Opening *Markman* Brief, Exhibit 6 at PNA-ITC0001015 (July 27, 2017 Applicants' Response to Final Office Action at 7). In the subsequent notice of allowability, the examiner included the following statement of reasons for allowance:

> The allowed claims include the inventive features of using a non-body motion parameter, and further a non-body motion parameter that does not include displacement, velocity, and acceleration, in order to compute a user's body motion artifact and an actigraphy signal based on the body motion artifact. The prior art of record uses a body motion parameter, for example a parameter derived via an accelerometer or gyroscope, in order to compute body motion artifacts and actigraphy signals. The prior art of record does not teach or suggest using a non-body motion parameter in order to compute a body motion artifact and an actigraphy signal.

*Id*. at PNA-ITC0001034 (Aug. 10, 2017 Notice of Allowability at 3). This statement from the examiner suggests that the exclusion of accelerometer-based data applies to the computation of both the body motion artifact and the actigraphy signal. Although such statements do not necessarily limit the scope of a claim, the Federal Circuit has held that an examiner's statement can narrow the scope of a claim where "the examiner's 'Reasons for Allowance' made clear that the examiner and the applicant understood what the applicant had changed, and what the claim amendment required." *Arendi S.A.R.L. v. Google LLC*, 882 F.3d 1132, 1136 (Fed. Cir. 2018).[5] That is the case here, where both applicant and examiner agreed to an amendment of the claims to require computations using non-body motion parameters to distinguish prior art that used both body motion data in combination with non-body motion data. The prosecution history thus confirms that the proper construction of the "computing an actigraphy signal" limitation excludes the use of accelerometer-based data.

Under this construction, there is no dispute that the accused Fitbit and Garmin products do not infringe the asserted claims of the '698 patent. Complainants' expert, Dr. Steve Warren,

[5] Philips argued in *Markman* briefing that the prosecution history does not show a clear and unmistakable disclaimer. *See* Philips's Responsive Claim Construction Brief at 16-17 (May 13, 2020). I agree that the record falls short of this standard, but the Federal Circuit has held that the prosecution history may be relevant to claim construction even where there is no disclaimer. *See MasterMine Software, Inc. v. Microsoft Corp.*, 874 F.3d 1307, 1312 (Fed. Cir. 2017) (finding that a statement "presented by the inventor during patent examination is relevant to claim construction, for the role of claim construction is to capture the scope of the actual invention that is disclosed, described, and patented," even if the statement does not amount to a disclaimer).

admitted at his deposition that "[i]n computing actigraphy signals, yes. I'm aware that accelerometer-based data are use[d]." Motion Exhibit 7 (Warren Tr.) at 34:11-17. The only accused "actigraphy signals" identified in Dr. Warren's expert report are sleep stages computed using accelerometer-based data. *See* Motion Memo. at 5-6, Exhibit 3 (Warren Expert Report) at ¶¶ 244, 338, Exhibit 23 (Warren Supplemental Report) at ¶¶ 57, 98, 112. Respondents' witnesses have confirmed that accelerometer-based data is used to compute the accused sleep stages. *See* Motion Exhibit 4 (Reetz Tr.) (Garmin engineer) at 46:23-49:4, 15:3-16:5, Exhibit 5 (Heneghan Tr.) (Fitbit engineer) at 72:13-73:4, 76:22-78:17, 79:16-80:15, 123:1-8.

On this record, summary determination of non-infringement is appropriate. Because there is no infringement of the '698 patent by any accused product, there is no violation of section 337 with respect to this patent.

## IV. U.S. PATENT NO. 9,717,464

Complainants accuse three functionalities of infringing the '464 patent. The first two functionalities monitor the user's heart rate. The Garmin heart rate monitoring functionality is used by all the accused Garmin products, and the Fitbit heart rate monitoring functionality is used by all the accused Fitbit products. The third functionality is a pulse oximetry functionality that monitors blood oxygen level and is used in a subset of the accused Garmin devices. Respondents argue that the accused heart rate monitoring functionalities do not perform claim 1's "based on a determination" step because the processor in the accused products continuously monitors readings from the non-accelerometer sensor. Respondents also argue that the accused pulse oximetry functionality does not measure the user's blood oxygen level while the monitored body part is in motion as required by claim 1. Staff agrees that the accused functionalities do not infringe for the reasons identified by Respondents. Staff Resp. at 7.

Complainants oppose Respondents' motion. With respect to the heart rate functionalities, Complainants argue that the processor in each accused product only generates readings from the signal received from the non-accelerometer sensor when the output signal of the accelerometer is below a predetermined threshold. With respect to the pulse oximetry functionality, Complainants argue that there is a genuine issue of material fact as to whether the functionality runs while the monitored body part is in motion.

For the reasons set forth below, I hereby GRANT Respondents' motion as to the accused Garmin and Fitbit heart rate monitoring functionalities and hereby DENY Respondents' motion with respect to the accused Garmin pulse oximetry functionality.

### A. Background

Complainants assert that the accused Garmin and Fitbit devices infringe claims 1 and 6 of the '464 patent.

#### 1. The asserted claims of the '464 patent

Claim 1 of the '464 patent recites:

1. A method for minimizing the effects of motion artifact on sensor readings taken during continuous transdermal monitoring of a body part in motion, the method comprising:

monitoring, with a processor, an output signal from an accelerometer, wherein the output signal indicates acceleration and deceleration of the body part of a user as the body part is in motion;

determining, with the processor, that the output signal is within a predetermined range that includes indication of acceleration and deceleration, wherein indication of acceleration and deceleration corresponds with a motion direction change of the body part in motion;

based on the determination that the output signal is within the predetermined range, monitoring, with the processor, a plurality of readings from a sensor, wherein monitoring the plurality of readings from the sensor occurs over a time window that coincides with the output signal remaining within the predetermined range; and

recording in a memory device the monitored plurality of readings from the sensor.

'464 patent, col. 20:30-51. Claim 6 depends from claim 1 and requires that the accelerometer be a "3-axis accelerometer." *Id.* at 20:66-67.

**2. The accused Garmin devices**

There are two categories of accused Garmin products: Generation 2 and Generation 3. Garmin Generation 2 products "utilize the nRF52 sensor hub (G0377270- 71), which does not include pulse oximetry (SpO2), and operates Garmin's Generation 2 Heart Rate Algorithm 2." Respondents Ex. 19 (Young Opening Garmin Report) at ¶ 141.[6] Garmin Generation 3 products "utilize the Apollo2 sensor hub (G0377272-79), which includes pulse oximetry (SpO2), and operates Garmin's Generation 3 Heart Rate Algorithm." *Id.* at ¶ 140.

**3. Heart rate functionality**

All the accused Garmin devices monitor the user's heart rate in the same general way. Respondents Ex. 19 (Young Opening Garmin Report) at ¶ 142 ("All the Garmin Devices use either the Generation 3 or Generation 2 Heart Rate Algorithms. Garmin's Generation 3 and Generation 2 Heart Rate Algorithms are materially equivalent with respect to the functionality described in this expert report.") (internal quotation marks omitted). The Garmin devices use a PPG ("Photoplethysmogram") sensor to measure heart rate. Respondents' Ex. 19 (Young Initial Report) at ¶ 146. Using green LEDs located on the back of each Garmin device, the PPG sensor

[6] Dr. Darrin Young submitted two opening expert reports on behalf of Complainants: one directed to the accused Garmin products (Respondents Ex. 19) and one directed to the accused Fitbit products (Respondents Ex. 18).

"illuminat[es] the blood flowing through the blood vessels in the user's skin." *Id.* A photodetector produces an electrical signal in response to any reflected light that it detects. *Id.* According to Complainants' expert, in the Garmin devices, "the timing of measurements is improved when motion artifacts are present to enable heart rate to be measured more accurately." *Id.* at ¶ 228.

**4. Pulse oximetry functionality**

The pulse oximetry functionality measures "the percentage of oxygenated blood (SpO2) in the blood stream." *Id.* at ¶ 147. All the accused Garmin Gen 3 devices "contain materially the same SpO2 functionality." *Id.* at ¶ 143. The pulse oximetry functionality uses red and infrared LEDs positioned on the back of the devices. *Id.* at ¶ 230. If the output of the accelerometer signal indicates that the motion level [redacted], the processor turns on the red and infrared LEDs and "the SpO2 sensor generates readings and the processor monitors those readings." *Id.* at ¶ 288.[7] If the motion level [redacted], the processor turns off the SpO2 sensor. *Id.* at ¶ 286.

**5. The accused Fitbit products**

Like the accused Garmin products, the accused Fitbit devices monitor the user's heart rate using a PPG sensor and a heart rate algorithm. Respondents Ex. 18 (Young Initial Report) at ¶¶ 81, 130, 133. The PPG sensor in the accused Fitbit products operates in the same way as the PPG sensor in the accused Garmin products. *Id.* at ¶ 134. To calculate heart rate, each accused

[7] In his expert report, Dr. Young identifies the sensor used to determine the user's blood oxygen level as the "SPO2 sensor" and identifies the sensor used to determine the user's heart rate as the "PPG sensor." Respondents' expert Dr. Daft disputes Dr. Young's identification of two different sensors and opines that the PPG sensor is used to determine the user's blood oxygen level as well as the user's heart rate. Respondents' Ex. 11 (Daft Rebuttal Rpt.) at ¶ 147. This issue is not directly addressed by the parties in the summary determination briefing, and it is unclear whether it is still disputed. This order relies on Dr. Young's description of the pulse oximetry functionality.

Fitbit device [redacted]. *Id.* at ¶ 129. With respect to the asserted claims, there is [redacted]. *Id.* at ¶ 129.

### B. Claim construction

#### 1. The "based on a determination" step

Respondents argue that the heart rate functionalities in the accused Garmin and Fitbit products do not perform the "based on the determination" step of claim 1, which recites "based on the determination that the output signal is within the predetermined range, monitoring, with the processor, a plurality of readings from a sensor, wherein monitoring the plurality of readings from the sensor occurs over a time window that coincides with the output signal remaining within the predetermined range." '464 patent, 20:43-49. The parties disputed the construction of this step during claim construction proceedings. The *Markman* order construed the language "based on the determination that the output signal is within the predetermined range, monitoring, with the processor" to require that, "when the processor determines that the accelerometer's output signal is within the predetermined range, the processor makes the decision to monitor and monitors" a plurality of readings from the non-accelerometer sensor. Order No. 26 (July 27, 2020) at 47. In addition, the *Markman* order found that the step's "wherein" clause requires that "the monitoring of the plurality of readings from the [non-accelerometer] sensor occur[] only while the accelerometer's output signal remains within the predetermined range." *Id.*[8]

[8] The "predetermined range" is described in a preceding step. This preceding step requires that the processor "determin[e] . . . that the output signal is within a predetermined range that includes indication of acceleration and deceleration, wherein indication of acceleration and deceleration corresponds with a motion direction change of the body part in motion." '464 patent, 20:38-42. The construction of the term "predetermined range" was disputed by the parties. The *Markman* order construed the term to mean "[a] predetermined range of acceleration and deceleration based on the output signal of the accelerometer that corresponds

In their opposition to Respondents' motion, Complainants raise a new claim construction dispute relating to the "based on a determination" step. Complainants argue that the "readings from a [the] sensor" are not output by the non-accelerometer sensor but are generated by the processor from the non-accelerometer sensor's output signal. Complainants' interpretation is contrary to the intrinsic evidence.

**a) The claim language requires that the "readings" be sent from the non-accelerometer sensor to the processor.**

Claim 1 requires that once the signal from the accelerometer comes within a "predetermined range" that the processor make the determination to "monitor[] . . . readings from a [non-accelerometer] sensor" and continue to "monitor the readings from the sensor," so long as the accelerometer signal remains within the predetermined range. '464 patent, col. 20:43-46; Order No. 26 (July 27, 2020) at 47. Thus, claim 1 explicitly states that the processor monitors "readings from" the non-accelerometer sensor. '464 patent, 20:43-46. This language indicates that the "readings" are sent to the processor by the non-accelerometer sensor, *i.e.,* the readings exist prior to being received by the processor. Complainants' interpretation would require re-drafting the claim to recite that the processor monitors "readings [generated from the signal] from" the non-accelerometer sensor. There is no basis for doing so.

Complainants' primary argument in support of their interpretation is that the claim describes the accelerometer generating an "output signal" instead of "readings." *Id.* at 20:34-38. The use of different terms, according to Complainants, indicates that the terms have different meanings. Philips Opp. at 22-24. Complainants are correct: "signal" and "readings" are different terms with different meanings. This, however, does not support Complainants' conclusion that the "readings" must be generated by the processor because the "signal" is

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with a change in direction of the body part in motion being monitored." Order No. 26 (July 27, 2020) at 37.

generated by the sensor. The non-accelerometer sensor generates both: The non-accelerometer sensor generates readings and transmits the readings to the processor by generating an output signal. The specification describes this process in detail. '464 patent, 6:47-50.

In the example provided in the specification, a pulse oximeter pulses a red LED. *Id.* at 6:47-53. The light from the LED is reflected off an artery or artery bed of the user. *Id.* at 6:55-59. The reflected light "is absorbed by a photodiode which may emit a small current of a few micro amps, as would be understood by one of ordinary skill in the art." *Id.* Using a transimpedance amplifier (also called an op-amp), the current is converted to a few millivolts of voltage. *Id.* at 6:59-63. The voltage signal is then sent to a bandpass filter that "filter[s] out all the noise above 5 Hz and below 0.5 Hz." *Id.* at 6:63-65. The filtered voltage signal "may allow a pulse rate resolution of as low as 20-30 beats per minute and as high as 300 beats per minute in some CTM embodiments." *Id.* at 6:65-7:1. The voltage signal is then sent to a gain amplifier that "set[s] the voltage's output signal level equal to the microcontroller's ADC range, as would be understood by one of ordinary skill in the art of electronics." *Id.* at 7:4-7. The voltage signal is then "sent through an analog to digital converter ('ADC')" and the digital signal output by the ADC is sent to the processor. *Id.* at 7:8-9. In this example, the readings are the measurements of the reflected light taken by the pulse oximeter's photodiode, and those readings are used to generate a digital output signal that is sent to the microcontroller.

Additionally, although the claim only refers to the accelerometer's signal, the specification makes clear that, like the non-accelerometer sensor, the accelerometer's signal transmits readings taken by the accelerometer. The specification describes an accelerometer "tak[ing]" readings from a patient: "An accelerometer attached to the patient, which accelerometer is proximate and in communication with the pulse oximeter, make [*sic*] take

readings." '464 patent, 8:55-58. The specification also describes the "FF module 101B" as "receiv[ing] the accelerometer readings from an accelerometer." '464 patent, 11:64-67.

Complainants further argue that interpreting "readings" as being generated by the non-accelerometer sensor is inconsistent with the final limitation of claim 1, which requires "recording in a memory device the monitored plurality of readings from the sensor." '464 patent, 20:50-51. According to Complainants, "[n]owhere does the '464 patent discuss 'recording' a transdermal sensor signal in a memory device; throughout the patent it discusses the recording of readings such as heart rate or blood oxygen saturation readings." Philips Opp. at 24. Complainants' assertion is unsupported attorney argument that is contradicted by their own expert witness. In his expert report, Dr. Young discusses the embodiments disclosed in the '464 patent. According to Dr. Young these embodiments record the "data" and "signal" from the non-accelerometer sensor. Respondents Ex. 19 (Young Opening Garmin Report) at ¶ 88 ("[A] range of acceleration and deceleration values can be used as a time-stamped 'flag' or a 'trigger' indicating the time window during which data from the transdermal monitoring sensor should be recorded in the memory of the device."), *id.* ("When the accelerometer detects motion in the preferred range, the sensor signal is recorded for further use.").

Consistent with Dr. Young's understanding and contrary to Complainants' assertion, the '464 patent discloses recording readings received from the non-accelerometer sensor. After being recorded these readings are used to calculate various physiological and non-physiological parameters. '464 patent, 10:48-53 ("Pulse oximetry readings may be taken according to the algorithms described herein. Total heart rate and accelerations may be recorded over time i. At the end of time i, the time interval until resting heart rate resumes may be recorded and HRR [heart rate recovery] may be calculated. The algorithm may then calculate HR [resting heart

rate], MHR [maximum heart rate], PMHR [projected maximum heart rate], HRV [heart rate variability], HRR, MP [movement profile] and GFF [general fitness factor]."), 11:64-12:2 ("The FF module 101B may subsequently instruct the monitor module 114 to record and forward a pulse oximetry reading."), 12:3-10 ("The data generated by the sensors 159, collected by the monitor module 114 and managed by the FF module 101B may be stored locally in the memory 112B of the sensor package 125 and/or transmitted to the hub component 100 and/or the fitness factor server 105. Once received by the hub component 100 and/or the fitness factor server 105, the FF modules 101A, 101C may use the data to generate other CTM outputs such as a fitness factor."), 12:17-19 ("In certain CTM embodiments, data generated by sensors 159 and transmitted to fitness factor server 105 may be stored in a database 120 for later download and utilization."), 12:46-49 ("The fitness factor database 120 may store various records related to, but not limited to, historical sensor reading data, fitness factor algorithms, filters/rules algorithms, user preferences, previously calculated fitness factors, trends, *etc.*"), col. 15:4-11 ("If, however, the accelerometer readings indicated that motion of the sensor package is minimized, then the 'yes' branch is followed to block 420 and the pulse oximetry reading is recorded.").

**b) The specification discloses the non-accelerometer sensor taking and generating readings that are output to the processor.**

Interpreting claim 1 to require that the "readings" be output by the non-accelerometer sensor is consistent with the specification's description of the claimed invention. The specification describes an embodiment that estimates the user's blood pressure "[u]sing one or more readings generated by the sensors." '464 patent, col. 5:21-23; *see also id.* at 14:60-61 ("Beginning at block 405, pulse oximetry readings generated by a pulse oximeter sensor 159 may be monitored."). In another instance, the specification describes an embodiment in which a pulse oximeter "take[s] a reading when user movement is at a minimum." *Id.* at 6:41-46; *see*

*also id.* at 6:38-41 ("[A] CTM embodiment may recognize readings taken from other sensors at a point in time that is close to the time of minimal user movement as being accurate."), 8:25-26-30 ("the pulse oximeter may take readings"), 8:31-34 ("the pulse oximeter, may take readings"). The patent also describes "readings" from the non-accelerometer sensor being "received" by a processor. *Id.* at 14:33-36 ("Beginning at block 305, pulse oximetry readings from a pulse oximeter 159 in sensor package 125 may be received continuously along with time stamps indicating when the various readings were taken.").

Complainants argue that construing "readings" as being output by the non-accelerometer sensor would read out every embodiment of the patent. According to Complainants, the disclosed embodiments fall into two categories. The first category identified by Complainants consists of embodiments in which "the processor is only monitoring readings from those sensors (*e.g.* taking heart rate readings) when the accelerometer signal is within the predetermined range." Philips Opp. at 2. The second category consists of embodiments in which "the processor is always monitoring the accelerometer signal and it is always monitoring readings from those other sensors." *Id.* Relying on their characterization of the two groups of embodiments, Complainants conclude that "[t]here is no embodiment where the processor must stop receiving a signal." *Id.*

While Complainants' description of the two classes of disclosed embodiments is consistent with the *Markman* order, which found claim 1 encompassed the first category of embodiments but not the second category, Complainants' conclusion—that "[t]here is no embodiment where the processor must stop receiving a signal"—is unsupported attorney argument and its focus on the non-accelerometer sensor's output signal is misplaced. Phillips Opp. at 2. The claim does not require the processor to stop receiving a signal when the

accelerometer's signal is outside the predetermined range. The claim requires that the processor stop monitoring the readings from the non-accelerometer signal when the accelerometer's output signal is outside the predetermined range.

The patent shows one way to perform the claimed methodology: the non-accelerometer sensor is configured to take readings only when the accelerometer's signal is within a predetermined range. In this embodiment, the accelerometer "effectively function[s] as the on/off control for the oximeter sensor, *i.e.* the accelerometer outuput [*sic*] may trigger the pulse oximeter sensor to take a reading when user movement is at a minimum, and vice versa." '464 patent, 6:41-46; *see also id.* at 8:26-30 ("A pulse oximeter may be attached to the subject at a convenient point of its body and the pulse oximeter may take readings at either predefined intervals or in another embodiment, intervals dependent on the movement of the subject."), 14:12-18 ("Notably, as the graph 11 indicates that the sensor package 125 is at either position P1 or P4, the CTM embodiment may recognize that noise attributable to a motion artifact is at a minimum. Based on such recognition the CTM embodiment may trigger a reading from a pulse oximeter, or other sensor, included in the sensors 159 of the sensor package 125."). Complainants' expert witness, Dr. Young, describes these embodiments accordingly: "In a 'triggering' preferred embodiment, the transdermal monitoring sensor may only monitor the subject when the accelerometer is in the predetermined range. Hence, the accelerometer triggers the transdermal monitoring sensor to monitor the subject." Respondents Ex. 19 (Young Opening Garmin Report) at ¶ 88.

The claim, of course, is not limited to the preferred embodiments. *See, e.g., Philips v. AWH Corp.,* 415 F.3d 1303, 1323 (Fed. Cir. 2005) ("[A]lthough the specification often describes very specific embodiments of the invention, we have repeatedly warned against confining the

claims to those embodiments."). The claim language does not require that the non-accelerometer sensor take readings only when the accelerometer's signal is within the predetermined range. Instead it requires that the processor monitor the readings only when accelerometer's signal is within the predetermined range. In other words, the claim encompasses methods in which the non-accelerometer sensor generates readings irrespective of whether the accelerometer's signal is in the predetermined range, so long as the processor only monitors the readings when the accelerometer's signal is within the predetermined range.

**2. "in motion"**

Respondents argue that the accused pulse oximetry functionality does not perform the method of claim 1 because it does not measure the user's blood oxygen level while the monitored body part is "in motion." The term "in motion" appears three times in claim 1. The first instance is in the preamble, which recites "[a] method for minimizing the effects of motion artifact on sensor readings taken during continuous transdermal monitoring of a body part in motion." *Id.* at 20:31-33.[9] The second instance is in the "accelerometer" limitation, which requires the processor to monitor "an output signal from an accelerometer, wherein the output signal indicates acceleration and deceleration of the body part of a user as the body part is in motion." *Id.* at 20:34-37. The third instance is in the "predetermined range" limitation, which requires "a predetermined range that includes indication of acceleration and deceleration, wherein indication of acceleration and deceleration corresponds with a motion direction change of the body part in motion." *Id.* at 20:38-42.

[9] The parties agreed that the preamble was limiting and that it should be construed to mean "a method for improving the timing of measurements taken during continuous transdermal monitoring of a body part in motion, such that inaccuracies attributable to motion artifacts are minimized." Order No. 26 (July 27, 2020) at 35.

While the parties did not seek a construction of "in motion" in the context of either the preamble or the "accelerometer" limitation, they disputed the construction of the term in the context of the "predetermined range" limitation. I found that the "predetermined range" limitation means "[a] predetermined range of acceleration and deceleration based on the output signal of the accelerometer that corresponds with a change in direction of the body part in motion being monitored." *Id.* at 37. With respect to the term "in motion," I found that the term did not need to be construed because "[t]he ordinary meaning of 'in motion' is readily apparent even to a lay judge." *Id.* at 43-46 (citing *Philips,* 415 F.3d at 1314).

### C. Discussion

For the reasons set forth below, I hereby GRANT Respondents' motion as to the accused Fitbit and Garmin heart rate monitoring functionalities and DENY Respondents' motion as to the accused pulse oximetry functionality.

#### 1. The accused Garmin heart rate monitoring functionality does not perform the "based on a determination" step of claim 1.

The processor in the accused Garmin devices does not perform claim 1's "based on a determination" step. This step requires that the processor "determine[] that the accelerometer's output signal is within the predetermined range, . . . make[] the decision to monitor and monitor[]" the non-accelerometer sensor. Order No. 26 (July 27, 2020) at 47. The step's "wherein" clause further requires that "the monitoring of the plurality of readings from the sensor occur[] only while the accelerometer's output signal remains within the predetermined range." *Id.* As shown below, the processor in the accused products continually monitors readings from the PPG sensor. Accordingly, the processor does not determine to monitor readings from the PPG sensor based on the accelerometer's signal being within a predetermined

range and does not satisfy the "wherein" clause's requirement that the monitoring only occur while the accelerometer's signal is within a predetermined range.

