

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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LULULEMON ATHLETICA CANADA INC. AND LULULEMON USA INC.,

*Petitioners,*

v.

NIKE, INC.,

*Patent Owner.*

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Case IPR2023-00438

Patent No. 8,620,413

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**PRELIMINARY RESPONSE OF PATENT OWNER  
NIKE, INC.**

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## **TABLE OF EXHIBITS**

| <b>Exhibit No.</b> | <b>Description</b>                                                                                                          |
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| Ex. 2001           | Declaration of Dr. Bryan Bergeron                                                                                           |
| Ex. 2002           | U.S. Patent No. 5,769,755 (“Henry”)                                                                                         |
| Ex. 2003           | U.S. Patent No. 6,163,718 (“Fabrizio”)                                                                                      |
| Ex. 2004           | Excerpted Prosecution File History of U.S. Patent No. 8,620,413, June 6, 2012 Information Disclosure Statement by Applicant |
| Ex. 2005           | Excerpted Prosecution File History of U.S. Patent No. 8,620,413, February 14, 2013 Receipt of IDS                           |
| Ex. 2006           | U.S. Patent App. No. 2003/0073911 (“Yoshimura”)                                                                             |

## I. INTRODUCTION

Patent Owner Nike, Inc. (“Nike”) submits this Preliminary Response to the Petition of lululemon athletica canada inc. and lululemon usa inc. (“Petitioner”) challenging the patentability of Claims 1–5, 7, 9, 12–14 and 17–19 (the “Challenged Claims”) of U.S. Patent No. 8,620,413 (the “’413 Patent”) (Ex. 1001). Institution should be denied because Petitioner has not established a reasonable likelihood of prevailing for any Challenged Claim.

The ’413 Patent relates to an athletic training device and methods, and the Challenged Claims recite, *inter alia*, determining heart rate zones based on heart rate measurements received from a sensor while a user exercises at exertion levels based on his or her own physical fitness, and determining and communicating to the user, during subsequent exercise, whether a heart rate measurement falls within one of the heart rate zones. *E.g.*, Ex. 1001, at 1:20–41, 18:5–23.

Petitioner presents nine grounds collectively challenging Claims 1–5, 7, 9, 12–14 and 17–19 of the ’413 Patent. Independent claims 1, 12, and 17 recite substantially the same elements in different claim form (apparatus, method, and computer readable medium, respectively). All remaining Challenged Claims depend from those claims. Petitioner’s Grounds 1–9 rely on a combined six references. Petitioner relies on three primary references: U.S. Patent No. 6,241,684 (“Amano,” Ex. 1002) for Grounds 1, 6–7; U.S. Patent No. 4,911,427 (“Matsumoto,” Ex. 1003)

for Grounds 2, 8–9; and U.S. Patent No. 4,566,461 (“Lubell,” Ex. 1004) for Grounds 3–5. Petitioner also relies on three secondary references: the journal article “Self-monitored exercise at three different RPE intensities in treadmill vs field running” (“Ceci,” Ex. 1005); U.S. Patent No. 5,400,794 (“Gorman,” Ex. 1007) and U.S. Patent App. No. 2001/0023315 (“Flach,” Ex. 1008).

The Board should deny institution for two reasons. First, the Board should exercise its discretion to deny institution under 35 U.S.C. § 325(d), because all asserted grounds rely on the same art, or substantially the same art and arguments, that were previously before the Office during prosecution. There is no dispute that two of the six asserted references—Lubell and Flach—were used by the Examiner during prosecution of the ’413 Patent for multiple anticipation and obviousness rejections. Nike overcame all of those rejections. The remaining four references are substantially the same as other references disclosing the same subject matter that were considered by the Examiner.

Second, the Board should deny institution because Petitioner fails to show that the asserted grounds anticipate or render obvious any of the Challenged Claims. For anticipation Grounds 1–2, Petitioner fails to demonstrate that either Amano or Matsumoto discloses each and every limitation of the independent claims. For obviousness Ground 3, Petitioner fails to show that the Lubell-Ceci combination discloses each and every limitation of the independent claims. Petitioner’s Ground

3 also fails because Petitioner has not adequately shown a motivation to combine Lubell and Ceci. Lubell disparages the type of self-directed workouts disclosed by Ceci, and instead claims standardized training protocols chosen by the device as an object of the invention. Petitioner's remaining grounds challenge only dependent claims, and Nike does not address those grounds for purposes of this Preliminary Response.<sup>1</sup> For at least these reasons, Petitioner failed to carry its burden of showing a reasonable likelihood of unpatentability for at least one Challenged Claim. Accordingly, Nike respectfully requests that the Board deny institution.

## **II. BACKGROUND**

### **A. '413 Patent**

The '413 Patent generally relates to monitoring athletic training based on measurements of a user's heart rate. Ex. 1001, 14:49–15:17. For example, the '413 Patent explains that an athlete may wish to train “by maintaining his or her heart rate within a target range or ‘zone,’” aided by a system that can “alert an athlete when his or her measured heart rate rises above or falls below a selected heart rate zone.” *Id.*, 14:59–15:5. However, prior approaches determined such heart rate zones using “a mathematical formula” or a standardized “heart rate chart,” resulting in “heart rate values” that “may be appropriate for a few individuals,” but “often are

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<sup>1</sup> If the Board institutes *inter partes* review, Nike reserves the right to address challenges to the dependent claims of the '413 Patent.

inaccurate for many users because they cannot take into account an individual's particular exercise ability.” *Id.*, 15:7–17.