When an accused Garmin device is turned on and is on the user's wrist, the processor [redacted] Ex. 19 (Young Opening Garmin Report) at ¶ 291. [redacted] *Id.* at ¶ 292. [redacted].

Complainants argue that the processor in the Garmin devices "monitors a plurality of readings from a sensor [redacted] when the output signal from the accelerometer is within the predetermined range, and the processor does not monitor [redacted] when the output signal from the accelerometer is outside the predetermined range." Phillips' Opp. at 30. Complainants acknowledge, however, that when the processor [redacted]

[redacted]. Thus, it is undisputed that the processor in the Garmin devices continually monitors readings from the PPG sensor. There is no point in time in which the processor is not monitoring the readings from the PPG sensor. Sometimes these readings are obtained through the low-power mode, other times through the high-power mode, and still other times through both modes.

Based on the foregoing, Respondents' motion is GRANTED with respect to the accused Garmin heart rate monitoring functionality.

**2. The accused Fitbit heart rate monitoring functionality does not perform the "based on a determination" step of claim 1.**

Like the accused Garmin heart rate monitoring functionality, the processor in the accused Fitbit devices continually monitors readings from the PPG sensor and therefore does not perform claim 1's "based on a determination" step. To show the operation of the accused Fitbit devices, Respondents point to, *inter alia*, the deposition testimony of Dr. Shelton Gee Jao Yuen, Fitbit's Vice President of Research. Respondents Ex. 12 (Dep. Tr. of S. Yuen) at 30:17-31:13. According to Dr. Yuen, the heart rate algorithms in the Fitbit devices calculate the user's heart rate every second. *Id.* at 91:16-25. As described by Dr. Yuen, the accused Fitbit "devices try to provide heart rate continuously, and all the time, during exercise" and "every other time as well." *Id.* at 89:6-15; *see also id.* at 89:21-90:4. Dr. Yuen further testified that the only time that the algorithm is not working is when the Fitbit device is not on the user's wrist or turned off. *Id.* at 90:5-21. In other words, according to Dr. Yuen, when an accused Fitbit device is turned on and on a user's wrist, it is always calculating the user's heart rate. *Id.* at 91:7-14.

The only argument advanced by Complainants that the Fitbit heart rate monitoring functionality performs the "based on a determination" step is that, "[i]f motion exceeds the

predetermined range, the Fitbit Accused Products do not monitor or display the plurality of heart rate readings and instead display two dashes '- -' on the screen of the devices." Opposition at 30. The only evidence that they point to in support of their argument is a string cite to the expert report of their expert, Dr. Young.

In the cited paragraphs, Dr. Young opines that "to determine whether to monitor heart rate or not, the Fitbit Devices [redacted] Respondents Ex. 18 (Young Opening Fitbit Report) at ¶ 223. According to Dr. Young, [redacted] "the Fitbit Devices monitor heart rate from the PPG sensor." *Id.* On the other hand, [redacted] then the "Fitbit Devices do not monitor heart rate from the PPG sensor and the Fitbit Devices show two dashes on the display instead of a heart rate." *Id.* At his deposition, however, Dr. Young confirmed that the processor in the Fitbit devices receives readings from the PPG sensor and uses those readings to calculate heart rate [redacted]. Respondent' Ex. 9 (Young Dep. Tr.) at 22:10-24:20. The difference identified by Dr. Young [redacted] relates to whether information is displayed to the user.

Both Complainants and their expert improperly equate monitoring "readings" from the non-accelerometer sensor with displaying information to the user. Claims 1 and 6 do not require information to be displayed to the user; for these claims it is irrelevant whether the Fitbit devices display information to the user some of the time, all the time, or none of the time. The unasserted claims and the specification of the '464 patent clearly and consistently refer to displaying information to a user as "rendering," not monitoring. For instance, unasserted claim 2 adds the step of "rendering an average of the monitored plurality of readings from the sensor via

a display" to the method of claim 1. *Id.* at 20:52-54. Like claim 2, the specification uses the term "render" to refer to displaying readings. *Id.,* abstract ("The pulse oximetry reading may be recorded for later query and/or rendered for the benefit of the user."), 2:17-19 ("The pulse oximetry reading may be recorded for later query and/or rendered for the benefit of the user."), 5:29-31 ("Certain CTM embodiments may include an integrated light emitting diode ('LED') screen which may render continuous information to the user of the CTM embodiment."), 7:58-60 ("Notably, it is envisioned that the collected data and/or outputs generated by the collected data may be rendered to a user according to a preferred format."), 11:41-42 ("The hub component 100 also is shown to include a display 132 for rendering one or more outputs to a CTM user.").

Because the processor in the accused Fitbit devices continuously monitors readings from the PPG sensor, the processor does not determine to monitor readings from the PPG sensor based on the accelerometer's signal being within a predetermined range, and does not satisfy the "wherein" clause's requirement that the monitoring only occur while the accelerometer's signal is within a predetermined range. Accordingly, Respondents' motion is GRANTED with respect to the accused Fitbit heart rate monitoring functionality.

**3. There is a genuine dispute of material fact as to whether the accused pulse oximetry functionality infringes.**

Garmin argues that the accused pulse oximetry functionality does not perform the method of claim 1 because it does not monitor a body part "in motion." As discussed below, however, there is a genuine dispute of material fact as to whether the accused pulse oximetry function measures the user's blood oxygen level while the monitored body part is in motion.

In order to use the functionality, Garmin owner manuals tell users to "[k]eep still" and "[r]emain motionless" [redacted] in order to obtain a pulse oximetry measurement. *See, e.g.,* Respondents Ex. 13 (Forerunner 245/245 Music

Owner's Manual) at G0236277 (section titled "Getting Pulse Oximeter Readings"); Respondents Ex. 10 (MacDonald Dep. Tr.) at 210:24-211:11. Garmin acknowledges, however, that the accused devices can "tolerate [redacted] energy when taking a pulse oximetry measurement." Motion Memo. at 20. Citing the deposition testimony of Paul MacDonald, a Garmin engineer, Respondents argue that a body part accelerating [redacted] is not "in motion" within the meaning of claim 1. *Id.* At his deposition, Mr. MacDonald characterized [redacted] as being "pretty small" or "pretty low." Respondents Ex. 10 (MacDonald Dep. Tr.) at 192:24-194:1.

Complainants counter by pointing to Garmin's source code, [redacted] Respondents Ex. 19 (Young Opening Garmin Report) at ¶¶ 268-274. Although this characterization does not definitively establish that a person of ordinary skill in the art would understand that a body part accelerating [redacted] in the context of a summary determination motion this characterization creates a genuine dispute of material fact.

Based on the foregoing, Respondents' motion is DENIED as to Garmin's pulse oximetry functionality.

## V. U.S. PATENT NO. 7,845,228

Respondents contend that the accused products do not infringe the asserted claims of the '228 patent because there are two separate processors that perform the functions required to be performed by "a processor" in claim 1. Motion Memo. at 22-36.

### A. Background

Philips asserts claims 1-3 of the '228 patent. 85 Fed. Reg. 2440. Claim 1 of the '228 patent recites:

> 1. An activity monitor comprising:

> a measurement unit including a plurality of motion sensors operable to produce respective sensor signals indicative of motion experienced thereby; and
>
> a processor operable to receive the sensor signals from the measurement unit and to process the sensor signals in accordance with a predetermined method,
>
> characterized in that the activity monitor is operable to monitor and process the sensor signals discontinuously in time and the processor is operable to monitor the sensor signals in turn.

'228 patent, col. 3:17-27.[10] Claims 2 and 3 depend from claim 1. *Id*., col. 3:27-33.

**B. Discussion**

Each of the accused products contains a chip package made by STMicroelectronics or Analog Devices that includes sensors (including accelerometers), a processor, and a memory (the "accused chip packages"). Motion Exhibit 18 (Young Expert Report) at ¶¶ 106, 148-51 (Fitbit products), Exhibit 19 (Young Expert Report) at ¶¶ 107, 162-66 (Garmin products), Exhibit 16 (Paradiso Expert Report) at ¶¶ 62-64. Philips accuses components of the accused chip packages of infringing the "measurement unit" limitation of claim 1 of the '228 patent. Motion Exhibit 18 (Young Expert Report) at ¶¶ 146-54 (Fitbit products), Exhibit 19 (Young Expert Report) at ¶¶ 161-68 (Garmin products). For the "processor" limitation of the claim, Philips identifies a host processor in each accused product that is outside of the accused chip packages. Motion Exhibit 18 (Young Expert Report) at ¶¶ 155-59 (Fitbit products), Exhibit 19 (Young Expert Report) at ¶¶ 169-89 (Garmin products).

Respondents argue that the accused products do not infringe claim 1 because the processor inside each accused chip package is "operable to receive the sensor signals from the measurement unit," and that the host processor identified by Philips does not perform this claimed function. Motion Memo. at 22-36. Staff agrees with Respondents that claim 1 of the

[10] The '228 patent is attached as Exhibit 14 to Respondents' motion.

'228 patent requires the claimed "processor" to receive signals directly from the motion sensors and supports a determination of non-infringement. Staff Resp. at 15-35. In opposition, Philips argues that Respondents' motion misinterprets Philips's infringement contentions and relies on erroneous interpretations of the claim language. Philips Opp. at 3-22. Philips identifies the entire accused chip package as the "measurement unit," with sensor signals from the package received by a host processor in each of the accused products. *Id*. at 6-12. Philips submits that the host processors satisfy the limitations of the claimed "processor" for monitoring and processing the sensor signals. *Id*. at 12-14.

There is no dispute that the processor in the accused chip package does not meet the limitations of the "processor" limitation of claim 1 of the '228 patent. In its infringement contentions, Philips identifies the processor of each accused chip package as part of the claimed "measurement unit," not the "processor." The critical dispute between the parties in the present motion is whether the '228 patent precludes the processor of the accused chip package from being part of the "measurement unit."

Respondents contend that the processor in the accused chip package cannot be part of the claimed "measurement unit," arguing that no processor can be part of the "measurement unit" because the claim identifies "a processor" in a separate limitation. Reply at 12-14. There is nothing in the claim language that requires such exclusion, however. The first limitation of the claim describes "a measurement unit including . . . ;" using open-ended language that allows for different components that may not be explicitly identified in the claims. The second limitation describes "a processor," without placing any limitations on other processors that may be part of the claimed device. Respondents and Staff cite Federal Circuit cases that are not applicable to the present dispute. In *Becton, Dickinson & Co. v. Tyco Healthcare Grp., LP*, the Federal

Circuit held that "[t]here can be no literal infringement where a claim requires two separate structures and one such structure is missing from an accused device." 616 F.3d 1249, 1255 (Fed. Cir. 2010). Similarly, in *Gaus v. Conair Corp.*, the Federal Circuit held that an accused device "does not have a pair of probe networks that is separate from the electrical operating unit, as is required by claim 12 of the [asserted] patent." 363 F.3d 1284, 1290 (Fed. Cir. 2004). In the present motion, however, Respondents do not contend that a separate "processor" is missing—Philips has clearly identified a separate processor in each of the accused products to meet the "processor" limitation of claim 1. There is nothing in the claim language of the '228 patent that precludes Philips from making these infringement contentions.

Respondents further argue that the specification supports a construction that excludes any processor from being part of the "measurement unit." Motion Memo. at 25-29. As described in the specification and depicted in Figure 1, the '228 patent's "activity monitor 1 comprises a measurement unit 11, a processor 12, and a memory unit 13." '228 patent, col. 1:63-65.

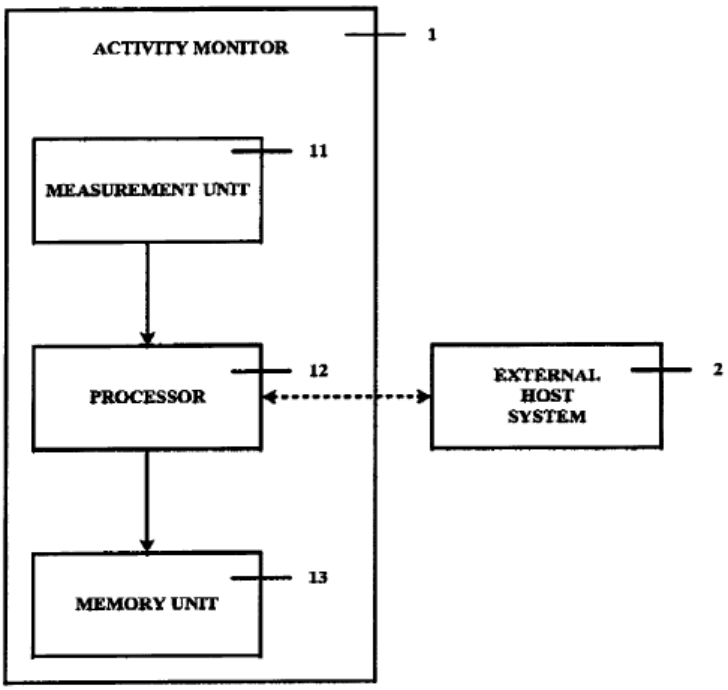



**FIG. 1**

*Id*., Fig. 1. Respondents submit that the components of the "activity monitor" in the specification correspond to sensors, processor, and memory in the accused chip packages of the accused products. Motion Memo. at 31-33; *see also* Staff Resp. at 20-24. Respondents argue that the host processors accused by Philips correspond to the "external host system" that is depicted outside the "activity monitor" in the specification. *Id*. Respondents further identify a prior art reference cited in the specification, "A Triaxial Accelerometer and Portable Data Processing Unit for the Assessment of Daily Physical Activity," by Bouten *et al.* ("Bouten"), which depicts a similar architecture for an activity monitor containing a measurement unit, processor, and memory. *Id*. at 29-31, Exhibit 17.

Although I agree with Respondents and Staff that the accused chip packages have a structure that is similar to the "activity monitor" depicted in Figure 1 of the specification, this is not the appropriate framework for an infringement analysis. "Infringement, literal or by

equivalence, is determined by comparing an accused product not with a preferred embodiment described in the specification, . . . , but with the properly and previously construed claims in suit." *SRI Int'l v. Matsushita Elec. Corp. of Am.*, 775 F.2d 1107, 1121 (Fed. Cir. 1985). As discussed above, the claim language is consistent with a "measurement unit" that includes additional components, including a processor. Respondents and Staff have not identified statements in the specification or prosecution history that preclude the measurement unit from including a processor, or that would require the claimed "processor" to receive sensor signals directly from the "motion sensors."[11] The premise of Respondents' argument on the '228 patent is thus flawed, and this part of the motion is denied.

## VI. CONCLUSION

For the reasons discussed above, Motion Docket No. 1190-027 is hereby GRANTED-IN-PART AND DENIED-IN-PART. It is my initial determination that summary determination of non-infringement is GRANTED with respect to the '698 patent, and summary determination of non-infringement is also GRANTED with respect to the '464 patent for the heart rate monitoring functionalities in the accused Fitbit and Garmin devices. The motion is DENIED with respect to the '464 patent for the pulse oximetry functionality in the Garmin devices, and it is DENIED with respect to the '228 patent.

Pursuant to 19 C.F.R. § 210.42(h), this initial determination shall become the determination of the Commission unless a party files a petition for review of the initial determination pursuant to 19 C.F.R. § 210.43(a), or the Commission, pursuant to 19 C.F.R. §

[11] The claim language does require that the "sensor signals" produced by the motion sensors are the same "sensor signals" received by the "processor," but Respondents do not contest this limitation in the context of the present motion. *See* Motion Memo. at 34 n. 11 ("Respondents assume for the sake of argument that the 'host processor' obtains the sensor signals from the STMicroelectronics processor.").

210.44, orders on its own motion a review of the initial determination or certain issues contained herein.

This order is being issued with a confidential designation. Pursuant to Ground Rule 1.10, each party shall submit to the Administrative Law Judge within seven (7) days a statement as to whether it seeks to have any portion of this order deleted from the public version. *See* 19 C.F.R. § 210.5(f). A party seeking to have a portion deleted from the public version must attach to its submission a copy of the order with red brackets indicating the portion(s) asserted to contain confidential business information. The parties' submissions shall not be filed with the Commission Secretary but shall be submitted by e-mail to the Administrative Law Judge's attorney advisor.

Redactions should be limited to avoid obscuring the reasoning underlying the decision. Parties who submit excessive redactions may be required to provide an additional written statement, supported by declarations from individuals with personal knowledge, explaining why each proposed redaction meets the definition for confidential business information in 19 C.F.R. § 201.6(a).

**SO ORDERED.**

Dee Lord

Dee Lord
Administrative Law Judge

**CERTAIN WEARABLE MONITORING DEVICES, SYSTEMS, AND COMPONENTS THEREOF** **Inv. No. 337-TA-1190**

## PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **INITIAL DETERMINATION** has been served via EDIS upon the Commission Investigative Attorney, **John Shin, Esq.**, and the following parties as indicated, on **October 28, 2020**.

Lisa R. Barton, Secretary
U.S. International Trade Commission
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**PUBLIC VERSION**

**UNITED STATES INTERNATIONAL TRADE COMMISSION**

**Washington, D.C.**

| | |
|---|---|
| **In the Matter of**<br><br>**CERTAIN WEARABLE MONITORING DEVICES, SYSTEMS, AND COMPONENTS THEREOF** | **Inv. No. 337-TA-1190** |

**ORDER NO. 34: INITIAL DETERMINATION GRANTING-IN-PART AND DENYING-IN-PART COMPLAINANTS' MOTION FOR PARTIAL SUMMARY DETERMINATION**

(October 1, 2020)

On August 20, 2020, Complainants Philips North America, LLC and Koninklijke Philips N.V. ("Philips") filed a motion for partial summary determination with respect to U.S. Patent No. 7,845,228 ("the '228 patent") (Motion Docket No. 1190-026). Respondents Garmin International, Inc., Garmin USA, Inc., and Garmin Ltd. ("the Garmin Respondents" or "Garmin") and Respondents Fitbit, Inc., Ingram Micro Inc., Maintek Computer (Suzhou) Co., Ltd., and Inventec Appliances (Pudong) ("the Fitbit Respondents" or "Fitbit") filed a memorandum in opposition to the motion ("Respondents' Opp.") on August 31, 2020. The Commission Investigative Staff ("Staff") filed a combined response to the parties' motions for summary determination ("Staff Resp.") on August 31, 2020, opposing Complainants' motion. Complainants filed a reply brief ("Reply") on September 3, 2020.

## I. BACKGROUND

The '228 patent is one of three asserted patents in this investigation. 85 Fed. Reg. 2440 (Jan. 15, 2020). Philips asserts claims 1, 2, and 3 of the '228 patent. *Id*. The '228 patent is titled "Activity Monitoring" and names inventors Joannes Gregorius Bremer, Paraskevas Dunias,

Gillian Antoinette Mimnagh-Kelleher, Adrianus Petrus Johanna Maria Rommers, and Wilhelmus Lambertus Marinus Cornelius Verhoeven. '228 patent, cover.[1]

The '228 patent describes an activity monitor "that reduces the amount of power consumed during a monitoring operation." '228 patent, Abstract. The activity monitor comprises a measurement unit, a processor, and a memory unit. *Id*., col. 1:62-2:4. "The measurement unit comprises three accelerometers, which are arranged in mutually orthogonal directions." *Id*., col. 2:16-17. The activity monitor reduces power consumption by using "discontinuous monitoring activity," whereby "the processor goes into a standby (or sleep) mode after a few seconds of monitoring." *Id*., col. 2:60-63. This standby mode can be controlled by software that "could detect changes in the human behavior and adopt the switch on, switch off strategy of the activity monitor." *Id*., col. 2:63-67. Claim 1 of the '228 patent recites:

> 1. An activity monitor comprising:
>
> a measurement unit including a plurality of motion sensors operable to produce respective sensor signals indicative of motion experienced thereby; and
>
> a processor operable to receive the sensor signals from the measurement unit and to process the sensor signals in accordance with a predetermined method,
>
> characterized in that the activity monitor is operable to monitor and process the sensor signals discontinuously in time and the processor is operable to monitor the sensor signals in turn.

*Id*., col. 3:17-27. Claims 2 and 3 depend from claim 1:

> 2. An activity monitor as claimed in claim 1, wherein the measurement unit is operable to output the sensor signals discontinuously in time.
>
> 3. An activity monitor as claimed in claim 1, wherein the processor is operable to monitor the sensor signals discontinuously in time.

*Id*., col. 3:27-33.

[1] The '228 patent is attached as Exhibit 1 to Complainants' motion for summary determination.

Several terms from the '228 patent were construed in a *Markman* order. Order No. 26 (July 27, 2020). The parties agreed to construe the term "activity monitor" to mean a device for monitoring physical activity of an individual or object; and the parties also agreed to construe "a plurality of motion sensors operable to produce respective sensor signals" to mean two or more motion sensors, such as uniaxial accelerometers, each of which produces a sensor signal, such as an x, y, or z axis data signal. *Id*. at 8. The claimed "processor" was found not to be subject to 35 U.S.C. § 112, ¶ 6. *Id*. at 8-10. The term "monitor and process the sensor signals discontinuously in time" was construed to require interruptions, pauses, breaks or the like between periods when the sensor signals are monitored and processed. *Id*. at 10-15. The term "monitor the sensor signals in turn" was construed to mean sequentially ordered non-overlapping monitoring of the sensor signals by the processor, *e.g.*, a time division monitoring of each of the x, y, or z axis data signals sequentially without overlap. *Id*. at 15-18. In Order No. 27 (July 27, 2020), the term "monitor" in the '228 patent was found to be not indefinite.

## II. LEGAL STANDARDS

### A. Summary Determination

In section 337 investigations, Commission Rule 210.18 governs motions for summary determination:

> The determination sought by the moving party shall be rendered if pleadings and any depositions, answers to interrogatories, and admissions on file, together with the affidavits, if any, show that there is no genuine issue as to any material fact and that the moving party is entitled to a summary determination as a matter of law.

19 C.F.R. § 210.18(b). The rule is patterned on Fed. R. Civ. P. 56. *See Certain Carbon and Alloy Steel Products*, Inv. No. 337-TA-1002, Initial Determination, 2017 WL 5167413 at *11 (Oct. 2, 2017), *not reviewed by* Commission Notice, 2017 WL 6434923 (Nov. 1, 2017). Under Rule 56, summary judgment is required where a party fails to make a showing "sufficient to

establish the existence of an element essential to that party's case, and on which that party will bear the burden of proof at trial." *Celotex Corp. v. Catrett,* 477 U.S. 317, 322 (1986). The movant may prevail by pointing out the lack of evidence supporting the non-moving party's case. *Id.* at 325.

**B. Infringement**

Section 337(a)(1)(B)(i) prohibits "the importation into the United States, the sale for importation, or the sale within the United States after importation by the owner, importer, or consignee, of articles that – (i) infringe a valid and enforceable United States patent or a valid and enforceable United States copyright registered under title 17." 19 U.S.C. §1337(a)(1)(B)(i). The Commission has held that the word "infringe" in Section 337(a)(1)(B)(i) "derives its legal meaning from 35 U.S.C. § 271, the section of the Patent Act that defines patent infringement." *Certain Electronic Devices with Image Processing Systems, Components Thereof, and Associated Software*, Inv. No. 337-TA-724, Comm'n Op. at 13-14 (December 21, 2011).

"An infringement analysis entails two steps. The first step is determining the meaning and scope of the patent claims asserted to be infringed. The second step is comparing the properly construed claims to the device accused of infringing." *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 976 (Fed. Cir. 1995) (*en banc*), *aff'd*, 517 U.S. 370 (1996) (citation omitted). Literal infringement requires the patentee to prove that the accused device meets each and every limitation of the asserted claim(s). *Frank's Casing Crew & Rental Tools, Inc. v. Weatherford Int'l, Inc.*, 389 F.3d 1370, 1378 (Fed. Cir. 2004).