Accordingly, the '413 Patent claims improvements over the prior art that can “advantageously calculate heart rate zones for an individual athlete automatically,” such as “by associating how a user is physically feeling when determining the heart rate” while exercising at exertion levels that feel “easy,” “medium,” and “hard,” to a user based on his or her own fitness level. *Id.*, 15:18–16:55. The Challenged Claims recite systems and methods that (i) “prompt” a user to exercise at multiple “exertion levels” that are “based on a level of physical fitness of a user,” (ii) “determine” multiple “heart rate zones based on” “heart rate measurements” taken “while the user exercises” at the multiple “exertion levels,” and then (iii) prompt a user to “to exercise while maintaining” his or her heart rate within a particular “heart rate zone,” whereby the system measures the user's heart rate and determines whether it is “within the particular heart rate zone.” *Id.*, 18:5–23. The claimed inventions therefore enable users “to determine the appropriate heart rate to exercise more efficiently and to avoid over-training.” *Id.*, 15:24–26. The three independent claims share substantively the same limitations, with limitations [1A] through [1G] reproduced below (*id.*, 18:5–23):

**1. An apparatus comprising:**

[1A] a processor; and

[1B] a memory storing instructions that, when executed by the processor, cause the apparatus at least to:

[1C] prompt a user to exercise at a plurality of successive exertion levels, *wherein an exertion level is based on a level of physical fitness of a user;*

[1D] *determine a plurality of heart rate zones based on first heart rate measurements* received from a sensor while the user exercises at the plurality of successive exertion levels;

[1E] generate a prompt instructing a user to exercise while maintaining heart rate within a particular one of the plurality of heart rate zones;

[1F] process second heart rate measurements received from the sensor subsequent to generating the prompt; and

[1G] determine whether the second heart rate measurements are within the particular heart rate zone.

**B. Relevant File History**

The Examiner allowed the Challenged Claims over nearly two dozen references considered during prosecution, including Lubell and Flach (which Petitioner re-asserts in Grounds 3–5, 7, and 9). In two office action rejections, the Examiner cited Lubell as anticipating the three independent claims 1, 12, and 17, and relied upon Flach for obviousness rejections of challenged dependent claims 7, 9, 14, and 19. Ex. 1011, at 2–3, 4–5; Ex. 1013, at 3–4, 6. The Examiner also considered, *inter alia*, U.S. Patent App. No. 2003/0073911 (“Yoshimura”), U.S.

Patent No. 5,769,755 (“Henry”), and U.S. Patent No. 6,163,718 (“Fabrizio”). Ex. 1011, at 3–5; Ex. 1013, at 4–6; Ex. 2005, at 2.

In response to the rejections under Lubell, the applicant explained that Lubell does not disclose “prompt[ing] a user to exercise at a plurality of successive exertion levels, wherein an exertion level is based on a level of physical fitness of a user.” Ex. 1014, at 7–8 (emphases original). Instead, the applicant explained, Lubell “is directed to a *prescribed* exercise test” such that it “executes a predefined exercise test protocol that is not based on a level of physical fitness of a user.” *Id.* The Examiner agreed, withdrew the rejections, and allowed the claims. Ex. 1015, at 2–3. The Examiner stated that the “reasons for allowance” included that the claimed “exertion levels are based on a level of physical fitness of the user and *are specifically chosen by the user [sic] there is no external device which is choosing the exercise level.*” *Id.* (emphasis added). The Examiner concluded that the “prior art fails to disclose or render obvious all of the limitations of the independent claims in combination with prompting the user to exercise at a plurality of exertion levels, *wherein an exertion level is based on a level of fitness of the user and determining a plurality of heart rate zones based on heart rate measurements received from the sensors while the user exercises at the plurality of exertion levels.*” *Id.* (emphasis added). “Although this is a device and method which guides the user,” the Examiner

explained, “*the exertion level is chosen and maintained exclusively by the user* and not in any way acted upon by the device.” *Id.* (emphases added).

The relevant file history is discussed in further detail in addressing discretionary denial of institution under 35 U.S.C. § 325(d). *See* Section V.

### **C. Alleged Prior Art References<sup>2</sup>**

#### **1. Amano**

Petitioner focuses on two aspects of Amano, which discloses an “exercise workout support device” that (1) estimates a subject’s “maximum oxygen uptake quantity” ( $VO_{2max}$ ), and (2) displays “upper and lower limit values” for pulse rates “corresponding to a suitable exercise intensity.” Ex. 1002, 2:65–3:6. The device estimates  $VO_{2max}$  using a subject’s body weight and a standardized table that correlates heart rates,  $VO_{2max}$ , and exercise intensity values (“an Astrand-Ryhming nomogram,” shown in Figure 3). *Id.*, 6:12–28. Then, using the estimated  $VO_{2max}$ , the device sets a target pulse using standardized “pulse rate tables for males and females” (the male version is shown in Figure 14) that correlate  $VO_{2max}$  with target pulse rates, and sets upper and lower pulse rate limits by multiplying the target pulse read from the table by the preset coefficients 80% and 120%, respectively. *Id.*, 6:12–

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<sup>2</sup> For purposes of this Preliminary Response, Nike addresses each of the alleged prior art references identified by lululemon, but only addresses the grounds challenging the independent claims of the ’413 Patent.

28, 19:66–20:28. Thereafter, while the subject is exercising, the device uses an audible “pitch maker” to indicate to the subject a running pace that results in a pulse rate between the upper and lower pulse rate limits, whereby the device can raise or lower the pitch sound to indicate that the runner should speed up or slow down, if the pulse rate is outside the upper and lower pulse rate limits. *Id.*, 20:31–21:23.

For the first aspect, Petitioner admits that Amano discloses “a *device that prompts a user* to exercise at increasing intensity levels,” not a device where a user chooses intensity levels. Petition at 1 (emphasis added). One reason is that Amano’s protocol for estimating  $VO_{2max}$  requires determining whether there is a straight line relationship between a subject’s heart rate and exercise intensity. *Id.*, 6:56–58. To accomplish this, “it is necessary to measure exercise intensity at least three or more stages, and determine the heart beat rate at each stage,” with the heart rates at each intensity level referred to as “intensity-beat rate pairs.” *Id.*, 6:59–67, 12:39–41. Amano employs preset workout intensity stages. Once a “test subject has started running,” the test begins and the device prompts the subject to “increase exercise intensity by 10%,” using a “beep alarm” synchronized with the increased pace. *Id.*, 13:35–55. The subject “tries to maintain running” at the increased pace for “120 seconds,” at which point an “alarm sound is generated at an interval corresponding to a further 10% increase.” *Id.*, 14:56–15:11. This process continues until three “intensity-beat rate” pairs are recorded. *Id.*, 15:9–11. Amano’s protocol does not

work “if a straight line relationship has not been established,” and in such cases the subject is either “prompted to stop running,” or the test is “put off until the next time.” *Id.*, 13:19–24.

For the second aspect of Amano, Petitioner also admits that the “device shows upper and lower limit values for heart rate” that “*relies on* VO<sub>2max</sub>,” not direct measurements of the subject’s heart rate. Petition at 10 (emphasis added). First, the device selects a target pulse rate from standardized tables indicating “the pulse rate when an average person . . . exercises at an intensity which corresponds to 50% of VO<sub>2max</sub>.” *Id.*, 19:40–46. Then, to set the limits for a subject’s workout, the device multiplies the target pulse by 120% to set the upper limit, and by 80% to set the lower limit. *Id.*, 20:14–28. Petitioner provides an example of this process, explaining that “*if the device chooses 125 as the target pulse*, the upper limit is 150 and the lower limit is 100.” Petition at 10 (emphasis added).

## 2. Matsumoto

Matsumoto discloses a training bicycle that selects preset exercise programs and target pulse rates, based on standardized characteristics including sex, age, and weight. Ex. 1003, 1:48–55. A user inputs those characteristics, and the “exercise program is obtained from” a table, such as that excerpted below (*id.*, 4:4–55):

| Age | Exercise<br>Prog. No. | Target<br>Pulse | Exercise<br>Time | Exercise Standard |       |
|-----|-----------------------|-----------------|------------------|-------------------|-------|
|     |                       |                 |                  | Men               | Women |
| -29 | 1                     | 120             | 5                | M1                | W1    |
|     | 2                     | 130             | 5                | M2                | W2    |
|     | 3                     | 140             | 5                | M3                | W3    |
|     | 4                     | 145             | 5                | M4                | W4    |
|     | 5                     | 150             | 5                | M5                | W5    |
|     | 6                     | 155             | 5                | M6                | W6    |
|     | 7                     | 155             | 6                | M7                | W7    |
|     | 8                     | 155             | 7                | M8                | W8    |
|     | 9                     | 155             | 8                | M9                | W9    |
|     | 10                    | 155             | 9                | M10               | W10   |

In Matsumoto's training protocol embodiment, Petitioner admits that "*the machine chooses* a workout," according to "an exercise program that is *suited to*," but not based on, "the individual user's physical fitness." Petition at 12, 31 (citing Ex. 1003, 4:33–35) (emphases added). Matsumoto discloses that the "first exercise program is determined by the user's sex, age and weight," using the standard table above. *Id.*, 5:17–25. Matsumoto also discloses that a "target pulse (PN) for warming up" is set by the device, which chooses a preset "PN" from a second standardized table (*id.*, 5:25–34):

| TABLE 2 |    |     |     |     |     |     |     |
|---------|----|-----|-----|-----|-----|-----|-----|
| N       | 0  | 1   | 2   | 3   | 4   | 5   | 6   |
| PN      | 80 | 100 | 120 | 130 | 140 | 150 | 160 |

For example, if the device chooses the value 3 for the warmup routine "N," the user is prompted to start "peddling the training bicycle" "to attain the target pulse" of 130. *Id.*, 5:33–42. The user exercises at the first preset pulse rate "until the one

minute timer expires,” at which point the target pulse “is set to  $N=N+1$ ,” i.e., 140 in this example, and the user is prompted to continue training at the higher pulse rate. *Id.*, 5:45–61. If the user’s pulse exceeds the target, the machine prompts the user to slow down, and if the pulse drops below the target, the machine prompts the user to speed up. *Id.*, 5:45–48.

Matsumoto also discloses a different embodiment in which a user exercises against a calculated “target pulse” rate. *Id.*, 7:36–44. The “target pulse” is set by the machine using formulas that input the user’s “pulse at rest,” which can either be entered by the user, or obtained from memory if the user has used the machine before. *Id.*, 8:24–60. The machine includes an LED display “which can emit green, red or yellow light, to inform the user whether he is above, below or” at the target pulse, e.g., within a range of “ $\pm 5$ ” beats, with green indicating “within the target pulse” range, red “above the target,” and yellow “below the target.” *Id.*, 7:49–51, 9:27–30.

### **3. Lubell**

Lubell discloses a fitness monitoring device that measures heart rates, and subjects users to a standardized exercise “stress test protocol.” Ex. 1004, Abstract. As Petitioner admits, the Examiner considered Lubell extensively during prosecution, and allowed the Challenged Claims after the applicant overcame anticipation rejections based on Lubell in multiple office actions. Petition at 7–8.