**C. Domestic Industry**

In patent-based proceedings under section 337, a complainant must establish that an industry "relating to the articles protected by the patent . . . exists or is in the process of being established" in the United States. 19 U.S.C. § 1337(a)(2). Under Commission precedent, the

domestic industry requirement of section 337 consists of an "economic prong" and a "technical prong." *See, e.g., Alloc, Inc. v. Intl Trade Comm'n,* 342 F.3d 1361, 1375 (Fed. Cir. 2003). To meet the technical prong, the complainant must establish that it practices at least one claim of the asserted patent. *Certain Point of Sale Terminals and Components Thereof*, Inv. No. 337-TA-524, Order No. 40 at 17-18 (Apr. 11, 2005). "The test for satisfying the 'technical prong' of the industry requirement is essentially [the] same as that for infringement, *i.e.*, a comparison of domestic products to the asserted claims." *Alloc*, 342 F.3d at 1375.

With respect to the "economic prong," subsection (3) of Section 337(a) provides:

> For purposes of paragraph (2), an industry in the United States shall be considered to exist if there is in the United States, with respect to the articles protected by the patent, copyright, trademark, mask work, or design concerned –
>
> (A) significant investment in plant and equipment;
>
> (B) significant employment of labor or capital; or
>
> (C) substantial investment in its exploitation, including engineering, research and development, or licensing.

19 U.S.C. § 1337(a)(3). A complainant can establish a domestic industry under subsection (A), (B) or (C) of section 337(a)(3). *Certain Optical Disc Drives, Components Thereof, and Prods. Containing the Same,* Inv. No. 337-TA-897, Order Remanding the Investigation at 4 (Sept. 4, 2014) (*citing Certain Electronic Devices, Including Wireless Communications Devices,* Inv. No. 337-TA-667/673, Order No. 49C (unreviewed) (Nov. 16, 2009)). Under subsections (A) and (B), the economic prong focuses on "articles protected by the patent." 19 U.S.C. § 1337(a)(3). Expenditures may be counted toward satisfaction of the domestic industry requirement "as long as those investments pertain to the complainant's industry with respect to the articles protected by the asserted IP rights." *Certain Television Sets, Television Receivers, Television Tuners, and Components Thereof*, Inv. No. 337-TA-910, Comm'n Op. at 68, 2015 WL 6755093, at *36 (Oct.

30, 2015); *accord, e.g., Certain Marine Sonar Imaging Devices, Including Downscan and Sidescan Devices, Prods. Containing the Same, and Components Thereof,* Inv. No. 337-TA-921 (Comm'n Op. at 61) ("Navico's allocation methodology reasonably approximates the warranty and technical customer support expenditures relating to the LSS-1 product.") (*citing Certain Ground Fault Circuit Interrupters and Prods. Containing Same,* Inv. No. 337-TA-739, Comm'n Op. at 74-75, 79-81 (June 8, 2012)).[2] To satisfy the "with respect to" requirement, complainants may use some type of allocation methodology to separate expenditures on DI products from non-qualifying investments.

Also under subsections (A) and (B), a licensing entity (one that does not manufacture articles for sale) can rely on the expenditures of its (manufacturing) licensees to establish a domestic industry. *Wind Turbines,* Remand Comm'n Op. at 7-8. In that fact pattern, the licensee's expenditures allocable to the product or products that practice the patented technology count toward satisfaction of the economic prong.

Whether a complainant satisfies the economic prong is not analyzed according to a rigid mathematical formula. *Certain Male Prophylactic Devices*, Inv. No. 337-TA-546, Comm'n Op. at 39 (Aug. 1, 2007). The decision is made case-by-case basis and requires "an examination of the facts in each investigation, the article of commerce, and the realities of the marketplace." *Id.* Although Section 337(a)(3) describes the economic activities as "significant" and "substantial," a complainant does not need to show any "minimum monetary expenditure," and a complainant does not "need to define or quantify the industry itself in absolute mathematical terms." *Stringed Musical Instruments,* Inv. No. 337-TA-586, 2009 WL 5134139, Comm'n Op. at 16. "A precise

[2] As noted below, section 337(a)(3)(C) adds the requirement to show a nexus to the patent itself, whereas subparagraphs (A) and (B) require a nexus only to the articles protected by the patent. To satisfy the economic prong, a complainant can rely on investments or employment "directed to significant components, specifically tailored for use in an article protected by the patent." *Motorola Mobility, LLC v. Int'l Trade Comm'n*, 737 F.3d 1345, 1351 (Fed. Cir. 2013).

accounting [of the complainant's domestic investments] is not necessary, as most people do not document their daily affairs in contemplation of possible litigation." *Id*. at 17.

A domestic industry is in the process of being established if the complainant demonstrates that it is " 'taking the necessary and tangible steps to establish such an industry in the United States'" and there is a "'significant likelihood that the industry requirement will be satisfied in the future.'" *Certain Non-Volatile Memory Devices and Prods. Containing the Same ("Non-Volatile Memory"),* Inv. No. 337-TA-1046, Comm'n Op. at 29 (Oct. 9, 2018) (quoting *Stringed Musical Instruments,* Inv. No. 337-TA-586, 2009 WL 5134139, Comm'n Op. at *10 (May 16, 2008)).

## III. INFRINGEMENT

Philips contends that certain accused Fitbit and Garmin products infringe claims 1, 2, and 3 of the '228 patent. Motion Memo. at 3-14, 29-40.

### A. Accused Products

The Fitbit products accused of infringing the '228 patent are the Versa Family (Versa 2, Versa 2 Special Edition, and Versa Lite), the Ionic Family, the Charge, 3, the Charge 4, the Charge 4 Special Edition, the Inspire HR, the Inspire and the Ace 2 models (the "accused Fitbit devices"). Motion Memo. at 2. The Garmin products accused of infringing the '228 patent are the Forerunner (35, 45, 45S, 235, 245, 245 Music, 645, 645 Music, 735XT, 935, 945), Vivoactive (3, 3 Music, 4, 4S), Vivofit (4, Jr. 2), Vivomove (3, 3S, HR, Luxe, Style), Vivosmart 4, Vivosport, Approach (S20, S40, S60, S62, X40), Fenix (5, 5 Plus, 5S, 5S Plus, 5X, 5X Plus, 6, 6 Pro, 6 Sapphire, 6S, 6X, 6X Pro Solar), Instinct (including Tactical Edition), Legacy Hero (First Avenger, Captain Marvel), Legacy Saga (Rey, Darth Vader), MARQ (Adventurer, Athlete, Aviator, Captain, Commander, Driver), Venu, Descent Mk1, D2 Charlie, D2 Delta (including S

and PX), Tactix (Charlie, Delta), Quatix (5, 5 Sapphire), and Garmin Swim 2 models (the "accused Garmin devices"). *Id*. at 2-3.

There is no dispute that the accused Fitbit devices and accused Garmin devices each contain a chip package made by STMicroelectronics or Analog Devices (the "accused chip packages"), which includes a tri-axial accelerometer, a processor, and a FIFO (first-in, first-out) buffer. Motion Memo. at 3-6; Respondents' Opp. at 9. It is further undisputed that each of the accused products contains a host processor separate from the accused chip packages. *Id*. at 7-9; Respondents' Opp. at 24-25. In the accused Fitbit devices, these host processors are made by [redacted]. *Id*. at 7-8. In the accused Garmin devices, the host processors are contained in a component called a "SensorHub." *Id*. at 8-9.

**B. Infringement Analysis**

Philips identifies an alleged "measurement unit" and "processor" in each of the accused products. Respondents raise few disputes regarding the structure and operation of the accused products but disagree with Philips's interpretation of the asserted claim language. Each disputed limitation is addressed below.

**a. The "measurement unit" limitation**

Philips identifies the accused chip packages in the accused products to meet the "measurement unit" limitation of claim 1 of the '228 patent. Motion Memo. at 30-31. There is no dispute that the accused chip packages include three uniaxial accelerometer sensors "a plurality of motion sensors operable to produce respective sensor signals indicative of motion experienced thereby."

Respondents do not dispute that this limitation is met by the accelerometer sensors in the accused chip packages, but they argue that the claimed "measurement unit" should be limited to the sensors, excluding the processor and FIFO buffer components of the accused chip packages.

Respondents' Opp. at 16-20. As addressed in Order No. 35, issued concurrently herewith, Respondents' interpretation of the "measurement unit" limitation is not supported by the intrinsic evidence, and the "measurement unit" can include additional components, including a processor. Under the correct interpretation of this claim language, Philips has shown that the accused products infringe the "measurement unit" limitation. Summary determination of infringement will not be granted, however, because there are disputes of material fact with respect to several other limitations of the claim, as discussed below.

**b. The "processor" limitation**

Philips identifies the host processor in the accused products to meet the "processor" limitation of claim 1 of the '228 patent. Motion Memo. at 31-34. Respondents argue that these host processors do not receive signals directly from the "measurement unit," Respondents' Opp. at 16-20, but this argument is based on Respondents' erroneous interpretation of the "measurement unit" limitation, as addressed in Order No. 35. Respondents further argue that the "sensor signals" received by the host processors are not the same "sensor signals" produced by the "plurality of motion sensors." Respondents' Opp. at 17 n.9. Relying on the testimony of a Fitbit engineer, Respondents contend that the "sensor signals" produced by the "plurality of motion sensors" in the STMicroelectronics chip package are converted and organized by the processor in each accused chip package before being output to the host processor. Respondents' Exhibit 6 (Paradiso Rebuttal Report) at ¶ 75; Respondents' Exhibit 11 (Rajagopal Tr.) at 34-38. Respondents' expert, Dr. Paradiso, offers an opinion that the STMicroelectronics chip package performs a similar conversion for the Garmin devices. *Id*. at ¶ 91. Philips does not address this non-infringement argument in its motion or reply brief, and Staff submits that there is a dispute of material fact on this issue. Staff Response at 39.

I agree with Staff that the Fitbit engineer testimony and the opinions of Respondents' expert establish a dispute of material fact that precludes summary determination on infringement of this limitation. In deciding whether to grant summary determination, the evidence "must be viewed in the light most favorable to the party opposing the motion . . . with doubts resolved in favor of the nonmovant." *Crown Operations Int'l, Ltd. v. Solutia, Inc.*, 289 F.3d 1367, 1375 (Fed. Cir. 2002) (citations omitted); *see also Xerox Corp. v. 3Com Corp.*, 267 F.3d 1361, 1364 (Fed. Cir. 2001) ("When ruling on a motion for summary judgment, all of the nonmovant's evidence is to be credited, and all justifiable inferences are to be drawn in the nonmovant's favor.").

**c. The "discontinuously in time" limitation**

The third limitation of claim 1 of the '228 patent requires that "the activity monitor is operable to monitor and process the sensor signals discontinuously in time." To meet this limitation, Philips points to the operation of the host processors [redacted] Motion Memo. at 34-38. There is no dispute regarding [redacted] *Id*. at 10-14; Respondents' Opp. at 9-11. [redacted]. *Id*. at 11-12, 13-14; Respondents' Opp. at 10-11 [redacted]. *Id*. at 35; Respondents' Opp. at 11.

Philips argues that [redacted] are monitored and processed "discontinuously in time." Motion Memo. at 34-39. In accordance with the *Markman* order, this limitation requires

interruptions, pauses, breaks or the like between periods when the sensor signals are monitored and processed. Order No. 26 at 10-15. Philips submits that the accused products meet this limitation because there are periods of time between each burst of data that is received and processed by the host processors. Motion Memo. at 34-39.

Respondents argue that Philips is relying on a discontinuity in the flow of sensor signals, which was a proposed claim construction that was explicitly rejected in the *Markman* order. Respondents' Opp. at 20-23. Respondents further argue that the host processors do not monitor discontinuously because they are continuously [redacted]. *Id*. at 24-26. Respondents also contend that [redacted], and they argue that Philips has failed to identify any evidence regarding [redacted]. *Id*. at 26-29. Finally, Respondents cite a statement from one of Philips's briefs filed before the Patent Trial and Appeal Board requiring a "discontinuity between monitoring of [the] signals and processing them." *Id*. at 29-30, Exhibit L at 43. Respondents argue that this is a separate reason to deny the motion because Philips has not identified any evidence that the accused products meet this limitation. *Id*. at 29-31. Referencing Respondents' arguments regarding the "discontinuous in time" limitation, Staff submits that there are disputes of material fact that preclude summary determination. Staff Resp. at 40-42.

I agree with Philips [redacted] "discontinuously in time," as that term has been construed in the *Markman* order. There is no dispute that [redacted], and this is all that is necessary to satisfy the claim language "discontinuously in time." *See* Reply at 2-3. I further agree with Philips that the claim does not require a

discontinuity between monitoring the sensor signals and processing the sensor signals. The statement cited by Respondents from Philips's brief filed before the Patent Trial and Appeal Board is not a disclaimer that changes the scope of this limitation. *See* Reply at 3-5. I agree with Respondents and Staff, however, that there are disputes of material fact regarding the "discontinuously in time" limitation that preclude summary determination of infringement, as discussed below.

Although Philips has shown that the sensor signals [redacted] "discontinuously in time," there is a dispute of material fact as to whether the host processors perform additional "monitoring" steps. Philips submits that [redacted] is the only relevant "monitoring" in the accused products, because it is the only step where the host processors obtain information about the claimed "sensor signals." Motion Memo. at 37. This argument is not consistent with the plain and ordinary meaning of "monitor," however, which is "to watch, keep track of, or check." Order No. 27 at 9-10. The "monitoring" step in claim 1 was construed as a function of the processor to receive and track the sensor signals. *Id*. at 10. Respondents submit [redacted] Respondents Opp. at 24-26. To support their non-infringement argument, Respondents cite testimony from a Fitbit engineer and an expert witness describing the operation of the host processors. *Id*., Exhibit 8 (Choi Tr.) at 102, Exhibit 6 (Paradiso Rebuttal Report) at ¶¶ 149, 208. It is not clear from this testimony whether there is any [redacted]. On summary

determination, the evidence must be viewed in the light most favorable to Respondents, and summary determination is accordingly denied.

Moreover, I agree with Respondents that there is a separate dispute of material fact regarding the timing of the processing by the host processors. To prove that the processing is discontinuous in the accused products, Philips relies on an inference from the fact that data is received discontinuously by the host processor, and the data is processed after it is received. Motion Memo. at 35. It may be logical to infer that this processing is discontinuous, but Philips has not shown that this is the only reasonable inference. Summary determination cannot be granted on this limitation without additional evidence.

**d. The "monitor the sensor signals in turn" limitation**

The final limitation of claim 1 of the '228 patent requires that "the processor is operable to monitor the sensor signals in turn." This limitation was construed to mean sequentially ordered non-overlapping monitoring of the sensor signals by the processor, *e.g.*, a time division monitoring of each of the x, y, or z axis data signals sequentially without overlap. Order No. 26 at 15-18. Philips submits that this limitation is met by [redacted] the sensor data transmitted from the accused chip packages to the host processors. Motion Memo. at 38-39. There is no dispute that the sensor data [redacted] *Id.*; Respondents' Opp. at 31-33.

Respondents argue that this limitation requires each of the x samples to be received without any intervening y or z samples. Respondents' Opp. at 31-33. Respondents made this argument in their *Markman* briefs, proposing a construction with an example of "time division monitoring of x-axis data signal from time period 1, y-axis data signal from time period 2, z-axis data signal from time period 3." *See* Order No. 26 at 15-18. Respondents' proposal was rejected in the adopted construction, however, in favor of language from Philips's and Staff's proposed

constructions: "a time division monitoring of each of the x, y, or z axis data signals sequentially without overlap." *Id*. at 18. The scope of this limitation as construed thus explicitly includes the sequential monitoring of x, y, and z samples, as reflected in the accused products. Respondents' non-infringement argument is contrary to the construction adopted in the *Markman* order. Under the correct interpretation of this claim language, Philips has shown that the accused products infringe the "in turn" limitation but, as discussed above, summary determination cannot be granted because there are disputes of material fact with respect to several other limitations of the claim.

**e. Dependent Claims**

Summary determination cannot be granted on infringement of dependent claims 2 and 3 because they depend from claim 1. The disputed issues discussed above also affect the infringement analysis for the limitations of claims 2 and 3. With respect to claim 2, there is a dispute as to whether the claimed "sensor signals" produced by the motion sensors are the same signals output by accused chip packages. With respect to claim 3, there is a dispute as to whether the host processors monitor signals continuously in time.

**f. Patent Exhaustion**

Respondents argue that a finding of infringement against most of the accused products is precluded by patent exhaustion, based on a license between Philips and [redacted]. Respondents' Opp. at 33-36. Philips did not raise this issue in its motion but addresses the patent exhaustion arguments in its reply brief. Reply at 6-11. Philips submits that the license to [redacted] was assigned to another entity, [redacted]. Reply at 7, Exhibit 39, 40. Philips further contends that the terms of the license do not cover the sale of the accused chip packages. *Id*. at 8-9. The parties also dispute whether the accused chip packages "substantially embody" the invention claimed in the '228 patent, as required by the Federal Circuit case law

regarding patent exhaustion. Respondents' Opp. at 35-36; Reply at 9-10; *See Quanta Computer, Inc. v. LG Electronics, Inc*., 553 US 617, 618 (2008). These disputed issues cannot be resolved in the context of this summary determination motion, and no finding will be made on patent exhaustion in this order.

## IV. DOMESTIC INDUSTRY – TECHNICAL PRONG

Philips's motion further seeks summary determination on the domestic industry requirement of section 337(a)(2).

### A. Domestic Industry Products

Philips relies on two types of products to meet the domestic industry requirement for the '228 patent: Philips Lifeline Devices (the GoSafe, GoSafe 2 and HomeSafe with AutoAlert) and a Philips Biosensor Device (the BX100) (collectively the "domestic industry products") (e.g., FD100, 7000 AHB, 7000 MHB, 7100 MHB, 7150 MHB). Motion Memo. at 3.

There is no dispute that each of the domestic industry products contains a chip package made by [redacted] that includes a tri-axial accelerometer, a processor, and a FIFO (first-in, first-out) buffer. Motion Memo. at 6-7; Respondents' Opp. at 12. Each domestic industry product also contains an additional processor outside of the [redacted] chip package. *Id*. at 9-10; Respondents' Opp. at 12-14. Each of the Philips Lifeline Devices includes either a [redacted] processor or [redacted]. *Id*. at 9. The Philips Biosensor Device includes a [redacted] microprocessor. *Id*.

### B. Technical Prong

The parties' disputes regarding the technical prong of the domestic industry requirement are similar to those addressed above in the context of infringement. *See* Respondents' Opp. at 36-38. For the same reasons that Philips's motion is denied with respect to infringement, summary determination is also denied with respect to the technical prong of the domestic

industry requirement. There is a dispute of material fact as to whether the "monitoring" and "processing" of the host processor is "discontinuous in time." Respondents' Opp. at 36-38.[3] Accordingly, summary determination cannot be granted on the technical prong of the domestic industry requirement.

### C. Economic Prong

#### 1. Summary of the parties' arguments

##### a. Philips's motion

Philips contends that it has satisfied the economic prong for the '228 patent based on its investments in two different product lines, the Biosensor BX100 (the "BX100") and the Lifeline Products. Philips moves for summary determination on the economic prong with respect to the '228 patent on one of those two product lines, the BX100. Philips claims to satisfy the economic prong under sections 337(a)(2) and 337(a) (3) (A) and (B). Motion Memo. at 43.[4]

The BX100 device is "a wearable biosensor that collects information about a patient's physiological condition and sends the data wirelessly to a multi-patient bridge." Motion Ex. 29 (Akemann Report) at ¶ 86. The device measures vital signs and activity levels. *Id.* at ¶ 87. The product is intended to assist in surveillance of patients, to speed response time, and to improve care. *Id.*

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[3] Respondents separately argue that certain of the domestic industry products, the Philips Lifeline Devices, do not meet the "discontinuously in time" limitation because they output data from the FIFO of the [redacted] chip package to the host processor continuously every 500 milliseconds, without using an interrupt signal. Respondents' Opp. at 12-14. Philips does not appear to have the same understanding of Respondents' contentions regarding this limitation, writing that "Respondents do not contend that the host processor of the Philips Lifeline Devices continuously monitors the FIFO buffer." Motion Memo. at 37 n.3. In light of this confusion, Respondents' argument is not addressed in the present order.

[4] The citations herein are to portions of the record cited by Philips. I find that the facts contained in this summary of Philips's arguments are true and, as explained below, that there is no genuine dispute concerning material facts.

The BX100 was developed by Philips Connected Sensing ("Philips CS"), which was formed for the purpose of developing and bringing the BX100 technology to market. Motion Memo. at 17; Mot Ex. 37 (Thiagarajan Decl.) at ¶ 14. Philips CS is a business unit within the Monitoring and Analytics business area of the Philips Connected Care and Health Informatics segment. Motion Ex. 36 (Hoye Decl.) at ¶ 2. Philips established the Philips CS business unit in late 2015 within the Philips Connected Care segment. *Id.* at ¶ 3. Philips states that the BX100 has been under development since 2015 and was released to the market in June 2020 (after the Complaint was filed). *Id.*; Motion Ex. 29 (Akemann Report) at ¶ 91. Philips projects [redacted] BX100 devices will be sold in 2020. *Id.* at 93.

According to Dr. Srik Thiagarajan, senior algorithm engineer for Philips CS, the BX100 is the only product developed by Philips CS since it was formed. Motion Memo. at 18; Motion Ex. 37 (Thiagarajan Decl.) at ¶¶ 1-4. Development of the BX100 included mechanical, electrical hardware, software, industrial design, and algorithm development, of which approximately [redacted] occurred in Cambridge, Mass. *Id.* at ¶¶ 16-17. According to Dr. Thiagarajan, Philips CS "retained and will retain full responsibility for the design of the solution and coordination" of BX100 manufacture. Motion Ex. 37 at ¶ 15.[5] *See* Motion Ex. 31 (Hoye Dep.) at 56:19-24 ("So, Philips Connected Sensing venture is, the prime focus is for them to create and now launch this BX-100 sensor. There will be discussion about further development or future key releases [redacted].")

Philips submits Exhibit 21 as the manufacturing plan for the BX100. *Id.* at ¶ 25. Under the manufacturing plan, parts, components and sub-assemblies are sourced from suppliers and contract manufacturers. Mot Ex. 21 at 3 of 7. [redacted] in [redacted],

[5] Dr. Thiagarajan's declaration contains a detailed account of the development of the BX100. *See* Motion Memo. at 18-19; Motion Ex. 37 at ¶¶ 21-24, discussion *infra*.

Ohio, assembles the parts and components into a saleable product and the product is then shipped to Philips's distribution warehouses (one domestic, one abroad). Motion Ex. 37 (Thiagarajan Decl.) at ¶ 25.

According to Dr. Michael P. Akemann, Philips's economic expert, a preliminary pricing quote from [redacted] indicates tooling costs of [redacted]. Motion Ex. 29 (Akemann Report) at ¶ 199. With respect to manufacturing pricing, Philips represents that a preliminary order of [redacted] BX100 units cost [redacted] per device; a second order of [redacted] will cost [redacted] per device; and an upcoming order of [redacted] will cost [redacted] per device. Motion Ex. 36 (Hoye Decl.) at ¶ 16. Dr. Thiagarajan testifies that assembly of BX100 units by [redacted] began around January 2019 with a few hundred assembled for testing, verification and validation, and as many as [redacted] were made by 2020. Motion Ex. 9 (Thiagarajan Dep.) at 70:12-22. He states that production has "[redacted]." *Id.* at 70: 22-24. Philips maintains that, with additional capital expenditures, [redacted] has the capacity to manufacture up to [redacted] BX100 devices per year. Motion Ex. 31 (Hoye Dep.) at 55:17-56:15.

In addition to the expenditures for the BX100 device itself, Philips includes costs associated with the multi-patient bridge, an off-the-shelf product that is necessary for the BX100 system to function as intended. Motion Ex. 37 (Thiagarajan Decl.) at ¶¶12-13. The bridge is designed and configured by the manufacturer/supplier before shipment to [redacted] for packaging and shipment. *Id.* at ¶12. Philips CS's development relating to the bridge was limited to integration and interface with the BX100 sensor and backend software. *Id*.

Philips points out that the BX100 has no user interface and must therefore integrate with the "backend software" *via* the multi-patient bridge. *Id.*; Motion Ex. 37 (Thiagarajan Decl.) at ¶ 11. Phillips asserts that the BX100 cannot be economically exploited without the bridge.

Motion Ex. 29 (Akemann Report) at ¶ 95. Philips argues that the bridge has "a direct relationship" to the patent, which describes the processor of the activity monitor being connected to an external host "to perform additional processing of the data held in the activity monitor." Motion Memo. at 42 (citing '228 patent at 2:5-9).

Philips CS tracks its rent and employee salary expenses in the ordinary course of business by project-based cost coding. Motion Ex. 36 (Hoye Decl.) at ¶ 14. Alleged expenditures for rent for the Cambridge facility since 2016 total approximately [redacted] and are shown in Table 1:

Table 1: BX100 R&D Plant Expenses

| Year | 2016 | 2017 | 2018 | 2019 | Q1 2020 |
|---|---|---|---|---|---|
| Rent (USD) | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |

Motion Memo. at 21-22; Motion Ex. 29 (Akemann Report) at ¶199.

From 2016 through the first quarter of 2020, Philips CS paid approximately [redacted] in salaries for Philips employees dedicated to the development of BX100, as shown in Table 2:

Table 2: BX100 R&D Labor Expenses

| Year | 2016 | 2017 | 2018 | 2019 | Q1 2020 |
|---|---|---|---|---|---|
| Salary (USD) | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |

Motion Memo. at 22; Motion Ex. 29 (Akemann Report) at ¶ 225. Philips says Philips CS will invest an additional [redacted] through 2020 for salaries of approximately [redacted] engineers working on continued development of the BX100. *Id.*

From 2016 to Q1 2020, Philips CS spent approximately [redacted] dollars in capital expenses dedicated to the development of the BX100, as shown in Table 3:

Table 3: BX100 R&D Capital Expenses

| Year | 2016 | 2017 | 2018 | 2019 | Q1 2020 |
|---|---|---|---|---|---|
| Salary (USD) | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |

Motion Memo. 22; Motion Ex. 29 (Akemann Report) at ¶ 226. Philips says Philips CS plans to invest another [redacted] in 2020. *Id.*

Philips argues that, without its investments in plant and equipment, the alleged domestic industry product would not exist at all. The BX100, Philips asserts, is the only device produced by Philips CS. *Id.* at ¶ 201. Philips notes that it paid about [redacted] in rent for the Cambridge, Mass., facility between 2016 and 2020. *Id.* at ¶ 199. Philips also points to amounts Philips CS paid to [redacted] for tooling and assembly of the BX100 device, arguing that "[s]ince all claimed investments in plant and equipment are domestic and exclusively related to the article protected by the '228 patent, no allocation of Philips' approximately [redacted] in plant and equipment expenses is necessary." Motion Memo. at 46. In addition, all of Philips CS's claimed plant and equipment investments are made in the U.S., therefore, according to Philips, investments in the U.S. add 100% to the value of the BX100. *Id.* at 46.

Philips maintains that Philips CS's labor and capital investment for the BX100 was made in the Boston area, with around [redacted] in Cambridge, Mass. Ex. 37 (Thiagarajan Decl.) at ¶ 17; Motion Ex. 9 (Thiagarajan Dep.) at 66:16-23. Philips asserts that since the BX100 constitutes 100% of Philips CS's product lines, the ratio of labor and capital expenses between domestic industry and non-domestic industry products is 100/0. Motion Ex. 29 (Akemann Report) at ¶ 230.

Philips asserts that the BX100 device is an important product that was expressly developed to fill a "gap between continuous cardiac telemetry and infrequent spot-check monitoring," Motion Ex. 37 (Thiagarajan Decl.) at ¶ 24, and that it is important for the growth and profitability of the Philips CS business. Motion Ex. 36 (Hoye Decl.) at ¶ 19. Philips points

to a growing market for wearable medical devices, valued at [redacted] in 2019, and states that Philips hopes to expand that market. Motion Ex. 29 (Akemann Report) at ¶ 165.

Regarding subparagraph (B) of section 337(a)(3), Philips presents as significant investments of approximately [redacted] in domestic labor dedicated exclusively to development of the BX100. Motion Ex. 29 (Akemann Report) at ¶¶ 225- 229. Philips asserts capital expenditures of about [redacted] similarly dedicated to the BX100. Motion Memo. at 49. Repeating the arguments made with respect to expenditures for physical plant, Philips asserts that [redacted] in labor and capital expenditures "is 'large' in the absolute sense (tens of millions of dollars)," *id.*; Motion Ex. 29 (Akemann Report) at ¶ 230,[6] and quantitatively significant in context since it comprises the vast majority, approximately [redacted] of Philips CS's development work." *Id.*; Motion Ex. 37 (Thiagarajan Decl.) at ¶17. Philips cites domestic activity and value-added ratios identical to those described with respect to investments in physical plant and relies on the same contextual considerations discussed above to assert that its expenditures under subparagraph (B) are qualitatively significant.

In addition, Philips claims to have a domestic industry in the process of being established, pointing to a multi-year development plan for the BX100 project and FDA approval in 2020, as well as the product's recent commercial release in the U.S. Motion Memo. at 50; Motion Exs. 20, 34; Motion Ex. 31 ("Hoye Dep.") at 144:17-25.

**b. Respondents' opposition**

[6] The "absolute" amount is not determinative. *See Certain Carburetors & Prod. Containing Such Carburetors,* Inv. No. 337-TA-1123, Comm'n Opinion, 2019 WL 5622443 at *12 (Oct. 28, 2019) ("Walbro has cited no case in which the Commission determined the quantitative significance of a complainant's domestic industry investments based solely on the absolute value of those investments."). The pertinent question is the significance of expenditures in context. *Id.*

Respondents do not dispute the amounts Philips claims to have spent, but they raise several legal arguments in opposition to the motion.

1. Respondents assert that the party that owns the '228 patent, Philips KPNV, is not the entity operating the alleged domestic industry, and that there is no license running between the respective parties. Respondents contend that a domestic industry must be based on the U.S. activity of the patent owner and/or its licensees. *See Certain Variable Speed Wind Turbines* ("*Wind Turbines*"), Inv. No. 337-TA-376, Remand Comm'n Op. at 12 (Nov. 24, 1997). They maintain that for Philips North America ("Philips NA") to claim expenditures related to the '228 patent, there must be a license between Philips KPNV and Philips NA, and there is none. Respondents' Opp. at 37-41.[7]

2. Respondents argue that Philips's witnesses have admitted that Philips made foreign investments in connection with the BX100, but that Philips ignores foreign investments and performs no "comparative analysis between foreign and domestic expenditures." *Id.* at 41-43 (citing Ex. H (Hoye Tr.) at 51:10–54:8, 88:15–89:12; Ex. 9 (Thiagarajan Tr.) at 66:16–67:5). Respondents note that Melissa Hoye, Philips's corporate witness regarding Philips CS's investments in the BX100, testified that Philips performed both domestic and foreign clinical trials relating to the BX100, but she excluded the foreign clinical trial expenditures in the spreadsheet showing domestic industry investments. *Id.* at 42. Respondents say Dr. Thiagarajan "identified additional foreign, unclaimed expenditures," stating that the [redacted] *Id.* at 42-43 (quoting Ex. 9 (Thiagarajan Tr.) at 66:16-67:5). Respondents note further Ms. Hoye's

[7] As explained below, I find that Respondents' assertions do not raise genuine issues of material fact. Generally, I take Respondents' factual assertions to be true (except where they are unsupported by evidence), but I do not agree with Respondents' characterization of the facts or their interpretation of the legal standards governing this determination.

testimony that Philips CS paid over [redacted] to a foreign vendor [redacted] between 2016 and 2019, which also was excluded from the claimed domestic investment amounts. *Id.* at 43 (citing Ex. 9 (Hoye Tr.) at 94:8–95:6). Respondents state that Philips also ignores foreign expenditures relating to the multi-patient bridge, asserting that such expenditures "must exist because the Bridge is configured and manufactured abroad." *Id.* at 44.

3. Respondents claim Philips should have apportioned expenses as between the BX100 and the multi-patient bridge. Respondents say that the bridge product does not meet the criterion for inclusion with domestic industry expenditures because it is not closely related to the patented features of the domestic industry product. Respondents argue further that, if the multi-patient bridge is integral to the domestic industry product, the cost of manufacturing the bridge overseas should have been included in a comparative analysis. *Id.* at 44-45.

4. Respondents contend that Philips fails to perform a comparison of the claimed domestic industry investments with the broader Philips operation. Respondents claim that Philips improperly focuses on the expenditures of Philips CS without presenting other Philips expenditures, thereby inaccurately representing the quantitative significance of the claimed domestic expenditures. Philips CS is not a discrete corporate entity, Respondents point out; rather, it is part of the Philips Connected Care and Health Informatics segment ("Connected Care"); further, they say, Philips CS was consolidated into the Philips General Care & Specialty Monitoring business unit ("PGC&SM") in 2019. *Id.* at 46 (citing Motion at 16; Motion Ex. 37 (Thiagarajan Decl.) at ¶ 2; Motion Ex. 36 (Hoye Decl.) at ¶ 2). Respondents say Philips "has provided no evidence that Philips CS operates entirely separately from PGC&SM or Connected Care, or that PGC&SM or other Connected Care business units did *not* make any investments relating to the BX100." *Id.* at 46. Respondents assert that, when compared with the Philips

organization overall, which reported "tens of billions of dollars of revenue every year for the past five years, with total operating expenses in the range of seven to eight billion dollars and an average of $2 billion in research and development costs per year," the investment in the BX100 is insignificant. *Id.* at 47 (citing Opp. Ex. U (Milani Rpt.) at 8; Opp. Ex. V (2019 Philips Annual Report) at 89).

5. With respect to an industry being established, Respondents say Philips's investments in the BX100 are declining and it has not presented hard evidence of future expenditures past the end of 2020. Respondents note that Philips CS has reduced its employees in the U.S. following the rollout of the BX100 and no longer pays rent for the facility from which it relocated in February 2020. Specifically, Respondents note that Philips CS's multi-year development plan is ending with the BX100's FDA approval and commercial release. *Id.* at 49. Respondents recite: "In 2019, Philips spent approximately [redacted] total on rent, salaries, and other expenditures. *See* Motion at 21–22. In 2020, after prorating the Q1 expenditures, Philips will spend approximately [redacted] on rent, [redacted] on salaries, and [redacted] on other expenditures—or [redacted] *total* for the entirety of 2020." *Id.* Respondents note that Philips CS's BX100 labor will be [redacted] in 2020 as opposed to 2019, "and Philips CS has moved into a new facility whose rent—and space usage—by the BX100 is unknown." *Id.*

Respondents assert that their arguments point to "failures of proof" that preclude summary determination. *Id.* at 41.

**2. Discussion**

Respondents maintain that Philips fails to make certain factual showings with respect to (1) a domestic industry based on the U.S. activity of the patent owner and/or its licensees; (2) comparison between domestic and foreign costs related to the BX100; (3) apportionment of

expenses as between the BX100 and the multi-patient bridge; (4) comparison of the claimed domestic industry investments with the operations of other Philips components; and (5) evidence of future expenditures past the end of 2020 to demonstrate an industry in the process of being established. With respect to these issues, I must determine whether, "[a]s a threshold matter . . . it is appropriate to decide [the] dispute as a matter of law, or whether the issues are better suited for a trier of fact." *Eger v. United States,* 405 F. Supp. 3d 850, 856-57 (N.D. Cal. 2019), *aff'd*, 818 Fed. App'x 751 (9th Cir. 2020).

As discussed below, the parties essentially agree on what the facts are; their dispute concerns "the import of those facts as applied to the law, which makes this a mixed question of law and fact." *Eger,* 405 F. Supp. 3d at 857 (citing *Parkside, Inc. v. CIR,* 571 F.2d 1092, 1094 (9th Cir. 1977)). In cases where "the only disputes relate to the legal significance of undisputed facts, 'the controversy collapses into a question of law suitable to disposition on summary judgment.'" *Id.* (quoting *Blue Lake Rancheria v. United States*, 653 F.3d 1112, 1115 (9th Cir. 2011)). "In other words, '[s]ummary judgment is authorized when it is quite clear what the truth is,' and the law requires judgment in favor of the movant based upon facts not in genuine dispute." *Paragon Podiatry Lab., Inc. v. KLM Labs., Inc.*, 984 F.2d 1182, 1185 (Fed. Cir. 1993) (citations omitted).

That is the case here. Respondents frame their opposition in terms of the absence of needed facts when in actuality they are arguing about principles of law. The distinction is critical, because non-movants are entitled to favorable inferences regarding factual disputes, but there is no advantage given to a non-movant with respect to the law. "On summary judgment, the court views facts and draws inferences in the light most favorable to the party opposing the motion, however the court need not treat a complaint's legal conclusions as true." *DePaola v.*

*Virginia Dep't of Corr.,* 2014 WL 1766098, at *2 n. 5 (W.D. WV May 2, 2014) (internal citations omitted); *L.H. v. Hamilton Cnty. Dep't of Educ.,* 2014 WL 6674445, at *1 (E.D. Tenn. Nov. 24, 2014) ("While the court must construe the complaint in the light most favorable to the claimant and accept as true all well-pleaded factual allegations, legal conclusions and unwarranted factual inferences need not be accepted as true.").

Among the questions of law that are most appropriate for summary determination are questions of statutory interpretation. *See* William W. Schwarzer, *et al*., Federal Judicial Center, "The Analysis and Decision of Summary Judgment Motions," 139 F.R.D. 441, 445 (1992). Courts decide statutory standards as a matter of law to ensure coherence and consistency. *Id.* at 461-473 (reviewing summary judgment decisions in various subject matter areas). *See Bellco Credit Union v. U.S.*, 735 F. Supp. 2d 1268, 1276-77 (D. Co. 2009) ("[W]here a decision is likely to have significant precedential impact on the resolution of an issue imbued with the need for consistency and reasoned resolution, the balance tilts toward determination by the judge rather than the jury.").

I find that the matters raised by the motion are appropriate for summary determination because they concern "the legal significance of undisputed facts." *Eger,* 405 F. Supp. 3d at 857 (citing *Merchants Refrigerating Co. of California v. U.S.*, 659 F.2d 116, 116-17 (9th Cir. 1981)). At issue here are statutory questions relating to the standards required to satisfy the economic prong. Such questions should be decided by the judge in the first instance and the Commission on appeal, if it chooses to review the judge's decision.

Respondents purport to raise issues of fact, but there are no genuine factual disputes. To establish a genuine issue of material fact in dispute, the non-moving party must present affirmative evidence. *See Matsushita Elec. Indus. Co. v. Zenith Radio Corp*., 475 U.S. 574, 586

(1986) (holding that the non-moving party "must do more than simply show there is some metaphysical doubt as to the material facts"). *Accord, e.g.*, *Procaps S.A. v. Patheon Inc*., 141 F. Supp. 3d 1246, 1260 (S.D. Fla. 2015), *aff'd*, 845 F.3d 1072 (11th Cir. 2016) (citing *Woolsey v. Town of Hillsboro Beach*, 541 Fed. Appx. 917, 919 (11th Cir. 2013); *Latele Television, C.A. v. Telemundo Commc'ns Grp., LLC*, 2014 WL 7272974, at *7 (S.D. Fla. Dec. 18, 2014); *Fields v. Gorman*, 2010 WL 3769396, at *3 (S.D. Fla. Sept. 3, 2010)). "Conclusory allegations and conjecture cannot be the basis for denying summary judgement." *Procaps*, 141 F. Supp. 3d at 1260 (citing *Mayfield v. Patterson Pump Co*., 101 F.3d 1371, 1376 (11th Cir.1996)). "Rhetoric and attorney argument" moreover, "are no substitute for record evidence." *Id*. (citing *Latele*, 2014 WL 7272974, at *7).

Respondents promote legal error by seeking to invoke, as invariable rules, principles that the Commission has held must be applied on a case-by-case basis, as appropriate. As discussed below, Respondents do not present any material factual disputes; their contested points are only legal argument and are either erroneous or unsupported by actual evidence. Under the correctly applied legal standards, Philips has established that the economic prong is satisfied.

**a. Lack of a license between Philips KPNV and Philips NA**

The parties do not dispute that Philips KPNV is the sole owner of the asserted patents and that Philips NA is a wholly owned subsidiary of Philips KPNV. The parties also do not dispute that Philips KPNV does not conduct operations in the U.S. and that Philips NA is the entity whose operations exploit the patent in this country.

Respondents argue that the entity performing the domestic activities must own or be licensed to the asserted patent. Respondents' Opp. at 38 (citing *Wind Turbines,* Remand Comm'n Op. at 12). Respondents maintain that the investments of Philips NA cannot satisfy the

economic prong because Philips KPNV is the patent owner and there is no written license agreement between the two entities.

Commission precedent indicates that domestic operations need not be carried out by the patent holder to qualify for consideration under the economic prong, so long as the operations are authorized by the patent holder. Thus, a patent holder is not limited to its own investments but may rely upon investments by related entities, even absent a license. *See Certain Magnetic Tape Cartridges and Components Thereof* ("*Magnetic Tape*"), Inv. No. 337-TA-1058, Comm'n Op. at *39 (Apr. 9, 2019) (finding several independent grounds for concluding that domestic industry operations were authorized) ("[The record evidence establishes that IBM has authorization from Sony to practice the asserted patents such that the IBM 3592 products fall within the umbrella of domestic industry products upon which Sony may rely."); *Certain Liquid Crystal Display Devices and Products Containing the Same*, Inv. No. 337-TA-631, 2008 WL 4682826 at *4, Order No. 18 (Sept. 23, 2008) (including expenditures by wholly owned subsidiary in domestic industry activities).

*Wind Turbines* is not to the contrary. As the Commission expressly stated in *Certain Optical Disc Drives, Components Thereof, and Prods. Containing the Same,* Investigation No. 337-TA-897, Corrected Order Remanding the Investigation at 4 (Sept. 29, 2014), "the statute requires only that 'an industry in the United States shall be considered *to exist[,]*' but does not specify that such industry must be comprised of one particular entity, *i.e.,* the complainant . . . ." Rather, a domestic industry encompasses the activities of the patent owner "*and the activities of those authorized by it to practice the patent*." *Id.* at 5 (quoting *Wind Turbines,* Remand Comm'n Op. at 7-8). Philips NA is implicitly authorized by its parent, Philips KPNV, to practice the '228 patent; no license or explicit authorization is necessary.

### b. Comparison of domestic to foreign investment

Respondents argue that Philips's failure to compare domestic to foreign investments precludes summary determination. Respondents' Opp. at 42-43. The argument proceeds from the erroneous assumption that such a comparison must be made in every case. The comparison between domestic and foreign investments is required only when the circumstances of the case make the comparison relevant. This is simply another way of saying that there is no prescription for determining whether the economic prong is satisfied. *Certain Carburetors & Prod. Containing Such Carburetors* ("*Carburetors*"), Inv. No. 337-TA-1123, 2019 WL 5622443, Comm'n Op. at *6 (Oct. 28, 2019) (quoting *Certain Optoelectronic Devices for Fiber Optic Communications* ("*Optoelectronic Devices*"), Inv. No 337-TA-860, Comm'n Op. at 18-19 (May 9, 2014)). Consistent with this principle, the Commission has affirmed that comparative evidence or comparative analysis of domestic versus foreign investments is not mandated in every case. "'[C]omparing complainant's domestic expenditures to its foreign expenditures is one of the possible factors that the Commission could but, contrary to Respondents' argument, is not required to consider.'" *Carburetors* at *6 (quoting *Certain Printing and Imaging Devices and Components Thereof* ("*Printing*"), Inv. No. 337-TA-690, Comm'n Op., 2011 WL 7628059 at *20 (Feb. 17, 2011)).

To be sure, a complainant under section 337 must place its alleged domestic industry expenditures in a meaningful context. But again, there is no universal, prescribed context. Methods include comparison of domestic and foreign sales, domestic and foreign investments, value added to the product by activities in the U.S., and: "Depending upon the particular company, industry, and marketplace in question, other contextual facts . . . whether the domestic industry investments and activities with respect to the protected articles are quantitatively significant or substantial." *Carburetors,* at *13.

Comparison of domestic to foreign sales, though commonly used by complainants, is not the only factor bearing on significance. Depending on the circumstances of the case, other factors may be decisive. *See, e.g., Certain Automated Teller Machines, ATM Modules, Components Thereof and Products Containing Same* ("*Automated Teller Machines*"), Inv. No. 337-TA-972, Initial Determination at 191 (Feb. 1, 2017) (finding low quantitative proportion of field service labor investments compared to sales revenues and manufacturing costs, and "that qualitative evidence weighs against the significance" of the investments in view of discontinuation of the module that practices the '010 patent product, decline in the number of in-service ATMs using the module, and that the service performed does not relate to the '010 patent), *unreviewed in pertinent part by* Comm'n Notice (Jan. 30, 2017); *Certain Table Saws Incorporating Active Injury Mitigation Technology and Components Thereof,* Inv. No. 337-TA-965, Order No. 10, Initial Determination at 17 (Apr. 27, 2016) (finding quantitative significance of labor costs based on the fact that these costs account for 11 percent to 19 percent of complainant's gross sales, and that nearly half of all labor costs supported R&D, in addition to qualitative significance of the claimed labor to continued development, improvement, production and sales of DI products), *unreviewed by* Comm'n Notice (Apr. 21, 2016).

Undisputed facts in the record indicate that Philips's domestic investments in the BX100 are quantitatively and qualitatively significant. The domestic industry product was developed almost entirely in the U.S. If a comparison of domestic to foreign expenditures were made with respect to investments in the BX100 under subparagraph (A) of section 337(a)(3), the ratio would be close to 100/0. *See* Motion Memo. at 46 (noting 100/0 ratio between U.S. and foreign plant and equipment investment) (citing Motion Ex. 29 (Akemann Report) at ¶ 203). Philips CS, the entity exploiting the patent in the U.S., was created to develop the BX100. The testimony

shows that Philips directed its investment in the new product in response to emerging circumstances in the health care industry.

This is not a case where a product is largely manufactured in another country and a determination must be made whether domestic activities are significant in the context of that overseas production. The BX100 was developed in the United States and is made in the United States. As Philips points out, these facts would result in a "value added" ratio of nearly 100%.

Respondents say that foreign clinical trials should have been compared to domestic industry expenditures. But there is no evidence that the clinical trials made up more than an insignificant portion of the overall costs of product development. As Philips points out, the cost of those trials is negligible compared to the claimed costs associated with domestic development and rollout of the BX-100. The amount expended on foreign trials is not in the record, but the amount spent on the trials Philips conducted domestically—[redacted]—indicates that similar expenditures abroad would not render the [redacted] domestic industry insignificant. Reply at 14 (citing Motion Ex. 25 at 15).

Respondents point out that Philips paid [redacted] to a foreign vendor in connection with the BX100 but, according to Philips, this represents [redacted] of Philips CS's investments in domestic labor and capital. *Id*. at 14. Respondents offer no evidence of foreign expenditures related to the BX100 that would have an impact on the significance of the amount of the domestic expenditures.

Respondents contend that Dr. Thiagarajan's statement that the Sensor Development Team had R&D support "located all over" suggests that Philips CS did not compare its [redacted] domestic labor and capital expenditure to foreign investments, as required. Opp. at 42-43. Again, Respondents present no factual evidence that the amount of overseas investment in

the BX100 is significant. Even viewed in the light most favorable to Respondents, Dr. Thiagarajan's statement alone does not undermine the evidence presented by Philips concerning domestic expenditures. Without credible evidence of significant overseas investment in the BX100, there is no genuine issue of material fact that would warrant submission to the factfinder.