Lubell discloses a device that calculates “an appropriate fitness parameter,” such as  $VO_{2max}$ , “by automatically pacing the subject through a straightforward training protocol.” Ex. 1004, 2:45–51. Lubell uses “pacing tones” “to establish an exercise cadence . . . at a predetermined pacing rate,” starting with a “first, slow rate,” and the progressing through “faster cadences,” whereby the device “measures the heart rate of the subject” while “he, she, or it is exercising at the prescribed cadence.” *Id.*, 3:30–42 (Lubell teaches that its protocol can also be used with animal subjects). Specifically, Lubell describes a test with preset running speeds of 4, 6, 8, 10, 12, and 14 miles per hour, where the subject is prompted by pacer tones to maintain each speed in “three minute intervals.” *Id.*, 8:61–67. The subject must maintain the prompted speeds until reaching “a maximal heart rate,” or until the subject “feels exhausted” and stops the test. *Id.*, 4:1–3, 8:47–49.

Lubell also discloses a “pacer mode,” in which the device can emit “[a]udio pacing tones,” indicating to the user the pace at which exercise may be maintained within a preset range of “60-80%” of  $VO_{2max}$ , which is referred to as the “fitness training range.” *Id.*, 1:23–29, 4:33–38, 9:58–68. If the user’s  $VO_{2max}$  deviates above the preset 80% limit, the device emits a “higher pitch pacer tone,” and emits a “lower pitch pacer tone” for deviations below the preset 60% limit. *Id.*, 10:1–3.

#### **4. Ceci**

Ceci is a 30-year-old journal article, titled “Self-monitored exercise at three different RPE intensities in treadmill vs field running,” published in *Medicine And Science in Sports And Exercise* in 1991. Ex. 1005. Ceci discloses a study of “self-regulation of exercise” that directed subjects to exercise at various intensity levels in the standardized “Ratings of Perceived Exertion (RPE) scale.” *Id.*, 732. The RPE scale is “subjective,” in that a subject exercises at “the degree of exertion they perceive as related to a certain physical intensity.” *Id.* Ceci directed subjects to run at paces that they subjectively experienced as “light exertion,” “somewhat hard” exertion, and “hard” exertion, which correspond to RPE scale intensity levels 11, 13 and 15, respectively. *Id.*, 734. The subjects’ heart rates were measured as they exercised. *Id.*, 733. Petitioner relies on Ceci only for its alleged disclosure of “subjective instruction” for workout routines (Petition at 15), not for any disclosure of an exercise device or exercise monitoring device.

#### **5. Gorman**

Gorman discloses a monitor that encodes a signal comprising biomedical data, such as “a heartbeat rate,” for the purpose of “wirelessly transmitting the encoded digital signal” to a “display,” such as a “wrist unit.” Ex. 1007, Abstract, 4:14–50. In addition to a “data part” (such as heart rate), the encoded signal also includes an “identification part” that “enables the receiving unit to accept only those signals sent

from the associated chest unit.” *Id.*, 8:41–45. In this manner, two monitors operating in close proximity on the same frequency will not receive and display signals from the wrong user. *Id.*, 4:67–5:2.

## **6. Flach**

Flach discloses a communication system and timing techniques for the real-time transmission and reception of health care data. Ex. 1008, Abstract. Petitioner acknowledges that the Examiner already considered Flach during prosecution. Petition at 20. In fact, in multiple office actions the Examiner rejected claims as obvious under Flach in combination with Lubell, but the applicant overcame those rejections and the Examiner allowed the claims. Exs. 1011, 1013.

Petitioner relies on Flach only for its disclosure of a TDMA (time division multiple access) wireless protocol (using “radio frequency”), that permits the transmission of “data packets” in different “timeslots” (Ex. 1008, at [0016] – [0018]), not for any disclosure of an exercise device or exercise monitoring device.

## **III. LEVEL OF ORDINARY SKILL IN THE ART**

For the purposes of this Preliminary Response only, Nike applies Petitioner’s proposed level of skill in the art: a POSITA for the technology of the ’413 Patent would have had (1) a bachelor’s degree in engineering, computer science, industrial design, biomechanics, or a related field, and (2) at least two years of experience researching, developing, designing, and/or testing fitness or physiological sensors,

wearable devices, physiological or biomechanical devices, remotely-controlled systems or interfaces, wired and wireless communication, network-based applications and/or equipment, or the equivalent experience or education. Petition at 18. Nike reserves the right to further address Petitioner's proposed level of ordinary skill and/or propose a different level of ordinary skill, if the Board institutes trial.

#### **IV. CLAIM CONSTRUCTION**

As a general rule, claim terms are given their "ordinary and customary meaning." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc). The "ordinary and customary meaning" is "the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention." *Id.*, 1313. Petitioner concedes that no claim construction is necessary for the purposes of this proceeding. Petition at 17. Nike agrees. All terms and phrases in the '413 Patent have their ordinary and customary meanings, which are readily apparent, and no further construction is required.

#### **V. THE BOARD SHOULD EXERCISE ITS DISCRETION TO DENY INSTITUTION UNDER 35 U.S.C. § 325(d)**

The Board uses a two-part framework for assessing discretionary denial under § 325(d). First, the Board considers "whether the same or substantially the same art previously was presented to the Office or whether the same or substantially the same

arguments previously were presented to the Office.” *Advanced Bionics, LLC v. MED-EL Elektromedizinische Gerate GmbH*, IPR2019-01469, Paper 6 at 8 (PTAB Feb. 13, 2020) (precedential). Second, if the Board answers the first question in the affirmative, it then asks, “whether the petitioner has demonstrated that the Office erred in a manner material to the patentability of challenged claims.” In applying the *Advanced Bionics* framework, the Board considers the non-exclusive *Becton, Dickinson* factors:

- a) the similarities and material differences between the asserted art and the prior art involved during examination;
- b) the cumulative nature of the asserted art and the prior art evaluated during examination;
- c) the extent to which the asserted art was evaluated during examination, including whether the prior art was the basis for rejection;
- d) the extent of the overlap between the arguments made during examination and the manner in which Petitioner relies on the prior art or Patent Owner distinguishes the prior art;
- e) whether Petitioner has pointed out sufficiently how the Examiner erred in its evaluation of the asserted prior art; and
- f) the extent to which additional evidence and facts presented in the Petition warrant reconsideration of the prior art or arguments.