**c. Investments in integrating the multi-patient bridge with the BX100**

Respondents claim that Philips's economic prong analysis "ignores" expenditures related to the multi-patient bridge, which is sold with the BX100 but made overseas and purchased by Philips. Philips has not included in its domestic industry analysis expenditures associated with the manufacture of the multi-patient bridge.[8] Rather, Philips has included the costs of integrating the BX100 with the multi-patient bridge to provide a complete product. As explained by Dr. Thiagarajan, Philips CS's development relating to the bridge was limited to its integration and interface with the BX100 sensor and backend software. Motion Ex. 37 (Thiagarajan Decl.), at ¶12. Respondents have provided no support for the contention that the cost of manufacturing an off-the-shelf product should be included in evaluating the economic prong under these circumstances.

Respondents contend that "Philips has made no assertion that the activities performed by the Bridge are required to perform the asserted claims of the '228 patent." Opp. at 44. Respondents cite no authority for the proposition that all domestic industry expenditures must

[8] Dr. Akemann testifies that he was careful to avoid including overseas expenditures in his report of domestic industry investments. Motion Ex. 29 (Akemann Tr.) at 84:20–85:8; 140:23-141:6 ("Obviously with respect to the domestic industry products that I was analyzing here, I very much did endeavor to only account R&D expenditures and other investments that were in the U.S. as opposed to foreign.").

relate to the claims of the patent in issue.[9] Philips maintains that the bridge is necessary because the BX100 lacks a "user interface" and cannot otherwise integrate with backend software. *See* Motion Memo. at 42. Moreover, Philips cites the '228 patent's reference to an optional "external host system" as evidence that the bridge is integral to the function of the patented product. Motion Ex. 29 (Akemann Report) at ¶ 95 ("I understand further that the multi-patient wireless bridge is essential, necessary, and/or integral componentry of the BX100, since the multi-patient bridge is used to connect up to 16 BX100 devices to a central monitoring system when used in the clinical environment for which the BX100 devices are intended. I also understand that a user cannot purchase or use a BX100 without the multi-patient bridge.").

"The Commission has defined the domestic industry to include investments necessary to bring to market the patented technology as embodied in the asserted domestic industry products." *Magnetic Tape,* Comm'n Op. at 53 (citing *Certain Video Game Sys. And Wireless Controllers and Components Thereof,* Inv. No. 337-TA-770*,* Comm'n Op. at 70 (Oct. 28, 2013) (including investments "central to enabling [the complainant] to exploit the technology of the claimed toy wands"); *Sleep-Disordered Breathing,* Inv. No. 337-TA-890*,* ID at 147 (finding "that the S9 flow generator is central to enabling [the complainant] to exploit the patented technology of the H5i humidifier")). The product incorporating the patent does not need to be "a closed, proprietary" system, as in *Magnetic Tape*. *Id.* The important fact is that given "the realities of the marketplace," the patented product cannot be used without the additional device. *Id.*

[9] Under subparagraphs (A) and (B) of section 337(a)(3), costs to be included in the domestic industry investment are those associated with the domestic industry article. That product, in many cases, will be a larger unit than the patented article, for example, a computer chip or a smart phone. The Commission has held that investment in the domestic industry product, not only in the patented article, counts under subparagraphs (A) and (B), and that a further showing of a nexus to the patent is required only under subparagraph (C) of section 337(a)(3). *Non-Volatile Memory,* Inv. No. 337-TA-1046, Comm'n Op. at 41 (citing 19 U.S.C. § 1337(a)(3)(C); *Certain Integrated Circuit Chips,* Inv. No. 337-TA-859, Comm'n Op., 2014 WL 12796437, at *21 (Aug. 22, 2014)).

A domestic industry encompasses investments necessary to bring the patented technology to market. Because the integration of the BX100 with the multi-patient bridge is properly considered part of Philips's domestic industry expenditures, no separate allocation of those costs is required.

Alternatively, Respondents argue that if expenditures relating to the multi-patient bridge are integral to the BX100, then Philips should have considered all expenditures relating to the bridge, including those spent in [redacted], where it is manufactured, in order to conduct a proper comparative analysis. This argument is illogical. The multi-patient bridge is not the patented article, but it is closely related to the patented article and necessary for it to be sold in the marketplace. The distinction is clear: costs associated with production of the multi-patient bridge are not domestic industry expenditures, but costs associated with integrating the multi-patient bridge and the BX100 to enable the BX100 to be marketed are. Philips quite properly does not claim as domestic industry investments the costs of developing and producing the multi-patient bridge. But Philips's own expenditures in the U.S. are not less significant because part of the product in which the patented device is sold is produced overseas by another entity. Respondents offer no legal support for their theory.

**d. Comparison to unrelated Philips business units**

Respondents argue that, to demonstrate the significance of Philips's investments in context, Philips CS's investments must be compared to investments made by other Philips business units and by Philips globally. Respondents assert that Philips CS is not a discrete corporate entity but a "part of" Connected Care; further, Philips CS was consolidated into the Philips General Care & Specialty Monitoring business unit ('PGC&SM') in 2019." Respondents' Opp. at 46. Respondents state that "Philips has provided no evidence that Philips

CS operates entirely separately from PGC&SM or Connected Care, or that PGC&SM or other Connected Care business units did *not* make any investments relating to the BX100." *Id.*

As set forth above, Philips has presented evidence that the BX100 was developed exclusively through investments made by Philips CS. On a motion for summary determination, the opposing party must present evidence to demonstrate a genuinely disputed issue of material fact. Respondents have presented no evidence indicating that any other Philips entity invested in the BX100 and have therefore failed to defeat the motion, as an evidentiary matter.

There is, moreover, no legal precedent requiring a comparative analysis of a complainant's unrelated operations in order to put its domestic industry investments in context. While it is true that the Commission may consider a complainant's size in relation to its domestic industry investments, the idea is not to penalize large, international corporations simply because they are large. The purpose is to compare a corporation's domestic industry investment in a patented article to its overseas investment in the patented article. In that context, where overseas investments may greatly exceed domestic expenditures, there may be a question about the significance of the domestic investments. *Printing*, 2011 WL 7628059 at *20 ("Aside from acknowledging that the C200 series printers and MFPs were manufactured entirely abroad, Ricoh has provided no evidence regarding its foreign *product-related* investment and/or employment activities.") (emphasis added). It may be that a complainant's comparative size could be relevant in additional ways, depending on the facts and circumstances of the case, but the Commission's decisions do not suggest that a domestic industry that would be significant if carried out by a small entity becomes insignificant simply because the complainant is a large, international corporation.

In this context, where the investments are almost entirely domestic, there is no reason to penalize a large corporation that engages in multiple operations, including vast overseas operations involving unrelated products. *Carburetors,* 2019 WL 5622443 at *19 ("Significance is based on the marketplace conditions regarding the articles protected by the Asserted Patents. The fact that a complainant may have substantial sales of other products is not pertinent to this analysis."). Philips's corporate structure also is irrelevant, absent evidence that corporate entities, particularly overseas entities, invested in the BX100.[10] Respondents do not cite authority for comparing an entire corporation's investments and activities around the world when the only asserted expenditures are those of one U.S. subsidiary created exclusively to develop the alleged domestic industry product. *See, e.g.*, *Certain Lithium Metal Oxide Cathode Materials, Lithium-ion Batteries for Power Tool Products Containing Same, and Power Tool Products with Lithium-ion Batteries Containing Same*, Inv. No. 337-TA-951, ID at 17-21 (Feb. 29, 2016) (rejecting arguments that a comparison with foreign investment or a comparison with the domestic investments of a larger corporation is required), *vacated in part on other grounds*, Comm'n Op. (Dec. 22, 2016) ("From the perspective of an extremely large business like BASF, the percentage of capital, labor, and other domestic investments may be relatively small when compared to its global sales. However, such expenditures may still have a significant effect on the relevant domestic industry in the United States.")

Philips CS's activities in developing the BX100 and bringing it to market are significant, as explained herein. Their significance is not diminished because Philips CS is a subsidiary of a very large, foreign parent. *See Carburetors,* 2019 WL 5622443 at *19 ("Accordingly, we decline to adopt the ID's statement that 'large multinational companies should be expected to

[10] Philips does not have to prove that such evidence does not exist, as Respondents contend. Rather, in opposition to a motion for summary determination, Respondents must present evidence of overseas expenditures.

invest larger dollar amounts in order for their investments to be deemed 'significant' or 'substantial.'").

**e. An industry in the process of being established**

As stated above, "[i]n a patent-based investigation, the complainant must show that an industry in the United States 'relating to the articles protected by the patent . . . exists or is in the process of being established.'" *Non-Volatile Memory*, Comm'n Op. at 29 (quoting 19 U.S.C. § 1337(a)(2)). "The Commission has held that a domestic industry is in the process of being established when (1) a patent owner takes 'the necessary tangible steps to establish such an industry in United States,' and (2) there is a 'significant likelihood that the industry requirement will be satisfied in the 'future.'" *Id.* (quoting *Stringed Musical Instruments,* 2008 WL 2139143, at *7). "'The owner of the intellectual property right must be actively engaged in steps leading to the exploitation of the intellectual property, including application engineering, design work, or other such activities.'" *Id.* (quoting H. Rep. 100-40 at 157).

Respondents maintain that Philips cannot demonstrate an industry in the process of being established. Respondents argue that three purchase orders placed by Philips with [redacted] are insufficient to show a likelihood of commercialization because "Philips does not confirm that Philips CS (or any Philips entity) has paid for the purchase orders in question or, critically, alleged or otherwise produced evidence of any expenditures in plant, equipment, labor, or capital that [redacted] has undertaken to fulfill those orders." Opp. at 50.

This is mere attorney argument, and, moreover, the argument is inconsistent with Commission precedent. In *Non-Volatile Memory*, the Commission rejected the notion that subsection 337(a)(2) requires commercialization. Comm'n Op. at 41. "Simply because Macronix has not yet arrived at the final stages of commercializing the [[ ]] does not mean

that Macronix does not have a domestic industry in the process of being established with respect to [[ ]] protected by the asserted patents," the Commission opined. *Id.* at 44.

As discussed in the Commission's s opinion in *Non-Volatile Memory*, the ALJ found that the complainant presented evidence of no commercial product, no sales, no customers, no plan for commercial manufacturing, and no manufacturing partner. Comm'n Op. at 30, 32-33. According to the initial determination, the complainants relied on a patented article that was the result of years of research and on which more research would be needed before commercialization could be undertaken. *Id.* at 32-33, 43. The Commission opined that the complainant nevertheless had "amply demonstrated its activities and investments of at least[[ ]] toward the establishment of a [] manufacturing industry in the United States, including the detailed tangible steps it has already taken and its further planned work to be undertaken in order to bring this industry to fruition within the foreseeable future." *Id.* at 44.

Per the Commission's ruling in *Non-Volatile Memory*, it follows that the requirements of an industry in the process of being established are satisfied here. Philips in fact has arrived at the final stage of commercializing its DI product. It has a finished product that is already being manufactured in the U.S. on an industrial scale. Philips successfully executed a detailed, multi-year development plan that has resulted in FDA approval of the BX100. To develop the product and bring it to market cost Philips CS approximately [redacted] dollars in domestic plant and equipment expenditures and approximately [redacted] dollars in domestic labor and capital. In addition, [redacted] has manufactured or will manufacture orders of [redacted]; [redacted]; and [redacted] BX100 units in [redacted], Ohio at costs of [redacted]; [redacted]; and [redacted] per device. At least [redacted] of the devices are intended to be sold in the United States or Europe. Philips expects to increase production of the BX100 products [redacted]. *See* Ex. 9 (Thiagarajan

Dep.) at 70-22-24. With additional capital expenditures, [redacted] could manufacture up to [redacted] BX100 devices per year. Motion Ex. 31 (Hoye Dep.) at 55:17-56:15.

Respondents assert that Philips's investment is "dwindling" but the record shows that, with completion of the development phase of the BX100 project, the focus of the domestic industry has shifted to manufacturing.[11] There is no evidence that the arrival of the finished product in the market signals the end of Philips's investment. According to Dr. Akemann, Philips CS is advertising the BX100 device on its website and actively pursuing commercial contracts for sale of the BX100 device in the U.S. Motion Ex. 29 (Akemann Report) at ¶ 91. As noted above, Philips says [redacted] employees remaining on this project will continue to work on development of the BX100. Motion Ex. 31 (Hoye Dep.) at 56:22-25. ("There will be discussion about further development or future key releases [redacted].").

Further, the product at issue takes advantage of a perceived need in the health care community, a need on which Philips seeks to capitalize with its development of the BX100. *See* Motion Ex. 37 (Thiagarajan Decl.) at ¶¶ 21-24 (describing in detail the marketing opportunities identified by Philips).[12] Such development in response to a perceived marketing

[11] "Until February 2020, Philips CS was located at 2 Canal Park, Cambridge, Massachusetts and had approximately [redacted] employees located in the United States, including approximately [redacted] scientists and engineers." Motion Memo. at 16; Motion Ex. 36 (Hoye Decl.) at ¶ 2. Since February 2020, Philips CS has been located across the street in premises at 222 Jacobs Street, Cambridge, Massachusetts. *Id.* Cambridge still is Philips CS's only location worldwide. *Id*. at ¶ 7.

[12] "When development of the BX100 began, Philips CS identified [redacted] Motion Ex. 37 (Thiagarajan Decl.) at ¶ 21 (quoting Motion Ex. 20 (PNA-ITC0010120-60[redacted] *Id.* at ¶ 23 (quoting "G10 Solution Commercial Requirements"); *see also id.* at ¶ 23-24 ([redacted]

opportunity may result in further development of and income for the domestic industry, and cannot be dismissed as insignificant simply because the industry is in an early stage. These qualitative indications of real-world significance contribute to the quantitative significance of Philips's investments.[13]

Accordingly, I find that Philips has satisfied the economic prong with respect to a domestic industry in the BX100 device under subparagraphs (A) and (B) of section 337(a)(3) and has demonstrated a domestic industry in the process of being established under section 337(a)(2).

## V. CONCLUSION

For the reasons and to the extent discussed above, Motion Docket No. 1190-026 is hereby GRANTED-IN-PART AND DENIED-IN-PART. It is my initial determination that Philips has satisfied the economic prong of the domestic industry requirement with respect to the BX100 device. The motion is denied with respect to infringement and the technical prong of the domestic industry requirement.

Pursuant to 19 C.F.R. § 210.42(h), this initial determination shall become the determination of the Commission unless a party files a petition for review of the initial determination pursuant to 19 C.F.R. § 210.43(a), or the Commission, pursuant to 19 C.F.R. § 210.44, orders on its own motion a review of the initial determination or certain issues contained herein.

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[redacted] Philips CS developed the BX100 to target patient monitoring in non-critical areas of the hospital and, specifically, the [redacted] *Id*. at ¶ 24.

[13] Philips's domestic industry is poised between an industry in the process of being established and a mature domestic industry. This liminality should result in satisfaction of the economic prong either under the rubric of an existing domestic industry or a domestic industry in the process of being established, or both.

This order is being issued with a confidential designation. Pursuant to Ground Rule 1.10, each party shall submit to the Administrative Law Judge within seven (7) days a statement as to whether it seeks to have any portion of this order deleted from the public version. *See* 19 C.F.R. § 210.5(f). A party seeking to have a portion deleted from the public version must attach to its submission a copy of the order with red brackets indicating the portion(s) asserted to contain confidential business information. The parties' submissions shall not be filed with the Commission Secretary but shall be submitted by e-mail to the Administrative Law Judge's attorney advisor.

Redactions should be limited to avoid obscuring the reasoning underlying the decision. Parties who submit excessive redactions may be required to provide an additional written statement, supported by declarations from individuals with personal knowledge, explaining why each proposed redaction meets the definition for confidential business information in 19 C.F.R. § 201.6(a).

**SO ORDERED.**

Dee Lord
Administrative Law Judge

**CERTAIN WEARABLE MONITORING DEVICES, SYSTEMS, AND COMPONENTS THEREOF** **Inv. No. 337-TA-1190**

## PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **INITIAL DETERMINATION** has been served via EDIS upon the Commission Investigative Attorney, **John Shin, Esq.**, and the following parties as indicated, on **October 28, 2020**.

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**PUBLIC VERSION**

**UNITED STATES INTERNATIONAL TRADE COMMISSION**

**Washington, D.C.**

| **In the Matter of** | |
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| **CERTAIN WEARABLE MONITORING DEVICES, SYSTEMS, AND COMPONENTS THEREOF** | **Inv. No. 337-TA-1190** |

**ORDER NO. 26: CLAIM CONSTRUCTION OF DISPUTED TERMS; EXTENDING DEADLINES FOR EXPERT REPORTS**

(July 27, 2020)

This order addresses the construction of disputed claim terms in U.S. Patent No. 7,845,228 ("the '228 patent"); U.S. Patent No. 9,820,698 ("the '698 patent"); and U.S. Patent No. 9,717,464 ("the '464 patent").

## I. BACKGROUND

The '228 patent, '698 patent, and '464 patent are the three patents asserted in this investigation by Complainants Philips North America, LLC and Koninklijke Philips N.V. *See* Notice of Investigation at 1-2 (Jan. 10, 2020); Order No. 25 (Jul. 17, 2020) (terminating '186 patent). The Respondents are Fitbit, Inc., Garmin International, Inc., Garmin USA, Inc., Garmin Ltd. d/b/a Garmin Switzerland GmbH, Ingram Micro Inc., Maintek Computer (Suzhou) Co., Ltd., and Inventec Appliances (Pudong). *Id*. at 2-3. The Commission Investigative Staff ("Staff") is also a party. *Id*. at 3. Pursuant to the Procedural Schedule (Order No. 4, Feb. 10, 2020), the private parties filed opening claim construction briefs on April 29, 2020.[1] Staff filed

[1] Complainants' opening claim construction brief is referenced herein as "CIB." Respondents' opening claim construction brief is referenced herein as "RIB."

its *Markman* brief on May 8, 2020.[2] The private parties filed rebuttal claim construction briefs on May 13, 2020.[3] Pursuant to Order No. 8 (Apr. 20, 2020), the *Markman* hearing that was previously scheduled in this investigation was suspended. The parties filed a joint technology tutorial (the "Tutorial") on May 27, 2020.

## II. LEGAL STANDARDS

### A. Claim Construction

"The construction of claims is simply a way of elaborating the normally terse claim language[] in order to understand and explain, but not to change, the scope of the claims." *Embrex, Inc. v. Serv. Eng'g Corp.*, 216 F.3d 1343, 1347 (Fed. Cir. 2000) (alterations in original) (quoting *Scripps Clinic v. Genentech, Inc.*, 927 F.2d 1565, 1580 (Fed. Cir. 1991)). "[O]nly those [claim] terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy." *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

Claim construction focuses mainly on the intrinsic evidence, which consists of the claims themselves, the specification, and the prosecution history. *See generally Phillips v. AWH Corp.,* 415 F.3d 1303, 1313-17 (Fed. Cir. 2005) (*en banc*). The words of a claim "'are generally given their ordinary and customary meaning,'" which is "the meaning that the term would have to a person of ordinary skill in art" as of the date that the patent application was filed. *Id*. at 1312-13 (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)) (citations omitted). A person of ordinary skill in the art "is deemed to read the claim term not only in the

[2] Staff's *Markman* brief is referenced herein as "SMB."

[3] Complainants' rebuttal claim construction brief is referenced herein as "CRB." Respondents' rebuttal claim construction brief is referenced herein as "RRB."

context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." *Id*. In some cases, "the ordinary meaning of claim language as understood by a person of skill in the art may be readily apparent even to lay judges." *Id*. at 1314. Often, however, "determining the ordinary and customary meaning of the claim requires examination of terms that have a particular meaning in a field of art." *Id*. "[T]he court looks to 'those sources available to the public that show what a person of skill in the art would have understood disputed claim language to mean.'" *Id*. (quoting *Innova/Pure Water, Inc. v. Safari Water Filtration Sys.*, 381 F.3d 1111, 1116 (Fed. Cir. 2004)). Those sources include "the words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art." *Id*.

"It is a 'bedrock principle' of patent law that 'the claims of a patent define the invention to which the patentee is entitled the right to exclude.'" *Id.* at 1312 (quoting *Innova*, 381 F.3d. at 1115)). "Quite apart from the written description and the prosecution history, the claims themselves provide substantial guidance as to the meaning of particular claim terms." *Id.* at 1314. For example, "the context in which a term is used in the asserted claim can be highly instructive," and "[o]ther claims of the patent in question, both asserted and unasserted, can also be valuable sources of enlightenment as to the meaning of a claim term." *Id.*

"[T]he specification 'is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.'" *Id.* at 1315 (quoting *Vitronics*, 90 F.3d at 1582). "The longstanding difficulty is the contrasting nature of the axioms that (a) a claim must be read in view of the specification and (b) a court may not read a limitation into a claim from the specification." *Innova*, 381 F.3d at 1117.

In addition to the claims and the specification, the prosecution history should be examined if in evidence. "The prosecution history . . . consists of the complete record of the proceedings before the PTO and includes the prior art cited during the examination of the patent. Like the specification, the prosecution history provides evidence of how the PTO and the inventor understood the patent." *Phillips*, 415 F.3d at 1317. "[T]he prosecution history can often inform the meaning of the claim language by demonstrating how the inventor understood the invention and whether the inventor limited the invention in the course of prosecution, making the claim scope narrower than it would otherwise be." *Id.*

If the intrinsic evidence does not establish the meaning of a claim, then extrinsic evidence may be considered. Extrinsic evidence "consists of all evidence external to the patent and the prosecution history, including inventor and expert testimony, dictionaries, and learned treatises." *Id.* at 1317. Extrinsic evidence is generally viewed "as less reliable than the patent and its prosecution history in determining how to read claim terms." *Id.* at 1318. "The court may receive extrinsic evidence to educate itself about the invention and the relevant technology, but the court may not use extrinsic evidence to arrive at a claim construction that is clearly at odds with the construction mandated by the intrinsic evidence." *Elkay Mfg. Co. v. Ebco Mfg. Co.*, 192 F.3d 973, 977 (Fed. Cir. 1999).

Although "[c]laim terms are generally given their plain and ordinary meanings to one of skill in the art when read in the context of the specification and prosecution history," there are two instances in which a court will depart from the plain and ordinary meaning. *Hill-Rom Service, Inc. v. Stryker Corp.*, 755 F.3d 1367, 1371 (Fed. Cir. 2014). The first is when a patentee acts as its own lexicographer. *Id.* "To act as its own lexicographer, a patentee must 'clearly set forth a definition of the disputed claim term.'" *Thorner v. Sony Comput. Entm't Am.*, 669 F.3d

1362, 1365 (Fed. Cir. 2012) (quoting *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002)). The second is when the patentee disavows the full scope of the claim term. *Id*. Disavowal can be effectuated by language in the specification or the prosecution history. *See Phillips*, 415 F.3d at 1316-17. "In either case, the standard for disavowal is exacting, requiring clear and unequivocal evidence that the claimed invention includes or does not include a particular feature." *Poly-Am., L.P. v. API Indus., Inc.*, 839 F.3d 1131, 1136 (Fed. Cir. 2017).

**B. Means-Plus-Function Claiming**

Subsection (f) of 35 U.S.C. § 112 allows patentees to express an "element in a claim for a combination . . . as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof."[4] Thus, patentees can "express a claim limitation by reciting the function to be performed rather than by reciting structure for performing that function." *Williamson v. Citrix Online LLC*, 792 F.3d 1339, 1347 (Fed. Cir. 2015) (*en banc*). If § 112(f) is invoked, the claim element "shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof." 35 U.S.C. § 112(f).