*Advanced Bionics, LLC*, IPR2019-01469, Paper 6 at 9, citing *Becton, Dickinson & Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8 at 17–18 (PTAB Dec. 15, 2017) (precedential as to § III.C.5, first paragraph). The Board considers *Becton, Dickinson* factors (a), (b), and (d) during the first step of the *Advanced Bionics* framework, and factors (c), (e), and (f) during the second step of the framework. *Advanced Bionics, LLC*, IPR2019-01469, Paper 6 at 9.

**A. *Advanced Bionics* Step 1: The Same Art, Or Substantially The Same Art, Was Previously Presented To The Office During Prosecution**

As to the first step of the *Advanced Bionics* framework, all of Petitioner’s Grounds 1–9 involve the same art, or substantially the same art, that was previously presented to the Office. Collectively, the Grounds rely on six references: Amano, Matsumoto, Lubell, Ceci, Gorman, and Flach. Two of those references—Lubell and Flach—were used by the Examiner during prosecution of the ’413 Patent for multiple anticipation and obviousness rejections, all of which were overcome by the applicant. The remaining four references are substantially the same as other references disclosing the same subject matter that were considered by the Examiner. Ex. 2001, ¶¶77-106.

**1. Grounds 3–5: Lubell And Flach Were Previously Considered, Ceci And Gorman Are Cumulative**

Petitioner does not dispute that Lubell and Flach were used by the Examiner during prosecution for multiple anticipation and obviousness rejections, all of which were overcome by the applicant. Thus, for Lubell and Flach, the same art was previously presented to the Office.

Ceci and Gorman were not cited during prosecution, but each reference is substantially the same as other references disclosing the same subject matter that were considered by the Examiner. In other words, Petitioner’s arguments add nothing new to what was already considered during prosecution.

**a) Ground 3: Lubell + Ceci**

In Ground 3, Petitioner challenges the independent claims 1, 12, and 17 as obvious over Lubell in combination with Ceci. As discussed above, the Examiner undisputedly considered Lubell during prosecution. And Ceci is cumulative of multiple references that were before the Examiner, including “Henry” (U.S. Patent No. 5,769,755, Ex. 2002), and “Fabrizio” (U.S. Patent No. 6,163,718, Ex. 2003). Ex. 2005, at 2 (“All References Considered” by Examiner); Ex. 2001, ¶¶97-104.

Petitioner describes Ceci as a “scientific study” “on *perceived* exertion,” whereby subjects “were asked to adjust their velocity” at three different “exertion” levels, and “researchers measured heart rate at each of the *self-determined exercise*

*intensities*,” or in other words, that Ceci discloses the determination of “heart rate zones from *subjective* instruction.” Petition at 14–15 (emphases added). Petitioner specifically relies on Ceci for its alleged disclosure of “self-determined exercise intensities,” such as “light exertion,” “somewhat hard” exertion, and “hard” exertion (Petition at 14–15), in combination with Lubell for elements [C] and [D] of the independent claims (element [D] also recites the “exertion levels” introduced in element [C]). Petition at 42–45. Petitioner acknowledges that element [C] of the independent claims was amended during prosecution to recite “exertion levels” that are “based on a level of physical fitness or a user,” which the Examiner found was not disclosed by Lubell, which only describes a “prescribed” or “predefined exercise test protocol.” Petition at 39, 41–42.

Petitioner relies upon Ceci for the same subject matter disclosed in Henry. Ex. 2001, ¶¶101-102. Henry also discloses a system that accounts for an “exerciser’s *perceived or actual fitness capacity*” (*id.*, 3:52-63 (emphasis added)), with an “exercise display system for aiding a user in maintaining *a desired exercise intensity level*,” (Ex. 2002, Abstract) (emphasis added), including by monitoring a user’s “exercise intensity level within a fitness training range *tailored to their individual circumstances*.” *Id.*, 1:67–2:3 (emphasis added). Henry recognizes that an “individual’s particular fitness training range” varies, such that, for example, a “fragile 80-year-old female will have a fitness training range that requires *much less*

*exertion* than a 20-year-old male athlete.” *Id.*, 1:59–63 (emphasis added). Henry explains that alternative devices that “suggest a target heart rate” are not “particularly useful in helping the exerciser understand where he or she is in terms of their own fitness training range during a workout.” *Id.*, 2:6–8, 13–16. In contrast, Henry describes a “display system that allows a user to see a spectrum of exercise intensity levels that have been created specifically for that individual,” such that the individual can “adjust his/her exertion level.” *Id.*, 2:21–30. To accomplish this, Henry “detects heart rate” “during a workout,” with those heart rates used to determine “preferably four” “intensity levels unique to the exerciser.” *Id.*, 4:13–54.

Therefore, under *Becton, Dickinson* factor (a), Ceci is substantially the same art as Henry, because Henry also describes workouts where a user can “adjust his/her exertion level” (Ex. 2002, 2:21–30) using multiple (“preferably four”) “intensity levels” that are “unique to the exerciser” (*id.*, 4:13–54), and which account for the “exerciser’s perceived or actual fitness capacity.” *Id.*, 3:52–63; Ex. 2001, ¶102. Petitioner does not acknowledge that the Examiner already considered Henry, let alone identify any alleged material differences between Henry and Ceci. And for similar reasons, under *Becton, Dickinson* factor (b) Ceci is cumulative of art evaluated by the Examiner during prosecution. Specifically, Petitioner’s reliance on Ceci for teaching that “a test protocol could be a self-regulated exercise chosen by a user” (Petition at 42–43), fully overlaps with Henry, which teaches that “a spectrum

of exercise intensity levels that have been created specifically for that individual,” such that the individual can “adjust his/her exertion level.” Ex. 2002, 2:21–30; Ex. 2001, ¶102.

Petitioner also relies on Ceci for the same subject matter disclosed in Fabrizio. Ex. 2001, ¶¶103-104. Fabrizio relates to a “heart rate target zone method and apparatus,” where a “target zone” “can be selectively changed” “*[d]epending upon the physical conditioning of the user.*” Ex. 2003, Title and Abstract (emphasis added). For example, Fabrizio describes a “wristwatch heart rate monitor” where “a lower heart rate limit, upper heart rate limit and maximum heart rate limit” “can be *selectively modified*” by a user as “the progress of the person wearing the monitor permits higher limits.” *Id.*, 2:49, 3:4–16 (emphasis added). In other words, based on “factors such as *physical condition*,” a user has “the option to raise or lower” the various heart rate limits. *Id.*, 3:24-27 (emphasis added). Thus, if a user “wishes to change” heart rate limits, the user can press a “button for incremental change to raise (or lower) the setting.” *Id.*, 3:55–57.

Therefore, under *Becton, Dickinson* factor (a), Ceci is substantially the same art as Fabrizio, because Fabrizio also describes workouts where “the upper and lower limits” of heart rate target zones “can be *selectively modified*” “*[d]epending upon the physical conditioning of the user.*” Ex. 2003, Title and Abstract, 3:12–16 (emphasis added); Ex. 2001, ¶104. Petitioner does not acknowledge that the

Examiner already considered Fabrizio, let alone identify any alleged material differences between Fabrizio and Ceci. And for similar reasons, under *Becton, Dickinson* factor (b) Ceci is also cumulative of Fabrizio. Specifically, Petitioner’s reliance on Ceci for teaching that “a test protocol could be a self-regulated exercise chosen by a user” (Petition at 42–43) fully overlaps with Fabrizio, which teaches a device where a user “can have the option to raise or lower” exercise heart rate limits based on individual “factors such as physical condition.” Ex. 2003, 3:17–31; Ex. 2001, ¶104.

**b) Ground 5: Lubell + Ceci + Gorman**

In Ground 5, Petitioner adds Gorman to the Lubell-Ceci combination as allegedly rendering obvious claims 2–4, 13, and 18. These dependent claims recite, *inter alia*, “heart rate measurements” that are “received in a plurality of encoded messages,” and decoding those “encoded messages using identification data of the sensor.” Petition at 47–51. Petitioner relies on Gorman for its alleged disclosure of an “encoded signal” for use in a “wireless heartbeat monitor” that can be “worn by a person engaged in all forms of physical exercise.” *Id.*, at 15–16. Petitioner claims this encoded signal of Gorman “can include identification data unique to the sensor so the receiver knows the source of the message.” *Id.*

Gorman, however, is cumulative of Yoshimura, which discloses the same “encoded signal” subject matter, and was already considered by the Examiner and

used for obviousness rejections of the same claims. Ex. 1013, at 5 (Examiner: “Regarding claims 2–4, 13 and 18 . . . Lubell is silent as to the use of encoded messages . . . Yoshimura however teaches of a similar device (Fig. 1) in which two sensor signals are monitored [and] each sensor signal is encoded using an ID coded protocol . . . and then decoded [at] the opposite end of the transmission”); Ex. 1011, at 3 (same Examiner quote). Indeed, Yoshimura discloses a “heart rate monitor” with a “wireless transmitting device,” such that data can be transferred “in a wireless manner . . . to be displayed on the screen of” a “data receiver watch.” Ex. 2006, at [0006]–[0007]. In Yoshimura, the heart rate data is “sent to the microprocessor to be encoded by the ID coded protocol,” which is “shown in FIG. 3,” and the “encoded data are then transmitted by the wireless transmitter circuit to the data receiver,” which employs “the ID coded protocol same as the one in the microprocessor” to decode and display the information. *Id.*, at [0008] and [0017].

Under *Becton, Dickinson* factors (a) and (d), Gorman is substantially the same art as Yoshimura (no material differences are identified in the Petition), and Petitioner’s arguments overlap entirely with those made during prosecution. For example, Petitioner argues Gorman discloses that “heart rate data can be sent in encoded digital messages,” and teaches messages with a “unique identification between a transmitter and an associated receiver.” Petition at 49. As shown above, Yoshimura discloses the same type of encoding/decoding protocol using an “ID,”

and the Examiner initially rejected the same claims based on the finding that it “would have been obvious . . . to modify Lubell to include encoding signals with an ID coded protocol . . . as taught by Yoshimura.” Ex. 1013, at 5. Thus, Gorman is cumulative of what was evaluated during prosecution under *Becton, Dickinson* factor (b) for the same reasons.

**c) Ground 6: Lubell + Ceci + Flach**

Petitioner adds Flach to the Lubell-Ceci combination as allegedly rendering obvious claims 9, 14, and 19. For claim 9, Petitioner acknowledges that the Examiner previously considered and used Flach in combination with Lubell for initial rejections, and later allowed the claim at least because Lubell does not disclose claim 1. Petition at 51–53. Petitioner, however, fails to mention that the same occurred during prosecution for claims 14 and 19. Ex. 1013, at 6 (“Claims 6–11, 14–16 and 19–20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lubell . . . further in view of Flach”). Accordingly, the Office has already considered the same art for the additional limitations of these dependent claims.