**C. Indefiniteness**

"The Patent Act requires that a patent specification 'conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as [the] invention.'" *Nautilus, Inc. v. Biosig Instruments, Inc.,* 572 U.S. 898 (2014) (quoting 35 U.S.C. § 112, ¶ 2). "[T]he second paragraph of § 112 contains two requirements: first, [the claim] must set forth what the applicant regards as his invention, and second, it must do

[4] Section 4(c) of the Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) ("AIA"), re-designated paragraph 6 of 35 U.S.C. § 112 as 35 U.S.C. § 112(f). For patents with an effective filing date prior to September 16, 2012, the pre-AIA version of 35 U.S.C. § 112 is applicable. AIA, § 4(e).

so with sufficient particularity and distinctness, *i.e.*, the claim must be sufficiently definite." *Allen Eng'g Corp. v. Bartell Indus., Inc,.* 299 F.3d 1336, 1348 (Fed. Cir. 2002) (citation and internal quotation marks omitted) (alteration in original). A claim does not satisfy the second requirement and is thereby indefinite "if read in light of the specification delineating the patent, and the prosecution history, [it] fail[s] to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus*, 534 U.S. at 901. Indefiniteness is a question of law, subject to a determination of underlying facts. *Akzo Nobel Coatings, Inc. v. Dow Chem. Co.,* 811 F.3d 1334, 1343-44 (Fed. Cir. 2016). The party challenging the validity of a claim bears the burden of establishing indefiniteness. *Id*.

## III. THE '228 PATENT

The '228 patent is titled "Activity Monitoring" and names inventors Joannes Gregorius Bremer, Paraskevas Dunias, Gillian Antoinette Mimnagh-Kelleher, Adrianus Petrus Johanna Maria Rommers, and Wilhelmus Lambertus Marinus Cornelius Verhoeven. '228 patent, cover.[5] The patent issued from a PCT application filed on November 21, 2003, claiming priority to a European patent application filed on December 10, 2002. *Id*.

### D. Specification and claims

The '228 patent describes an activity monitor "that reduces the amount of power consumed during a monitoring operation." '228 patent, Abstract. The activity monitor comprises a measurement unit, a processor, and a memory unit. *Id*., col. 1:62-2:4. "The measurement unit comprises three accelerometers, which are arranged in mutually orthogonal directions." *Id*., col. 2:16-17. The activity monitor reduces power consumption by using

[5] The '228 patent is attached as Exhibit 1 to Complainants' Opening Claim Construction Brief and as Exhibit 1 to Respondents' Opening Claim Construction Brief.

"discontinuous monitoring activity," whereby "the processor goes into a standby (or sleep) mode after a few seconds of monitoring." *Id*., col. 2:60-63. This standby mode can be controlled by software that "could detect changes in the human behavior and adopt the switch on, switch off strategy of the activity monitor." *Id*., col. 2:63-67. Claim 1 of the '228 patent recites:

> 1. An activity monitor comprising:
>
> a measurement unit including a plurality of motion sensors operable to produce respective sensor signals indicative of motion experienced thereby; and
>
> a processor operable to receive the sensor signals from the measurement unit and to process the sensor signals in accordance with a predetermined method,
>
> characterized in that the activity monitor is operable to monitor and process the sensor signals discontinuously in time and the processor is operable to monitor the sensor signals in turn.

*Id*., col. 3:17-27. Claims 2 and 3 depend from claim 1:

> 2. An activity monitor as claimed in claim 1, wherein the measurement unit is operable to output the sensor signals discontinuously in time.
>
> 3. An activity monitor as claimed in claim 1, wherein the processor is operable to monitor the sensor signals discontinuously in time.

*Id*., col. 3:27-33.

**E. Level of ordinary skill in the art**

Complainants propose a level of ordinary skill in the art for the '228 patent of "an undergraduate engineering or associate[']s degree in the field of circuit design and/or 2-3 years of experience in that field." CIB at 8. Staff agrees with this proposal. SMB at 5. Respondents did propose a different level of ordinary skill in the art, and the parties do not contend that the level of ordinary skill in the art affects any claim construction.

### F. Agreed constructions

The parties have agreed to construe the term "activity monitor" to mean a device for monitoring physical activity of an individual or object; and to construe "a plurality of motion sensors operable to produce respective sensor signals" to mean two or more motion sensors, such as uniaxial accelerometers, each of which produces a sensor signal, such as an x, y, or z axis data signal. SMB at 6 n.6.

### G. Disputed constructions

#### 1. "processor operable to receive the sensor signals from the measurement unit and to process the sensor signals in accordance with a predetermined method"

| Philips's and Staff's Construction | Respondents' Construction |
|---|---|
| Plain and ordinary meaning, no construction required.<br><br>To the extent that § 112, ¶ 6 applies:<br><br>**Function:**<br>The function of the "processor" in the claims of the '228 Patent is "characterized in that the activity monitor is operable to monitor and process the sensor signals discontinuously in time and the processor is operable to monitor the sensor signals in turn"<br><br>**Structure:**<br>"a processor that is separate from the measurement unit and receives sensor signals from the measurement unit, the sensor signals being monitored by the processor in turn, and monitored and processed discontinuously in time" | Subject to § 112, ¶ 6.<br><br>**Function:**<br>"to receive the sensor signals from the measurement unit and to process the sensor signals in accordance with a predetermined method"<br><br>**Structure:**<br>indefinite for lack of corresponding structure. |

Respondents contend that the claim phrase "processor operable to receive the sensor signals from the measurement unit and to process the sensor signals in accordance with a predetermined method" in claim 1 should be construed as a means-plus-function term. RIB at 14-18. This term does not use the words "means for," which is traditionally used to signal

means-plus-function claiming, and it is therefore presumed not to be subject to 35 U.S.C. § 112, ¶ 6. *Williamson*, 792 F.3d at 1348-49. This presumption may be rebutted where the term "fails to 'recite sufficiently definite structure' or else recites 'function without reciting sufficient structure for performing that function.'" *Id*. at 1349 (quoting *Watts v. XL Sys., Inc.*, 232 F.3d 877, 880 (Fed.Cir.2000)).

The term "processor" has been found to recite sufficiently definite structure where it is used in accordance with its plain and ordinary meaning, describing a general purpose computer or central processing unit ("CPU") performing functions typically found in a commercially available off-the-shelf processors. *See, e.g., Certain Digital Video Receivers and Hardware and Software Components Thereof*, Inv. No. 337-TA-1001, Initial Determination at 322–26 (Jun. 26, 2017), *not reviewed in relevant part by* Comm'n Notice (Aug. 10, 2017). This term may be subject to § 112, ¶ 6, however, where a claim recites functions that "could not 'be executed by a general purpose processor without additional programming,'" and "the surrounding claim language did not recite sufficient structure to perform the claimed functions *Certain Intraoral Scanners and Related Hardware and Software* ("*Intraoral Scanners*"), Inv. No. 337-TA-1090, Order No. 32 at 40-41 (Sept. 25, 2018) (quoting *Ex parte Lakkala*, Appeal No. 2011-001526, Decision on Appeal at 8 (U.S. Patent Trial and Appeal Board, Mar. 13, 2013)).

As an initial matter, the parties dispute which function the processor is claimed to perform. The claim language specifies that the processor must receive and process sensor signals in accordance with a "predetermined method." '288 patent, col. 3:21-23. Respondents argue that this method is undefined in the claim language. RIB at 15-18. Philips and Staff rely on the next limitation of the claim, which provides that the predetermined method is "characterized in that the activity monitor is operable to monitor and process the sensor signals

discontinuously in time and the processor is operable to monitor the sensor signals in turn." '288 patent, col. 3:34-37; *see* SMB at 7-8; CRB at 4-5. Respondents argue that the indentation of three stanzas in claim 1 indicates that the "characterized" limitation refers to the "activity monitor" of the preamble, noting that the limitation references "the activity monitor" before "the processor." RIB at 17. Respondents' interpretation is not consistent with the grammar and punctuation in the claim, however. Claim 1 recites: "An activity monitor comprising: a measurement unit . . . ; and a processor . . . with a predetermined method, characterized in that . . . ." '228 patent, col 3:17-27. This describes two structural limitations "comprising" the activity monitor: "a measurement unit" and "a processor," which are separated by a semicolon and the conjunction "and." *Id*., col. 3:17-23. In contrast, the "characterized in that" limitation is a parenthetical clause set off by a comma from the identification of "a predetermined method." *Id*., col. 3:24-27. Accordingly, I agree with Philips and Staff that the predetermined method is characterized in accordance with the third limitation of the claim.

When these limitations of the claim are read correctly, there is no dispute that a generic processor can perform the processing and monitoring functions recited in the claims. *See* CIB at 11-12, Exhibit 7 (Young Decl.) at ¶¶ 22-24. Accordingly, this term is not subject to § 112, ¶ 6, and no construction is necessary.

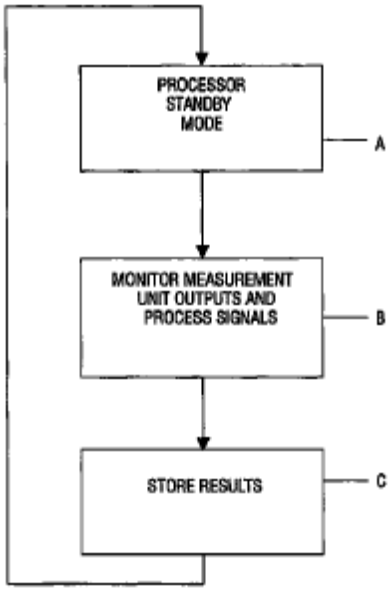
**2. "monitor and process the sensor signals discontinuously in time"**

| Philips's Construction | Respondents' Construction | Staff's Construction |
|---|---|---|
| Monitoring and processing the sensor signals discontinuously in time refers to interruptions, pauses, breaks or the like in the otherwise continuous monitoring and processing of the sensor signals, *i.e.*, discontinuities in the | "monitor the sensor signals with a time interval between monitoring periods and process the sensor signals with a time interval between processing periods" | [the ***activity monitor*** is operable to] "(1) monitor and then process a first portion of each of the x, y, or z axis data signals, (2) followed by a pre-defined period of time when the activity monitor does not monitor or process each of the x, y, or z axis data signals, |

| | | |
|---|---|---|
| underlying flow of sensor signals. | | such as occurs during a standby mode, and then (3) to monitor and process a second portion of each of the x, y, or z axis data signals [after the pre-defined period of time]" |

As discussed above, claim 1 requires that the claimed activity monitor is operable to "monitor and process the sensor signals discontinuously in time." Philips proposes to construe this term based on a statement in the prosecution history, suggesting that monitoring and processing the sensor signals discontinuously in time refers to interruptions, pauses, breaks or the like in the otherwise continuous monitoring and processing of the sensor signals, i.e., discontinuities in the underlying flow of sensor signals. CIB at 12-13. Respondents contend that the claim language requires discontinuity in both the monitoring and processing of signals, proposing to construe the term to mean "monitor the sensor signals with a time interval between monitoring periods and process the sensor signals with a time interval between processing periods." RIB at 4-6. Staff proposes its own construction based on the disclosed embodiments in the specification: "(1) monitor and then process a first portion of each of the x, y, or z axis data signals, (2) followed by a pre-defined period of time when the activity monitor does not monitor or process each of the x, y, or z axis data signals, such as occurs during a standby mode, and then (3) to monitor and process a second portion of each of the x, y, or z axis data signals [after the pre-defined period of time]." SMB at 11-16.

In the specification, the operation of the activity monitor is depicted in a flowchart designated as Figure 3:




'228 patent, Fig. 3. "[A]s illustrated in FIG. 3, the activity monitor operates such that the processor remains in a standby mode (step A) for a predefined period of time then inputs the measurement unit outputs and processes those signals (step B), storing the results (step C), in the memory unit 13, before returning to the standby mode." '228 patent, col. 2:41-46. The specification explains: "Thus, the monitoring of the measurement unit outputs is performed in a discontinuous manner over time." *Id*., col. 2:47-48. The specification further explains that "reduction in monitoring time to a few seconds with a variable time interval between monitoring periods, is beneficial for the power consumption of the activity monitor." *Id*., col. 2:56-59. In addition, "discontinuous monitoring activity can be achieved by programming the processor unit appropriately, so that the processor goes into a standby (or sleep) mode after a few seconds of monitoring." *Id*., col. 2:60-63.

During prosecution of the application leading to the '228 patent, the applicant appealed a rejection to the Board of Patent Appeals and Interferences ("BPAI"), filing a brief that includes a definition of "discontinuously in time."

> The Appellant respectfully asserts that the plain meaning of the claim limitation "discontinuously in time" as recited in independent claims 1 and 9 and consistent with the specification comprises interruptions, pauses, breaks or the like in the monitoring and processing of the sensor signals. An example of "discontinuously in time" is a switching of an activity monitor between a monitoring mode and a standby mode as encompassed by dependent claims 5-8 and 10-12.

Philips Exhibit 5, BPAI Reply Brief at 9 (Apr. 1, 2008). The Patent Office subsequently allowed the claims, although there was no explicit discussion of the "discontinuously in time" limitation. Philips Exhibit 6, BPAI Decision (Jun. 30, 2010).

No party disputes the portion of Philips's proposed construction that is derived from the prosecution history's definition of "discontinuously in time" but Respondents and Staff oppose the alternative definition in Philips's proposed construction of "*i.e.,* discontinuities in the underlying flow of sensor signals," arguing that this language is not based on any intrinsic evidence. RIB at 6-7; SMB at 15. Philips suggests that this additional language is merely intended to "explain the technical concepts in the claim language in a way that will be useful to the decision maker." CRB at 6-7. Respondents contend that this additional language would improperly cover devices where monitoring is continuous but accumulated data is processed discontinuously. RRB at 2-3.

Respondents' proposed construction seeks to require that both the monitoring and processing of sensor signals is discontinuous in time. RIB at 5-6. Philips and Staff criticize Respondents' proposal for appearing to require two separate intervals between "monitoring periods" and "processing periods." CIB at 14; SMB at 15-16. Philips does not dispute that the claim language requires both discontinuous monitoring and discontinuous processing but argues that this limitation can be satisfied where monitoring and processing use the same time interval or different time intervals. CRB at 5-6. Staff argues that the time intervals for monitoring and processing must be the same, relying on disclosures in the specification. SMB at 13-14.

Staff's proposed construction relies on the description of monitoring and processing in the specification. SMB at 12-14. Staff notes that the parties have agreed to a construction of "sensor signals" that includes an example: "such as an x, y, or z axis data signal." *Id*. at 12 n.10. Staff points to the specification's description of a standby (or sleep) mode to construe the "discontinuously in time" limitation. *Id*. at 13-14. Staff notes that the specification describes a "predefined period of time" when the processor within the activity monitor does not monitor or process any sensor signals. '228 patent, col. 2:37-48. Staff thus proposes to construe this term to require a pre-defined period of a time of standby separating two periods of time where the activity monitor is monitoring and processing sensor signals. SMB at 13-14.

None of the parties' proposed constructions is entirely satisfactory. Complainants' alternative construction describing "discontinuities in the underlying flow of sensor signals" is ambiguous and is not consistent with the intrinsic evidence. In particular, the specification describes a "standby mode" for the processor before inputting and processing signals, not a discontinuity in the flow of sensor signals. *See* '228 patent, col. 2:41-44 ("the activity monitor operates such that the processor remains in a standby mode (step A) for a predefined period of time then inputs the measurement unit outputs and processes those signals (step B)"). Respondents' proposed construction is also inconsistent with the specification to the extent that it describes "a time interval between processing periods" that must be distinct from the "time interval between monitoring periods"—these time intervals are not separately described in the '228 patent. Staff's proposed construction requires a "pre-defined period of time" between monitoring and processing, but a predefined period is only required in one embodiment. Another part of the specification describes "a variable interval between monitoring periods," and

dependent claim 6 specifies that "respective time periods for monitoring and standby modes are variable." *Id*., col. 2:56-49, 4:9-11.

There is no dispute between the parties that discontinuity is required for both monitoring and processing of sensor signals, in accordance with the claim language and specification.[6] With respect to the time intervals between monitoring periods and processing periods, I find nothing in the intrinsic evidence requiring these time intervals necessarily to be the same or to be different. In addition, no party has taken issue with the definition of "discontinuously in time" in the prosecution history, where the applicant defined discontinuities to mean "interruptions, pauses, breaks or the like in the monitoring and processing of the sensor signals." Philips Exhibit 5, BPAI Reply Brief at 9. Based on these disclosures, the term "monitor and process the sensor signals discontinuously in time" shall be construed to require interruptions, pauses, breaks or the like between periods when the sensor signals are monitored and processed.

### 3. "monitor the sensor signals in turn"

| Philips's Construction | Respondents' Construction | Staff's Construction |
|---|---|---|
| sequentially ordered non-overlapping monitoring of the sensor signals by the processor (e.g., a time division monitoring of the sensor signals) | "sequentially monitor the sensor signals from non-overlapping time periods (e.g., time division monitoring of x-axis data signal from time period 1, y-axis data signal from time period 2, z-axis data signal from time period 3)" | [the processor is operable to] "monitor each of the x, y, or z axis data signals sequentially without overlap, such as during time division monitoring, except during a pre-defined period of time" |

[6] Respondents contend that the term "monitor" is indefinite in a separate motion for summary determination (Motion Docket No. 1190-012).

The final limitation of claim 1 requires the processor to be "operable to monitor the sensor signals in turn." The parties agree to construe this limitation in accordance with statements made by the applicant in the prosecution history:

> the Appellant respectfully asserts that the plain meaning of claim limitation "in turn" as recited in dependent claims 4 and 13 and consistent with the specification comprises a sequentially ordered non-overlapping monitoring of the sensors (e.g., a time-division monitoring of the sensors). In other words, the plain meaning of the limitation "in turn" encompasses the sensor signals are monitored one after the other (i.e., in due order of succession).

Philips Exhibit 5, BPAI Reply Brief at 9-10.[7] In its brief to the BPAI, the applicant distinguished the pending claims from several pieces of prior art based on this definition of "in turn." *Id*. at 10-12. The parties thus agree that the "in turn" limitation requires monitoring that is "sequentially ordered" and "non-overlapping," which can be described as "time division monitoring." The parties do not agree, however, on the precise scope of this language.

Respondents submit that this limitation requires sequential monitoring of sensor signals from non-overlapping time periods. RIB at 8-13. Respondents' proposed construction includes the example of "monitoring of x-axis data signal from time period 1, y-axis data signal from time period 2, z-axis data signal from time period 3." *Id*. at 8. Respondents claim that construing this term narrowly is required to distinguish the prior art cited in the prosecution history in accordance with the applicant's statements.

First, with respect to U.S. Patent No. 5,317,304 to Choi, Respondents' Exhibit 7 ("Choi"), the applicant argued that the "discontinuously in time" and "in turn" limitations were not anticipated. Respondents' Exhibit 4, Response to Office Action at 7-9 (Feb. 27, 2007). With

[7] Respondents and Staff note that the language "in turn" is only found in the claims, and this feature of the invention is not discussed in the specification. RIB at 7 n.5; SMB at 17 n.14.

respect to the discontinuous limitation, applicant argued that "it is imperative" for Choi's "trigger capturing circuit 23 to continually monitor both tamper switch 21 and motion sensor 22 in concurrence to thereby prevent trigger capturing circuit 23 from failing to capture any generated signal or pulse." *Id*. at 8. With respect to the "in turn" limitation, "Choi teaches away from any type of time-division monitoring . . . because Choi teaches that trigger capturing circuit 23 must monitor the duration, frequency and intensity of each signal/pulse and the time duration between each signal/pulse." *Id*. When addressing a second prior art reference, PCT Pub. No. WO 02/089081, naming inventor Christopher Verplaetse, Respondents' Exhibit 8 ("Verplaetse"), the applicant argued that "Verplaetse teaches away from accelerometer 36 outputting signals 6 and 7 based on any type of time-division monitoring and microcontroller 38 inputting signals 6 and 7 based on any type of time-division monitoring because is it imperative microcontroller 38 continually monitor signals 6 and 7 in concurrence." Respondents' Exhibit 4 at 10. With respect to time-division monitoring, applicants explained: "time would be divided into time periods with a first signal being monitored during odd time periods and a second signal being monitored during even time periods." *Id*. Applicants also distinguished a third reference, U.S. Patent No. 6,201,476 to Depeursinge *et al.*, Respondents' Exhibit 9 ("Depeursinge"), arguing that "Depeursinge actually teaches away from any type of time-division monitoring," citing the disclosure of "continuous monitoring of the outputs." Respondents' Exhibit 4 at 6. The BPAI recognized that applicants "consistently argued throughout the prosecution history that the applied references of Depeursinge and Choi monitor sensor signals *concurrently* or at the same time, as opposed to one after the other." Complainants' Exhibit 6, BPAI Decision at 4 (emphasis in original). The BPAI thus found that Depeursinge and Choi do not teach the "in turn" limitation and reversed the examiner's rejection of the claims. *Id*. at 4-5.

Relying on this evidence in the prosecution history, Respondents argue that the applicant disavowed "concurrent" monitoring, and that the "in turn" limitation thus requires sequential monitoring of sensor signals from non-overlapping time periods. RIB at 12. I agree with Complainants and Staff, however, that there has been no disclaimer of sequential monitoring of sensor signals from the same time period. CRB at 8-11; SMB at 20. None of the statements in the prosecution history focus on the timing of the underlying signals, and the BPAI did not interpret the prior art in the way that Respondents' propose, recognizing that "Depeursinge and Choi are silent with respect to how or in what order the sensor signals are being monitored." Complainants' Exhibit 6, BPAI Decision at 4.

Staff's reading of the claims is more consistent with the prosecution history, requiring only the sequential monitoring of separate sensor signals, such as by monitoring each of the x, y, or z axis data signals one after the other. SMB at 17-19. Complainants do not oppose this aspect of Staff's proposed construction, but they argue that the additional language proposed by Staff requiring a "pre-defined period of time" improperly imports a limitation from its "discontinuously in time" construction, which was rejected above. CRB at 11. For the same reasons discussed above, I agree that a "pre-defined period of time" is not required by the claim language, and this portion of Staff's proposed construction is therefore rejected.

Accordingly, the term "monitor the sensor signals in turn" shall be construed to mean sequentially ordered non-overlapping monitoring of the sensor signals by the processor, *e.g.*, a time division monitoring of each of the x, y, or z axis data signals sequentially without overlap.

## IV. THE '698 PATENT

The '698 patent is titled "Actigraphy Methods and Apparatuses," naming inventors Pedro Miguel Fonseca, Reinder Haakma, Ronaldus Maria Aarts, and Xi Long. '698 patent, cover.[8] The patent issued from an application filed on November 6, 2015. *Id*.

### A. Specification and claims

The '698 patent describes "actigraphy" as "a relatively unobtrusive method of monitoring human rest/activity/sleep cycles." '698 patent, col. 1:6-7. The patent identifies situations where "body movements cannot be measured using displacement, velocity or acceleration sensors placed on the person's body or on a support system such as a chair or a bed." *Id*., col. 1:24-27. The patent discloses a system of sensors, "each of which sense a physiological parameter other than body movement (displacement, velocity, acceleration)." *Id*., col. 2:57-60. As examples, "the physiological sensors may measure one or more of the following: cardiac activity; thoracic respiratory effort; abdominal respiratory effort; respiratory flow; or so forth." *Id*., col. 3:1-4.

The invention is described as an "electronic data processing device" that is "programmed to by the software or firmware" to process sensor data, including a "Body Movement Artifact (BMA) versus time signal extraction process" and a "BMA signal to actigraphy sensor signal process." *Id*., col. 3:29-34. The specification identifies several examples of physiological sensors that can be used to generate the BMA signals. Using the example of electrocardiography (ECG), "when measuring an ECG, body movements will cause the skin to deform, changing its capacitance and impedance." *Id*., col. 4:6-9. Similarly, a Respiratory Inductive Plethysmography (RIP) sensor measures the expansion and contraction of the ribcage "due to

[8] The '698 patent is attached as Exhibit 2 to Complainants' Opening Claim Construction Brief and as Exhibit 2 to Respondents' Opening Claim Construction Brief.

respiratory excursion, but also due to body movements." *Id*. col. 4:12-23. The BMA versus time signal extraction process is used "to distinguish artifacts from the physiological signal being measured." *Id*., col. 4:50-52. The BMA signal to actigraphy sensor signal process is used to "quantify them as a measure of body movements." *Id*., col. 4:52-54.