**2. Grounds 1, 6, and 7: Amano Is Cumulative Of Lubell**

Petitioner relies on Amano for the same subject matter, and using the same arguments, that the Examiner already rejected in allowing the Challenged Claims over Lubell. Ex. 2001, ¶¶81-89. The Examiner found that Lubell does not disclose “prompt[ing] the user to exercise at a plurality of exertion levels,” where the

“exertion levels are based on a level of physical fitness of the user and are specifically chosen by the user,” and “there is no external device ***which is choosing the exercise level.***” Ex. 1015, at 2 (emphasis added). Instead, the device in Lubell selects the exercise levels for the user by “automatically pacing the subject through a straightforward training protocol” at “predetermined” pacing rates using “pacing tones,” so that heart rates can be measured “at the prescribed cadence.” Ex. 1004, 2:45–51, 3:30–43. Lubell describes that a “preferred” version of the “predetermined” protocol paces a subject through speeds of four, six, eight, ten, twelve, and “fourteen miles per hour” for “successive three minute intervals.” *Id.*, 3:58–64. However, in recognition of common sense, Lubell notes that “only a person in superb athletic condition would be expected to run for three minutes at the fastest pace,” and therefore explains that a subject “may terminate the test at an appropriate earlier time,” including when a subject “simply becomes too exhausted to continue.” *Id.*, 8:61–9:12.

Petitioner agrees that Lubell chooses exertion levels for the user with a preset protocol that “starts slow and prompts users through faster cadences.” Petition at 13. And Petitioner does not dispute that Amano discloses the same type of device. For example, Petitioner admits that Amano “***notifies an exerciser to increase their exercise intensity*** after a certain amount of time ***at a particular intensity.***” Petition at 10 (emphases added). Petitioner further admits that Amano uses “beeps that

indicate to the subject the pace they should run.” *Id.* Thus, under *Becton, Dickinson* factor (a), Amano is substantially the same art as Lubell. Ex. 2001, ¶¶83-86.

Petitioner’s argument for using Amano where Lubell already failed rests upon one alleged difference, where Petitioner takes one sentence from Amano out of context, stating that during an exercise test “it is also acceptable for the test subject to vary exercise intensity according to his own preferences.” Petition at 10 (citing Ex. 1002, 13:66-67). Importantly, Petitioner fails to explain that this sentence in Amano does not disclose “prompting” a user to exercise at an “exertion level” that is based on” his or her own “level of physical fitness,” as required by the Challenged Claims. Ex. 2001, ¶¶87-89. Instead, the “test subject” in Amano is “notified to increase exercise intensity by 10%” for each interval, and just as in Lubell, the subject is supposed to “tr[y] to maintain running at” the predetermined “pitch,” until the next “intensity increase” notification is made, at which point the subject is again supposed to “tr[y] to maintain running” at the new intensity level. Ex. 1002, 13:52–55, 14:52–15:5. And again just as in Lubell, Amano recognizes that a subject may not be able to maintain the preset rates prompted by the device, noting that “the test subject may maintain exercise intensity at a constant level, or conversely, may reduce exercise intensity to some extent.” *Id.*, 13:63–66. In other words, Amano explains that each predetermined “10%” increase in workout intensity “is merely *a target*” (*id.*, 13:62–63) (emphasis added), which is only common sense, because no

workout device could **force** a subject to maintain intensity levels that were too difficult. Ex. 2001, ¶¶87-89.

Further, Petitioner fails to acknowledge that Amano only discloses **protocols** that are **predetermined**, and directs users to try running at the predetermined speeds synchronized to an “alarm sound” corresponding “to the pitch of running.” *Id.*, 14:32–35 (emphases added). Accordingly, because Amano does not teach **prompting** a user to exercise at an “exertion level” that is “based on” his or her own “level of physical fitness,” Amano is substantially the same art as Lubell. Ex. 2001, ¶¶87-89. And under *Becton, Dickinson* factor (d), the Examiner already considered and rejected the same argument that an “external device which is choosing the exercise level” can anticipate, by allowing the Challenged Claims over Lubell. Ex. 1015, at 2–3.

Ground 6 adds Gorman for the same dependent claims as discussed for Ground 4 above, and Ground 7 adds Flach for the same dependent claims as discussed for Ground 5 above. Accordingly, Petitioner’s arguments for Grounds 1, 6, and 7 add nothing new to what was already considered during prosecution, and these Grounds are cumulative under *Becton, Dickinson* factor (b). Ex. 2001, ¶¶105-106.

### 3. Grounds 2, 8, and 9: Matsumoto Is Cumulative Of Lubell

For similar reasons as Amano, Matsumoto is also substantially the same art as Lubell. *See* Section V(A)(2). First, Petitioner acknowledges that Matsumoto discloses a device that chooses the exercise level for the subject, just as Lubell does. For example, Petitioner admits that in Matsumoto the “*machine chooses a workout* with several target pulses, from warm-up to full-fledged training.” Petition at 12 (emphasis added). Petitioner further admits that in Matsumoto “the machine sets the initial exertion level targets.” Petition at 31. Thus, under *Becton, Dickinson* factor (a), Matsumoto is substantially the same art as Lubell. Ex. 2001, ¶¶90-96.

Petitioner’s only argument for using Matsumoto where Lubell failed rests upon one alleged difference, namely that Matsumoto refers to “an exercise program that is *suited to* the individual user’s physical fitness.” Petition at 31 (citing Ex. 1003, 4:33–35) (emphasis added). Petitioner glosses over the fact that Matsumoto does not disclose prompting a user to exercise at an “exertion level” that is “*based on*” a user’s own “level of physical fitness,” as required by the claims. Instead, Matsumoto uses an “exercise standard” “table” that selects predetermined exercise programs for a user based only on a “user’s age, sex, [and] weight.” *Id.*, 3:15–55. Ex. 2001, ¶¶94-96. Matsumoto expressly discloses that the preset “data in Table 1” is “used to calculate the user’s exercise program.” *Id.*, 5:20–22. While Matsumoto’s standardized tables may provide exercises “*suited to*” users in various age and

weight classes, that is not equivalent to a specific user's individual fitness level. Ex. 2001, ¶¶94-96. Indeed, Petitioner acknowledges that the workout programs in Matsumoto are “*not subjective*,” and instead are based on “typical fitness tables” that “*estimate* the physical fitness of the user.” Petition at 31–32 (emphases added). Petitioner also does not dispute that in Matsumoto “the *machine sets* the initial exertion level targets” (Petition at 31) (emphasis added), just as the device in Lubell.