Claim 1 of the '698 patent recites:

> 1. A physiological monitoring device comprising:
>
> a sensor configured to generate a non-body motion physiological parameter signal as a function of time for a physiological parameter other than velocity, displacement, and acceleration; and
>
> an electronic digital signal processing (DSP) device configured to perform operations including:
>
> computing a body motion artifact (BMA) signal as a function of time from the non-body motion physiological parameter signal, and
>
> computing an actigraphy signal as a function of time from the BMA signal.

*Id*., col. 11:21-32.

**B. Level of ordinary skill in the art**

Complainants propose a level of ordinary skill in the art for the '698 patent of "an undergraduate scientific degree or associate[']s degree in a field related to body-motion and/or non-body-motion physiological parameter measurement (such as electrical, mechanical, or biomedical engineering), and/or at least 2-3 years of experience with physiological sensors." CIB at 21. Staff agrees with this proposal. SMB at 22. Respondents did not propose a different level of ordinary skill in the art, and the parties do not contend that the level of ordinary skill in the art affects any claim construction.

### C. Disputed constructions

#### 1. "an electronic digital signal processing (DSP) device configured to perform operations including: computing a body motion artifact (BMA) signal as a function of time from the non-body motion physiological parameter signal, and computing an actigraphy signal as a function of time from the BMA signal"

| Philips's Construction | Respondents' and Staff's Construction |
|---|---|
| Plain and ordinary meaning, no construction required.<br><br>To the extent that § 112(f) applies:<br><br>**Function:**<br>"computing a body motion artifact (BMA) signal as a function of time from the non-body motion physiological parameter signal, and computing an actigraphy signal as a function of time from the BMA signal"<br><br>**Structure:**<br>"an electronic digital signal processing (DSP) device," that receives a "non-body motion physiological parameter signal" from "a sensor configured to generate a non-body motion physiological parameter signal" and provides actigraphy signal as a function of time from a BMA signal that is determined from the non-body motion physiological parameter signal as a function of time" | Subject to § 112(f).<br><br>**Function:**<br>"computing a body motion artifact (BMA) signal as a function of time from the non-body motion physiological parameter signal, and computing an actigraphy signal as a function of time from the BMA signal"<br><br>**Structure:**<br>"a microprocessor or microcontroller that is programmed to compute Expression (1), (2), (3), (5), or (6) for computing a BMA signal as a function of time from the non-body motion physiological parameter signal, and to compute Expression (7) or (8) for computing an actigraphy signal as a function of time from the non-body motion physiological parameter signal" |

Respondents propose to construe the term "electronic digital signal processing (DSP) device" as a means-plus-function term, subject to 35 U.S.C. § 112(f). RIB at 38-40. [9] Although the claim does not use the term "means," the Federal Circuit has held that the term "device" is "a well-known nonce word that can operate as a substitute for 'means' in the context of § 112, ¶ 6

[9] In their rebuttal brief, Complainants cite Respondents' filings in an *inter partes* review for the '698 patent, where Respondents did not propose to construe this term in accordance with § 112(f). CRB at 11-13. Complainants have not cited any authority, however, that precludes Respondents from proposing a claim construction in this investigation that is different from the one they proposed in *inter partes* review.

[*i.e.*, AIA § 112(f)]." *Williamson*, 792 F.3d at 1350. Staff agrees that this term is subject to § 112(f). SMB at 24-26. Complainants argue that this term should not be interpreted in view of the nonce term "device" but as a "digital signal processor," which they contend is a known electronic component. CIB at 23-27.

The term used in the claim is "device" rather than "processor," but even if a "processor" had been claimed, I agree with Respondents and Staff that this term is subject to § 112(f). A "processor" has been found to be subject to § 112(f) where a claim recites functions that "could not be executed by a general purpose processor without additional programming," and "the surrounding claim language did not recite sufficient structure to perform the claimed functions." *Intraoral Scanners*, Inv. No. 337-TA-1090, Order No. 32 at 40-41 (internal quotations removed).[10] That is the case here, where the claimed DSP device must be configured to perform two operations: "computing a body motion artifact (BMA) signal as a function of time from the

[10] The *Markman* order in *Intraoral Scanners* analyzed three decisions of the Patent Trial and Board ("PTAB") finding that the word "processor" invokes § 112(f) using the same analytical framework. *Id*. at 38-41. In these three decisions, the PTAB found that the plain and ordinary meaning of the term "processor" was "a general purpose computer, a central processing unit ('CPU'), or a program that translates another program into a form acceptable by the computer being used." *Ex parte Lakkala*, Appeal No. 2011-001526, Decision on Appeal at 10 (Mar. 13, 2013); *Ex parte Smith*, Appeal No. 2012-007631, Decision on Appeal at 13 (Mar. 14, 2013); *Ex parte Erol*, Appeal No. 2011-001143 at 15 (Mar. 13, 2013). The PTAB found that the plain and ordinary meaning of "processor" evokes only sufficient structure to perform "functions typically found in a commercially available off-the-shelf processor." *Lakkala* at 11-12; *Smith* at 13-14; *Erol* at 15-16. Finding that the claimed functions could not "be executed by a general purpose processor without additional programming," the PTAB examined whether the surrounding claim language provided structure to perform the claimed functions. *Lakkala* at 12; *Smith* at 14-15; *Erol* at 16-17. The PTAB found that the surrounding claim language did not recite sufficient structure to perform the claimed functions. *Lakkala* at 12; *Smith* at 14-15; *Erol* at 16-17. In reaching this determination the PTAB noted that the word "processor" appeared in the claims without a structural modifier. *Lakkala* at 12; *Smith* at 15; *Erol* at 16-17. The PTAB also found that, although the claims recited structure connected to the "processor," the recited structure was insufficient to perform the claimed function. *Lakkala* at 12; *Smith* at 15-16; *Erol* at 16-17. The PTAB further noted that the claims did not recite the specific steps undertaken by the processor to perform the claimed functions. *Lakkala* at 12; *Smith* at 16; *Erol* at 16-17.

non-body motion physiological parameter signal, and computing an actigraphy signal as a function of time from the BMA signal." '698 patent, col. 11:28-30. If these functions cannot be performed by the claimed DSP device or a general purpose processor without additional programming, the term must be construed in accordance with § 112(f) because the claim language "recites 'function without reciting sufficient structure for performing that function.'" *Williamson*, 792 F.3d at 1348 (quoting *Watts v. XL Sys., Inc.*, 232 F.3d 877, 880 (Fed. Cir. 2000)).

Complainants argue that the term "electronic digital signal processing (DSP) device" connotes sufficient structure. CIB at 24-26. Complainants' expert, Dr. Darren Young, submits that "[a] DSP device can be implemented by using a microprocessor, a microcontroller, or a field-programmable gate array (FPGA)." CIB, Exhibit 7 (Young Decl.), ¶ 34. There is no evidence, however, that one of these structures would be sufficient to perform the claimed functions of "computing a body motion artifact (BMA) signal" or "computing an actigraphy signal," without additional programming. The specification explicitly states that any microprocessor or microcontroller would need to be "programmed [] by suitable software or firmware." '698 patent, col. 3:8-11. This is similar to the claim language at issue in *Intraoral Scanners*, where a claimed processor was required to determine the surface topology of a three-dimensional object. Inv. No. 337-TA-1090, Order No. 32 at 41-42. The claimed BMA signal processing computations cannot be implemented on a generic processor without specific algorithms, and the claim language is only functional in nature, without describing any specific processing steps. Accordingly, the "digital signal processing (DSP) device" is a means-plus-function term subject to § 112(f).

The claimed functions in the claim language are "computing a body motion artifact (BMA) signal as a function of time from the non-body motion physiological parameter signal, and computing an actigraphy signal as a function of time from the BMA signal." '698 patent, col. 11:28-30. Respondents submit that the corresponding structure for these functions are the algorithms disclosed in the specification. RIB at 40-41. Staff agrees with Respondents' identification of corresponding structure. SMB at 27. Complainants argue that the corresponding structure should not be limited to the disclosures in the specification, CIB at 27-30, but this position is inconsistent with the law regarding § 112(f), which requires that the corresponding structure include the algorithms used to perform the claimed function. *See Finisar Corp. v. DirecTV Grp., Inc.*, 523 F.3d 1323, 1340 (Fed. Cir. 2008) (quoting *WMS Gaming, Inc. v. Int'l Game Tech.*, 184 F.3d 1339, 1349 (Fed. Cir. 1999)) ("For computer-implemented means-plus-function claims where the disclosed structure is a computer programmed to implement an algorithm, 'the disclosed structure is not the general purpose computer, but rather the special purpose computer programmed to perform the disclosed algorithm.'").

In the '698 patent, the processor that performs the relevant functions is the "electronic data processing device 12, for example a microprocessor, microcontroller, or the like, that is programmed to by suitable software or firmware." '698 patent, col. 3:7-12, Fig. 1. The specification further states:

> The electronic data processing device 12 is further programmed to by the software or firmware to implement an actigraphy synthesis module 20, including performing a Body Movement Artifact (BMA) versus time signal extraction process 22, performing a BMA signal to actigraphy sensor signal process 24 (where the generated actigraphy sensor signal is again a function of time), and performing optional further processing.

*Id*., col. 3:29-40, Fig. 1. Process 22 and process 24 in the specification correspond directly to the functional language in claim 1.

With respect to the "BMA versus time signal extraction process 22," the specification identifies several methods of computation:

> The BMA versus time signal extraction process 22 may use various processing to derive this signal, such as computing the local signal power in the time domain, computing the regularity of the signal in the time domain, computing signal power in the time-frequency domain (for example by means of a Wavelet Transform), computing local signal power in the frequency domain (for example by means of Discrete Fourier Transform), or so forth.

*Id*., col. 3:52-59. The specification further describes each of these embodiments in detail. In the "local signal power" embodiment, signal power is computed in "time windows (also called 'epochs') of a certain relatively short duration so as to differentiate epochs in which BMAs are present from epochs where they are absent while giving a measure of the amplitude or intensity of the body movement for each epoch." *Id*., col. 5:13-18. This "local signal power" embodiment relies on a calculation of local power using an equation (1), and examples of the computed signal power are depicted in Figures 3 and 4. *Id*., col. 5:13-6:2, Figs. 3, 4. The "local signal variance" embodiment relies on a calculation of local variance using equation (2) and examples of this variance are depicted in Figures 5, 6, and 7. *Id*., col. 6:3-46, Figs. 5, 6, 7. A Fourier transform embodiment applies a discrete Fourier transform using equations (3) and (4), generating spectrogram representations depicted in Figures 8 and 9. *Id*., col. 6:47-7:48, Figs. 8, 9. A wavelet embodiment performs a wavelet transform using equations (5) and (6), with results depicted in Figures 10, 11, and 12. *Id*., col. 7:49-8:46. The specification further states that "[o]ther approaches for performing the processing 22 are contemplated, such as approaches that exploit signal regularity to quantify artifacts in the signal," such as "Dynamic Time Warping," citing two references. *Id*., col. 8:47-57.

The specification also discloses specific algorithms for computing an actigraphy signal, whereby "the processing 24 processes the BMA-versus-time signal to generate an actigraphy signal versus time." *Id*., col. 8:58-61. With respect to one-dimensional BMA signals such as those generated using the local signal variance or local signal power methods, "a body movement estimate (BME) can be obtained by suitable scaling and translating that signal" using equation (7). *Id*., col. 8:62-67. Equation (8) describes a procedure for multi-dimensional BMA signals. *Id*., col. 9:8-18. The factors used in these equations are obtained through linear regression. *Id*., col. 9:3-7, 16-18. The specification also references alternative approaches using "non-linear regressions" or to "directly classify the quantified artifacts in categorical classes, which describe, qualitatively, the type of body movements." *Id*., col. 9:41-52.

Respondents' and Staff's proposed construction restricts the claimed structure to one of the numbered equations disclosed in the specification, RIB at 40-41, but this is not consistent with the specification of the '698 patent. As discussed above, the specification describes five distinct methods for computing a BMA signal, which do not each correspond to one of the numbered equations. '698 patent, cols. 4:65-8:57. There are several methods disclosed for computing an actigraphy signal, which are not restricted to equations (7) and (8). *Id*., cols. 8:58-9:52.

Accordingly, the corresponding structure shall be construed to be the electronic data processing device 12 of Figure 1, which can be a microprocessor or microcontroller, programmed by software or firmware to implement an actigraphy synthesis module 20, which includes a Body Movement Artifact (BMA) versus time signal extraction process 22 and a BMA signal to actigraphy sensor signal process 24. The algorithms that may be used to compute the BMA signal include computing the local signal power, computing the variance of the signal,

implementing a Discrete Fourier Transform, implementing a Wavelet Transform, or a Dynamic Time Warping technique, as described in the specification at cols. 4:65-8:57 and Figs. 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12. The algorithms that may be used to compute an actigraphy signal from the BMA signal include scaling and translation using parameters determined through linear regression or non-linear regression, or qualitative classification of body movements, as described in the specification at cols. 8:58-9:52 and Figs. 13 and 14.

**2. "computing a body motion artifact (BMA) signal as a function of time from the non-body motion physiological parameter signal"**

| Philips's Construction | Respondents' and Staff's Construction |
|---|---|
| From a non-body motion physiological parameter signal, computing an artifact signal as a function of time that derives from physical movement of the body. "As a function of time" means data sequentially ordered, one after the other, in time to differentiate time windows. | "deriving from the non-body motion physiological parameter signal, without using accelerometer data, a separate signal reflecting artifacts due to body motion as a function of time" |

The parties also dispute the constructions for the two claimed functions of the DSP device. As discussed above, the scope of this claim language is subject to § 112(f) and is thus limited to the algorithms disclosed in the specification. The parties nevertheless dispute certain aspects of this claim language. Specifically, Respondents contend that computing a body motion artifact (BMA) signal must not use accelerometer data, and that the computed BMA signal must be a separate signal from the non-body motion physiological parameter signal. RIB at 42-47. Staff agrees with Respondents' proposed construction. SMB at 29-33. Complainants oppose Respondents' addition of a negative limitation to the claim regarding accelerometer data. CIB at 15-17. Complainants also disagree with Respondents' proposal requiring separate signals, explaining that the BMA signal can be a mathematically-modified or signal-processed version of the non-body motion physiological signal. *Id*. at 18-19.

Because this claim language has been construed according to § 112(f), the parties' claim construction disputes will be addressed in the context of the algorithms disclosed in the specification. The specification requires that the process for computing a BMA signal uses signals from "one or more physiological sensors 10, each of which sense a physiological parameter other than body movement (displacement, velocity, acceleration)." '698 patent, col. 2:58-60.[11] The local signal power embodiment describes an example using a respiratory effort signal. *Id*., col. 5:32-50, Figs. 3, 4. The local signal variance embodiment describes examples using a respiratory effort signal and an ECG signal. *Id*., col. 6:34-46, Figs. 5, 6, 7. The Fourier transform and wavelet embodiments describe examples using respiratory effort signals. *Id*., col. 7:19-39, 8:25-46, Figs. 8, 9, 10, 11, 12. None of these embodiments use body movement to compute the BMA signal, and in accordance with § 112(f), the claim thus excludes the use of accelerometer-based data.

As recognized by Respondents and Staff, excluding accelerometer-based data from the computation of BMA signals is consistent with the prosecution history, where the claims were amended to require "non-body motion" physiological parameter signals. RIB, Exhibit 6, Response to Final Office Action (July 27, 2017). Complainants cite references to accelerometer-based data in the specification, CIB at 31-32, but these citations are taken out of context. In the local signal power embodiment, the BMA signal computed from the respiratory effort data is compared to accelerometer-based data to show its efficacy—the BMA signal is not computed using any accelerometer-based data. '698 patent, col. 5:32-50, Figs. 3, 4. Complainants also cite

[11] The examples listed in the specification are "an ECG sensor; an inductance plethysmography sensor; a photoplethysmography sensor; a ballistocardiography sensor; a nasal pressure sensor; a thoracic impedance sensor; or so forth," which measure "cardiac activity; thoracic respiratory effort; abdominal respiratory effort; respiratory flow; or so forth." '698 patent, col. 2:60-66.

a disclosure in the specification that the computed signals can be used to enhance movement signals, but this only describes a potential use for the actigraphy signals after they have been computed, not a separate method for computing the BMA signal. *Id*., col. 10:21-26. There is no disclosure in the specification that is consistent with using accelerometer-based data for computing the BMA signal.

There does not appear to be a material dispute between the parties as to whether the BMA signal is a "separate signal" from the physiological parameter signal. In each of the embodiments in the specification, the BMA signal is the result of a computation involving the physiological parameter signal. The BMA signal can be a computed local signal power, a local signal variance, a windowed spectral density obtained from a Fourier transform, or a windowed maximum wavelet transform value. *Id*., cols. 4:65-8:57. All of these are mathematically-modified or signal-processed versions of the non-body motion physiological signal, which are "separate signals" according to Complainants and Respondents.

Complainants also propose to construe "as a function of time" to mean sequentially ordered, one after the other, in time. CRB at 17. There does not appear to be any dispute regarding the interpretation of this claim language, and the embodiments in the specification describe BMA signals that are consistent with this meaning, computing signal power and local signal variance in the time domain, and Fourier transforms and wavelet transforms computed within sequential time windows. *Id*., cols. 4:65-8:57.

Because the parties' claim construction disputes can be resolved by reading the embodiments in the specification, no further construction of the claim language is necessary beyond the recitation of the claimed functions and the corresponding structure identified pursuant to § 112(f).

### 3. "computing an actigraphy signal as a function of time from the BMA signal"

| Philips's Construction | Respondents' and Staff's Construction |
|---|---|
| Using the BMA signal to calculate a signal as a function of time (meaning data sequentially ordered, one after the other, in time) that indicates sleep stages. | "deriving from the BMA signal, without using accelerometer data, a separate signal reflecting gross motor activity, such as human rest, activity, and sleep cycles, as a function of time" |

Complainants propose to construe an "actigraphy signal" to mean a signal that indicates sleep stages. CIB at 34-36. Complainants cite a purported definition in the specification: "Actigraphy is a relatively unobtrusive method of monitoring human rest/activity/sleep cycles." '698 patent, col. 1:6-7. The specification further identifies actigraphy devices as "clinical tools for monitoring sleep/wake patterns." *Id*., col. 1:15-17. In the embodiments describing the computation of an actigraphy signal, the specification describes figures depicting an actigraphy signal and a BMA signal "for a full night recording." *Id*., col. 9:31-34, Fig. 14.

Respondents argue that actigraphy is not limited to "sleep stages." RIB at 48-49. In particular, the definition in the specification defines actigraphy in terms of the monitoring of "rest/activity/sleep cycles," not "sleep stages." RIB at 48-49. When describing such monitoring in the prior art, the specification describes subjects wearing an accelerometer "which is used to measure gross motor activity." '698 patent, col. 1:7-10. In the prosecution history, the examiner stated: "An actigraphy signal is a measure of the user's activity and body motion." RIB, Exhibit 6, Advisory Action (July 6, 2017). Staff agrees with Respondents' interpretation of this term. SMB at 33-35.

As discussed above, this functional claim language is subject to § 112(f), and the step of computing an actigraphy signal corresponds to actigraphy sensor signal process 24 in the specification. The embodiments in the specification describe the results of this process as "a

body movement estimate (BME)." '698 patent, col. 8:61-64. Figures 13 and 14 compare an accelerometer-based "actigraphy" signal with a respiratory effort signal and the body movement estimation. *Id*., col. 9:27-34, Figs. 13, 14. The specification discloses an alternative approach for process 24 where "one can directly classify the quantified artifacts in categorical classes which describe, qualitatively, the type of body movements." *Id*., col. 9:49-51.

These disclosures in the specification clearly indicate that the scope of the claimed actigraphy signals is broader than the sleep cycles or sleep stages proposed by Complainants. In accordance with the disclosed corresponding structure, actigraphy signals represent body movements, which may be used to monitor human rest/activity/sleep cycles. Because this is explicitly disclosed in the specification, no further construction of the claim language is necessary beyond the recitation of the claimed functions and the corresponding structure identified pursuant to § 112(f).

## V. THE '464 PATENT

The '464 patent is titled "Continuous Transdermal Monitoring System and Method," naming inventors James Tyler Frix, Andrew Johnson, James Mitchell Frix, and Robert Andrew Taylor. '464 patent, cover.[12] The patent issued from an application filed on April 18, 2016, claiming priority to an application originally filed on July 7, 2014. *Id*.

### D. Specification and claims

The '464 patent describes a method for continuous transdermal monitoring ("CTM") of the human body, including by "measuring pulse oximetry of a subject." *Id*., col. 4:24-33. CTM may also include measurements of "pulse rate, blood oxygen saturation, transdermal core

[12] The '464 patent is attached as Exhibit 3 to Complainants' Opening Claim Construction Brief and as Exhibit 2 to Respondents' Opening Claim Construction Brief.

temperature, Global Positioning System ('GPS') coordinates, 3-axis accelerometer outputs, skin and ambient temperature readings, hydration levels, and barometric readings." *Id*., col. 4:33-40. The invention described includes "algorithms for collecting accurate pulse oximetry readings, as well as other sensor readings, by minimizing the effects of motion artifact errors when the reading(s) is taken." *Id.*, col. 6:30-33. "An exemplary algorithm involves measuring when user motion and/or movement is at a minimum." *Id*., col. 6:33-35.

Claim 1 of the '464 patent recites:

> 1. A method for minimizing the effects of motion artifact on sensor readings taken during continuous transdermal monitoring of a body part in motion, the method comprising:
>
> monitoring, with a processor, an output signal from an accelerometer, wherein the output signal indicates acceleration and deceleration of the body part of a user as the body part is in motion;
>
> determining, with the processor, that the output signal is within a predetermined range that includes indication of acceleration and deceleration, wherein indication of acceleration and deceleration corresponds with a motion direction change of the body part in motion;
>
> based on the determination that the output signal is within the predetermined range, monitoring, with the processor, a plurality of readings from a sensor, wherein monitoring the plurality of readings from the sensor occurs over a time window that coincides with the output signal remaining within the predetermined range; and
>
> recording in a memory device the monitored plurality of readings from the sensor.

*Id*., col. 20:30-51.

**E. Prosecution History**

Application claim 1 was amended before issuing as claim 1.[13] As originally drafted, the "predetermined range" limitation required a range corresponding to "zero acceleration." '464

[13] A certified copy of the prosecution history of the '464 patent was filed with the complaint as Appendix D.

Patent File History, Application (Apr. 18, 2016) at 29. In the first office action, the examiner found that U.S. Patent Application 2005/0228298 Al to Banet *et al.* ("Banet") anticipated application claim 1. '464 Patent File History, Office Action (Aug. 30, 2016) at 4. In response, the applicants argued that Banet did not disclose the limitation "wherein the output signal [from the accelerometer] indicates acceleration and deceleration of the body part of a user as the body part is in motion." '464 Patent File History, Applicants' Response (Oct. 27, 2016) at 7 (brackets in original). According to the applicants, Banet taught using an accelerometer to determine when the user's body part is at "complete rest," *i.e.,* motionless, "for a period of time long enough to generate a constant signal" from the accelerometer. *Id.* The applicants argued that, in contrast, the '464 patent disclosed a method for taking a pulse oximeter reading at "a time at which the body part is at a point of minimum deceleration." *Id.*

The examiner reaffirmed his rejection. '464 Patent File History, Office Action (Dec. 1, 2016) at 9. Noting that the "applicability of Banet turns on an analysis of what constitutes 'as the body part is in motion,'" the examiner explicitly rejected the applicants' "conception of the terms motion and rest" as "mutually exclusive," so that "[e]ither a body part is in motion or it is not." *Id.* According to the examiner, such an interpretation is inconsistent with the broadest reasonable construction of the application claim, which—as originally drafted—recited "'a body part in motion . . . includes a zero acceleration.'" *Id.* (quoting application claim 1) (omissions in original).

The examiner also found that Banet satisfied the preamble's requirement of "continuous transdermal monitoring of a body part in motion" even though Banet "only takes a measurement when the subject is at rest." *Id.* Pointing out that the application claim "states that monitoring may only occur 'based on the determination that the output signal [from an accelerometer] is

within the predetermined range' that includes indication of zero acceleration," the examiner concluded that "the claim would include a measurement that only occurs when the subject is at rest." *Id.* (brackets in original).

In response to the second office action, the applicants amended the "predetermined range" limitation to its current form requiring that the claimed range correspond to a "motion direction change" rather than to "zero acceleration." '464 Patent File History, Applicants' Response (Feb. 27, 2017) at 2. The applicants argued that Banet does not disclose the "predetermined range" limitation as amended because Banet taught taking "a pulse oximeter reading at a time when a body part is at complete rest." *Id.* at 7.

The examiner found that the amended application claim was allowable over Banet, the "closest reference found during Examiner's search of the prior art." '464 Patent File History, Notice of Allowability (Mar. 29, 2017) at 3. In particular, because Banet taught that the "ideal" time to obtain a measurement is when the body part is "at rest" and the "'at rest' condition [is calculated] by determining whether the accelerometer signal exhibits an invariant signal for a sufficient period of time," the examiner concluded that Banet does not disclose an "indication of acceleration and deceleration [that] corresponds with a motion direction change of the body part in motion." *Id.* The examiner noted that he was interpreting claim 1 "such that the determining whether the output signal is within a predetermined range must include signals indicating motion of a moving body part in one direction and motion of the moving body part in an opposing direction." *Id.* (underlining in original).

**F. Level of ordinary skill in the art**

Complainants propose a level of ordinary skill in the art for the '464 patent of "an undergraduate scientific degree or associate[']s degree in a field related to electrical sensors (such as electrical, mechanical, or biomedical engineering), and/or at least 2-3 years of

experience researching, developing, or working with, relevant monitoring technology where additional work experience or education can be sufficient." CIB at 39-40. Staff agrees with this proposal. SMB at 37. Respondents did not submit a proposal regarding the level of ordinary skill in the art.

The parties do not contend that the level of ordinary skill in the art affects the construction of any claim term. Because the claim constructions adopted below do not depend on the level of ordinary skill in the art, this order makes no findings regarding the level of ordinary skill in the art for the '464 patent.

### G. Agreed constructions

The parties have agreed that the preamble of claim 1 is limiting and to construe the preamble language "a method for minimizing the effects of motion artifact on sensor readings taken during continuous transdermal monitoring of a body part in motion" to mean "a method for improving the timing of measurements taken during continuous transdermal monitoring of a body part in motion, such that inaccuracies attributable to motion artifacts are minimized."

### H. Disputed constructions

#### 1. "a predetermined range that includes indication of acceleration and deceleration, wherein indication of acceleration and deceleration corresponds with a motion direction change of the body part in motion"

| Philips's Construction | Respondents' and Staff's Construction |
|---|---|
| "A predetermined range of acceleration and deceleration based on the output signal of the accelerometer that corresponds with a change in direction of the body part in motion being monitored." | "a limited range determined in advance indicating a maximum allowable deceleration followed by a maximum allowable acceleration, wherein the output signal indicates overall motion of the body part reversing its direction without an intervening period of complete rest" |

The "predetermined range" limitation requires a predetermined range of acceleration and deceleration that "corresponds with a motion direction change of the body part in motion." '464

patent, col. 20:38-42. Such an interpretation is consistent with the specification's description of the disclosed invention with respect to the runner's arm shown in Figure 2A.

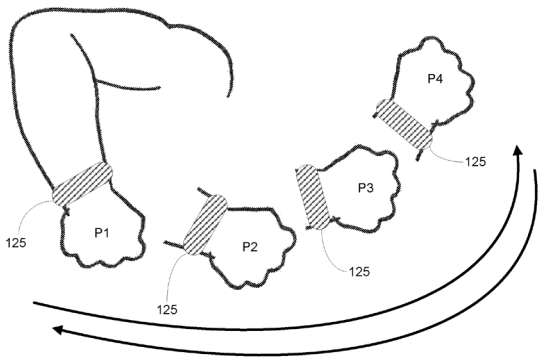



***FIG. 2A***

As shown in the figure, the runner's arm moves back and forth between the rearmost position (position P1) and the forwardmost position (position P4). '464 patent, col. 13:52-56. The runner's "arm may accelerate and then decelerate as it moves from position Pl to P2 to P3 to P4." *Id.* at col. 13:61-63. Similarly, the runner's "arm may accelerate and then decelerate as it moves from position P4 to P3 to P2 to Pl." *Id.* at col. 13:63-65. Typically, when the runner's arm is at position P1 or P4, the runner's feet will not be in contact with the ground. *Id.* at col. 13:56-60. The patent notes that pulse oximetry readings are optimally taken when the arm is at points P1 and P4. *Id.* at col. 13:64-col. 14:5. At these points, inaccuracies attributable to motion artifacts are minimized because the runner's feet are no longer in contact with the ground and the runner's arm is "at a momentarily stationary position as it decelerates to a minimum, *e.g.,* substantially zero, acceleration before it reverses its direction of motion (points Pl and P4)." *Id.* at col. 13:64-col. 14:5. Thus, as described in the context of the runner's arm shown in Figure

2A, inaccuracies attributable from motion artifacts are lowest when the body part being monitored is changing direction.

Complainants' proposed construction—" A predetermined range of acceleration and deceleration based on the output signal of the accelerometer that corresponds with a change in direction of the body part in motion being monitored"—captures the meaning of the "predetermined range" limitation. Respondents' and Staff's proposed construction seeks to narrow the scope of the limitation by (1) imposing a temporal requirement on the claimed range requiring that a maximum allowable deceleration be "followed by" a maximum allowable acceleration; (2) limiting the term "motion direction change" to a reversal of direction; and (3) construing the term "in motion" to mean "without an intervening period of complete rest." As explained below, Respondents' and Staff's proposed construction is unsupported by the intrinsic record.

**1) The claimed range does not require that a maximum deceleration be "followed by" a maximum acceleration.**

Respondents and Staff argue that the claimed range is "a limited range determined in advance indicating a maximum allowable deceleration followed by a maximum allowable acceleration." There does not appear to be a dispute that the claimed range is "limited," "determined in advance," and "indicat[es] a maximum allowable deceleration" and "a maximum allowable acceleration." *See, e.g.,* CIB at 43-45. Complainants, however, take issue with the proposed requirement that the maximum allowable deceleration be "followed by" the maximum allowable acceleration. *Id.*

The use of the term "followed by" imposes a requirement that the "maximum allowable deceleration" must occur before the "maximum allowable acceleration." As Complainants point out such a requirement "is inconsistent with the basic concept of a range" because "[a] numeric

range is a numeric range; sequence does not matter." CIB at 44. Neither Respondents nor Staff point to any examples from the art of numeric ranges incorporating a temporal requirement.

Respondents put forth two arguments in support of the "followed by" language. Respondents' first argument seeks to refute Complainants' assertion that a temporal requirement is inconsistent with the basic concept of a range. Respondents argue that "time is plainly compatible with the concept of a range," giving as an example "I'll be home between 5 and 6 p.m." RRB at 13. Respondents' example is inapposite. In Respondents' example, whether a time falls within the time range (*e.g.,* 5:30 p.m.) does not depend a condition precedent: If the speaker comes home between 5 and 6 p.m., the range is satisfied. In contrast, under Respondents' and Staff's proposed construction, whether a number representing acceleration satisfies the claimed range depends not only on whether the number falls within the numeric range but whether a condition precedent has been satisfied, *viz.,* whether the acceleration was preceded by a maximum allowable deceleration.

The second argument advanced by Respondents is that the "followed by" language is necessary to limit monitoring of the non-accelerometer sensor to periods where the effect of the motion artifacts is minimized. RRB at 13. In support of this argument, Respondents point to the parties' agreed-upon construction of the preamble, which the parties agree is limiting and requires a method for reducing "inaccuracies attributable to motion artifacts." CIB at 40. In essence, Respondents are arguing that a requirement that appears in one limitation (the preamble) should be read into another limitation (the "predetermined range") limitation. There is no basis for doing so. As discussed above, construing the claim term "predetermined range" to require "a maximum allowable deceleration followed by a maximum allowable acceleration" is inconsistent with the basic concept of a "range." In addition, reading the concept of "reducing inaccuracies

attributable to motion artifacts" into the construction of "predetermined range" would not affect the scope of claim 1. Even without the "followed by" language, in order to infringe claim 1, a method must satisfy the preamble's requirement of reducing "inaccuracies attributable to motion artifacts."

Staff bases its support for the "followed by" language on the deposition testimony of Andrew Johnson, one of the named inventors of the '698 patent. SMB at 40 (citing Staff Exhibit A (Dep. Tr. of A. Johnson) at 147:7 to 149:15). At his deposition, Dr. Johnson was asked a series of questions about the arm shown in Figure 2A. Staff Exhibit A (Dep. Tr. of A. Johnson) at 147:7-149:15. At the end of this line of questioning, Dr. Johnson was asked, "So a predetermined range can be represented by an output signal that represents maximum deceleration followed by maximum acceleration?" Staff Exhibit A (Dep. Tr. of A. Johnson) at 149:5-9. In response, Dr. Johnson stated that "I think that's one way—yeah, within that range, I think that's one way you could do it." *Id.* Staff's reliance on this testimony is misplaced. Dr. Johnson indicates that the method described in the question is only "one way" of implementing the claimed method with respect to Figure 2A. Staff Exhibit A (Dep. Tr. of A. Johnson) at 149:5-9.

**2) The claimed "motion direction change" is not limited to a reversal of direction.**

Respondents and Staff also seek to limit "motion direction change" to a reversal of direction. While "motion direction change" encompasses a reversal of direction, it is not limited to a reversal of direction. Limiting "motion direction change" to a reversal of direction requires that the patentees acted as their own lexicographers or disavowed claim scope. *Hill-Rom Servs., Inc. v. Stryker Corp.,* 755 F.3d 1367, 1371 (Fed. Cir. 2014) ("We depart from the plain and

ordinary meaning of claim terms based on the specification in only two instances: lexicography and disavowal.").

"The standards for finding lexicography and disavowal are exacting." *Id.* For lexicography, the applicants "must clearly set forth a definition of the disputed claim term other than its plain and ordinary meaning' and must 'clearly express an intent to redefine the term.'" *Id.* (quoting *Thorner v. Sony Computer Entm't Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012)). For disavowal, the patentees must make clear in the specification or prosecution history "that the invention does not include a particular feature,' or is clearly limited to a particular form of the invention[.]" *Id.* at 1372 (quoting *SciMed Life Sys., Inc. v. Advanced Cardiovascular Sys., Inc.,* 242 F.3d 1337, 1341 (Fed. Cir. 2001) and citing *Edwards Lifesciences LLC v. Cook Inc.,* 582 F.3d 1322, 1330 (Fed. Cir. 2009)).

Respondents and Staff base their proposed construction limiting "motion direction change" to a reversal of direction in the specification's discussion of Figure 2A and the examiner's stated reasons for allowing claim 1. Neither portion of the intrinsic record constitutes a clear statement defining "motion direction change" or limiting its claim scope as required for lexicography or disavowal.

As discussed above, Figure 2A is "an illustration of a user's arm motion 11 during running." '464 patent, col. 13:49-52. While the specification teaches that a pulse oximetry reading can be taken "with minimal noise attributable to motion artifact" "before [the arm] reverses its direction (points P1 and P4)," the specification does not state or suggest that the claimed invention is limited to this embodiment. Lexicography and disavowal cannot be established by showing that "all of the embodiments, contain a particular limitation." *Thorner,* 669 F.3d at 1365 ("It is not enough [for lexicography] for a patentee to simply disclose a single

embodiment or use a word in the same manner in all embodiments, the patentee must 'clearly express an intent' to redefine the term."), 1366 ("It is likewise not enough [for disavowal] that the only embodiments, or all of the embodiments, contain a particular limitation."). Respondents and Staff do not point to any language in the specification showing that the patentees intended to limit the claims to the Figure 2A implementation. *See, e.g., Blackbird Tech LLC v. ELB Elec., Inc.,* 895 F.3d 1374, 1377 (Fed. Cir. 2018) ("[The specification] never refers to this run-of-the-mill fastener as the 'present invention' or 'an essential element' or uses any other language that would cause the ordinarily skilled artisan to believe that this fastening mechanism is an important component of the invention or that it is critical to the invention for any reason.").

With respect to the prosecution history, Respondents and Staff point to the examiner's statement that he was allowing claim 1 over Banet because he "interpreted" claim 1 "such that the determining whether the output signal is within a predetermined range must include signals indicating motion of a moving body part in one direction and motion of the moving body part in an opposing direction." '464 Patent File History, Notice of Allowability at 3 (Mar. 29, 2017) (underlining in original). The examiner's statement, however, does not indicate that he viewed claim 1 as requiring a reversal of direction.

Respondents' and Staff's interpretation of the examiner's statement depends on the examiner having acted gratuitously to limit the scope of claim 1. The examiner's reference to "an opposing direction" occurs in his explanation of why the claims were allowable over Banet. The examiner found that Banet's method for taking pulse oximetry readings when a body part is at rest did not satisfy the "predetermined range" limitation requiring that monitoring occur while the body part was in motion and undergoing a "motion direction change." '464 Patent File History, Notice of Allowability (Mar. 29, 2017) at 3.

During the prosecution, the examiner was giving the claim terms their broadest reasonable construction. *See, e.g.,* '464 Patent File History, Office Action (Dec. 1, 2016) at 9 ("However, this would be an incorrect interpretation of the broadest reasonable interpretation of the claim.") (discussing the first "monitoring" limitation). It is not plausible that the examiner deemed a "reversal of direction" to be the broadest reasonable construction of "motion direction change."

In addition to the intrinsic evidence, Respondents point to four pieces of extrinsic evidence in support of their construction. RIB at 25-27. The first piece of extrinsic evidence is a slide from a presentation produced by James Tyler Frix, one of the named inventors. RIB at 25-26 (citing Respondents' Ex. 10 at PNA-ITC-TFRIX0001261). The slide states that the "difference between us and Banet is that our user is in motion when we take measurements." Ex. 10 at PNA-ITC-TFRIX0001261. The slide does not state anything regarding a "motion direction change" or a "reversal of direction."

The remaining pieces of extrinsic evidence are three letters sent to Respondents Garmin and Fitbit by the inventors. RIB at 26 (citing Respondents' Ex. 12-14). In these letters, the inventors are trying to sell their patent portfolio. In order to illustrate the scope of the claims of the issued patents in the portfolio, the letters discuss how the claimed technology could be implemented in the context of running. The description of such an implementation mirrors the specification's description of Figure 2A. *See, e.g.,* Respondents' Ex. 12 ("For instance, if the product is worn on the wrist, as the subject thrusts their arm forward and backward during exercise (*e.g.,* running), the patented invention operates to detect the deceleration of the arm up to and including a momentarily stationary state of the arm and then acceleration of the arm in the opposite direction."). The letters' description appears to be intended to illustrate a potential

implementation of the inventions claimed by the patents in the portfolio and is not presented as a claim construction.

Based on the foregoing, I find that "motion direction change" does not need to be construed and should be given its plain and ordinary meaning. When given its plain and ordinary meaning, the term "motion direction change" encompasses—but is not limited to—a reversal of direction.

**3) It is not necessary to construe "in motion."**

Respondents' and Staff's proposed construction construes the term "in motion" to mean "without an intervening period of complete rest." Respondents and Staff argue that this facet of their proposed construction is necessary because the claim language, specification, and the prosecution history require that the monitoring of the non-accelerometer sensor readings occur while the body part is in motion and cannot occur while the body rest is at "complete rest." SMB at 41; RIB at 22-23. There is no dispute that the claim language requires that the monitoring of the non-accelerometer sensor readings occur while the body part is "in motion." The preamble, which all parties agree is limiting, requires "continuous transdermal monitoring of a body part in motion." '464 patent, col. 20:31-33. The "predetermined range" limitation requires that the "motion direction change" occur while the "body [is] in motion." *Id.,* col. 20:45-49. Complainants' proposed construction of the "predetermined range" limitation retains the requirement that the body part be "in motion": "A predetermined range of acceleration and deceleration based on the output signal of the accelerometer that corresponds with a change in direction of the body part in motion being monitored." The ordinary meaning of "in motion" is readily apparent even to a lay judge. *Phillips v. AWH Corp.,* 415 F.3d 1303, 1314 (Fed. Cir.

2005) (*en banc*). Respondents' and Staff's proposed construction would not clarify the term's meaning but would add a layer of ambiguity as to the meaning of "complete rest."[14]

Based on the foregoing, I find that the term "in motion" does not need to be construed and should be given its plain and ordinary meaning.

**2. "based on the determination that the output signal is within the predetermined range, monitoring, with the processor" / "wherein monitoring the plurality of readings from the sensor occurs over a time window that coincides with the output signal remaining within the predetermined range"**

| Philips's Construction | Respondents' Construction | Staff's Construction |
|---|---|---|
| Monitoring a plurality of readings from a sensor over a time window when the output signal is within the predetermined range. / The plurality of readings from the sensor are monitored during the time period that the output signal is within the predetermined range. | "when the processor determines that the accelerometer's output signal is within the predetermined range, the processor makes the decision to monitor and monitors" / "wherein the monitoring of the plurality of readings from the sensor occurs only while the accelerometer's output signal remains within the predetermined range" | "when the processor determines that the accelerometer's output signal is within the predetermined range and motion is minimized, monitoring with the processor" [a plurality of readings from a sensor,] "wherein the processor monitors the plurality of readings from a sensor other than the accelerometer during a time period when the accelerometer's output signal is within the predetermined range" |

Under Respondents' proposed construction, the second "monitoring" limitation requires that the processor start monitoring the non-accelerometer sensor only after it determines that the accelerometer's output signal is within the predetermined range and continues to monitor the non-accelerometer sensor only while the accelerometer's output signal remains within the

[14] The phrase "complete rest" comes from the applicants' statements during prosecution. The applicants distinguished Banet from claim 1 on the basis that Banet taught taking "a pulse oximeter reading at a time when a body part is at complete rest." '464 Patent File History, Applicants' Response (Feb. 27, 2017) at 7. Although the meaning of "complete rest" is ambiguous, a body part "in motion" would not be at "rest," much less at "complete rest."

predetermined range.[15] Complainants and Staff interpret the claim limitation broadly, so that the limitation is satisfied if the processor continuously monitors the non-accelerometer sensor irrespective of whether the accelerometer's output signal is outside or within the claimed range.

Complainants' and Staff's interpretation of the second "monitoring" limitation negates one of the limitation's express requirements: The claimed monitoring must be "based on the determination that the output signal is within the predetermined range." '464 patent, col. 20:43-45. If the processor is always monitoring the non-accelerometer sensor, then the monitoring does not take the predetermined range into account. Complainants and Staff do not attempt to reconcile the claim language with their proposed constructions. CIB at 45-46; SB at 46-47. Instead they cite an embodiment in the specification where the monitoring is continuous. This embodiment, however, is only one of two methods that are disclosed in the specification for ensuring that data from the non-accelerometer sensor corresponds to periods in which motion artifacts are minimized.

In the first method, the processor "trigger[s]" a reading from pulse oximeter after the processor determines that the body part is at a point where motion artifacts are minimized. '464 patent, col. 14:12-18 ("Notably, as the graph 11 indicates that the sensor package 125 is at either position P1 or P4, the CTM embodiment may recognize that noise attributable to a motion artifact is at a minimum. Based on such recognition the CTM embodiment may trigger a reading from a pulse oximeter, or other sensor, included in the sensors 159 of the sensor package 125."); *see also id.,* col. 6:42-46 ("In such an embodiment, for example, an accelerometer in a sensor package may be effectively functioning as the on/off control for the oximeter sensor, *i.e.* the

[15] The first "monitoring" limitation is directed at monitoring the output signal of the accelerometer; the second "monitoring" limitation is directed at monitoring the non-accelerometer sensor. '464 patent, col. 20:34-42.

accelerometer output may trigger the pulse oximeter sensor to take a reading when user movement is at a minimum, and *vice versa*."). In the alternative, the processor could "monitor[] pulse oximetry readings the whole time and then identify[] the readings that correspond to the period of time when the accelerometer signals are within the pre-determined range." CIB at 46 (describing the Figure 3 and Figure 4 embodiments).

Claims are not required to cover every embodiment disclosed in the patent. *Apple Inc. v. Andrea Elec. Corp.,* 949 F.3d 697, 708 (Fed. Cir. 2020) ("As we have held, '[when] the patent describes multiple embodiments, every claim does not need to cover every embodiment. This is particularly true [when] the plain language of a limitation of the claim does not appear to cover that embodiment.'") (quoting *Pacing Techs., LLC v. Garmin Int'l, Inc.,* 778 F.3d 1021, 1026 (Fed. Cir. 2015)) (brackets in original). The claim language excludes embodiments in which the processor continuously monitors the non-accelerometer sensor, without taking the predetermined range into account. Such embodiments do not satisfy the claim's requirement that the monitoring be "based on the determination that the output signal is within the predetermined range."

Interpreting claim 1 to exclude embodiments that continuously monitor the non-accelerometer is supported by the prosecution history. In the second office action, the examiner explicitly noted that the second "monitoring" limitation "states that monitoring may only occur 'based on the determination that the output signal [from an accelerometer] is within the predetermined range.'" '464 Patent File History, Office Action (Dec. 1, 2016) at 9 (brackets in original). In contrast to the examiner's construction, Complainants' and Staff's constructions are broader—allowing monitoring of the non-accelerometer sensor even when the accelerometer's output signal is outside the claimed range. In interpreting the second "monitoring" limitation,

the examiner applied the broadest reasonable construction. *See, e.g., id.* ("However, this would be an incorrect interpretation of the broadest reasonable interpretation of the claim.") (discussing the first "monitoring" limitation). Respondents and Staff are urging a construction broader than the one the examiner deemed to be the broadest reasonable construction.

Based on the foregoing, I find that the term "based on the determination that the output signal is within the predetermined range, monitoring, with the processor" means "when the processor determines that the accelerometer's output signal is within the predetermined range, the processor makes the decision to monitor and monitors." I further find that the term "wherein monitoring the plurality of readings from the sensor occurs over a time window that coincides with the output signal remaining within the predetermined range" means "wherein the monitoring of the plurality of readings from the sensor occurs only while the accelerometer's output signal remains within the predetermined range."

## VI. CONCLUSION

Hereafter, all discovery, briefing, and the presentation of evidence in this investigation shall be governed by the claim constructions adopted herein. Because these claim constructions are likely to affect the opinions of the parties' experts in this investigation, the parties may submit supplemental opening expert reports on Friday, July 31, 2020. The deadline for rebuttal expert reports is hereby extended to Friday, August 7, 2020.

This Order is being issued with a confidential designation, and pursuant to Ground Rule 1.10, each party shall submit to the Administrative Law Judge a statement as to whether or not it seeks to have any portion of this Order deleted from the public version within seven (7) days. The parties' submissions regarding confidential information shall not be filed with the Commission Secretary but shall be submitted by e-mail to the Administrative Law Judge's attorney advisor. A party seeking to have a portion of the order deleted from the public version

thereof must attach to its submission a copy of the order with red brackets indicating the portion(s) asserted to contain confidential business information.[16]

**SO ORDERED.**

Dee Lord
Administrative Law Judge

[16] To avoid depriving the public of the basis for understanding the result and reasoning underlying the decision, redactions should be limited. Parties who submit excessive redactions may be required to provide an additional written statement, supported by declarations from individuals with personal knowledge, justifying each proposed redaction and specifically explaining why the information sought to be redacted meets the definition for confidential business information set forth in Commission Rule 201.6(a). *See* 19 C.F.R. § 210.5(f).

**CERTAIN WEARABLE MONITORING DEVICES, SYSTEMS, AND COMPONENTS THEREOF** **Inv. No. 337-TA-1190**

## PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **ORDER** has been served via EDIS upon the Commission Investigative Attorney, John Shin, Esq., and the following parties as indicated, on 8/10/2020.

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