Accordingly, because the device in Matsumoto chooses the exertion level, and does so based on a standardized preset table that is not “based on” an individual user's own “level of physical fitness,” Matsumoto is substantially the same art as Lubell. And under *Becton, Dickinson* factor (d), the Examiner already considered and rejected the same argument that an “external device which is choosing the exercise level” can anticipate, by allowing the Challenged Claims over Lubell. Ex. 1015, at 2–3.

Ground 8 adds Gorman for the same dependent claims as discussed for Ground 4 above, and Ground 9 adds Flach for the same dependent claims as discussed for Ground 5 above. Accordingly, Petitioner's arguments add nothing new to what was already considered by the Examiner during prosecution, and these Grounds are cumulative under *Becton, Dickinson* factor (b). Ex. 2001, ¶¶105-106.

**B. *Advanced Bionics* Step 2: Petitioner Does Not Demonstrate That The Office Erred**

Petitioner fails to make any showing under *Becton, Dickinson* factors (c), (e), and (f). With respect to the Lubell and Flach references, Petitioner does not dispute the Examiner's previous determinations, or identify any Office error. Instead, Petitioner conclusively asserts that "Section 325(d) is not at issue" because the Office did not previously consider Lubell in combination with Ceci. Petition at 19-20. But as discussed, under *Becton, Dickinson* factors (a), (b), and (d), the Examiner previously considered Henry and Fabrizio, which are substantially the same art and cumulative of the disclosures in Ceci. While Henry and Fabrizio were not expressly used for rejections, Petitioner has not identified any error in the Examiner's evaluation of the disclosed prior art.

For Amano, Matsumoto, and Gorman, Petitioner does not acknowledge that substantially the same art and same arguments were previously considered and rejected by the Examiner during prosecution. Accordingly, Petitioner has not demonstrated any error, or identified any additional evidence or facts, that warrant reconsideration of the determination that was already made.

The Board should deny institution under § 325(d) because Petitioner's nine asserted Grounds raise the same or substantially the same art or arguments as was

previously before the Office, and Petitioner did not even attempt to show the Examiner erred in considering that art and arguments during prosecution.

**VI. PETITIONER FAILS TO SHOW A REASONABLE LIKELIHOOD OF PREVAILING FOR ANY CHALLENGED CLAIM**

Petitioner bears the burden on institution of demonstrating a reasonable likelihood that it will prevail in showing the unpatentability of at least one Challenged Claim. *SMIC, Ams. v. Innovative Foundry Techs., LLC*, IPR2020-00837, 2020 WL 5991664, at \*5 (PTAB Oct. 9, 2020) (citing 35 U.S.C. §§ 314(a) and 312(a)(3)). To meet its burden, “[i]t is of the utmost importance” that Petitioner “identify ‘with particularity’ the ‘evidence that supports the grounds for the challenge to each claim.’” *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1369 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3)). Conclusory expert opinions that do “not cite to any additional supporting evidence or provide any technical reasoning” are “entitled to little weight” in assessing whether a Petition has demonstrated a reasonable likelihood of prevailing as to at least one challenged claim. *Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 9 at 15 (PTAB Aug. 24, 2022) (precedential).

For the anticipation Grounds 1–2, Petitioner must show a reasonable likelihood of proving that “the four corners of a single, prior art document describe every element of the claimed invention” in the same specific “arrange[ment] as in

the claim.” *See Net Money, Inc., v. Verisign, Inc.*, 545 F.3d 1359, 1371 (Fed. Cir. 2008). The Board regularly denies petitions that “lack particularity or present deficient or conclusory analysis.” *Sinjimoru v. Geneze Innovation Inc.*, IPR2021-00493, Paper 8 at 11 (PTAB July 28, 2021). The requirement for particularity “takes on heightened importance when considered in conjunction with” the “all-or-nothing approach” that applies to decisions on institution. *Adaptics Limited v. Perfect Co.*, IPR2018-01596, Paper 20 at 17 (PTAB Mar. 6, 2019) (informative).

For the obviousness Ground 3, Petitioner must show a reasonable likelihood of proving that “the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made” to a POSITA. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). Petitioner must “articulate specific reasoning, based on evidence of record, to support the legal conclusion of obviousness.” *U.S. Well Servs., LLC v. Halliburton Energy Servs., Inc.*, IPR2022-01163, Paper 9 at 10 (PTAB Dec. 20, 2022). Petitioner cannot rely on conclusory statements or blanket assertions of common sense to fill gaps and missing limitations from the prior art. *Arendi S.A.R.L. v. Apple Inc.*, 832 F.3d 1355, 1362–63 (Fed. Cir. 2016). In addition, there can be no motivation to combine references when one is found to “teach away,” such that a POSITA “upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent

from the path that was taken by the applicant.” *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1327 (Fed. Cir. 2009) (teaching away includes when a reference criticizes, discredits, or otherwise discourages an approach). Furthermore, obviousness cannot be found when a proposed combination would “require the alteration of the principles of operation of” a reference, or render such reference “inoperable for its intended purpose.” *Adidas AG v. Nike, Inc.*, 963 F.3d 1355, 1358–59 (Fed. Cir. 2020).

As discussed for each Ground below, Petitioner has not met its burden of showing a reasonable likelihood of prevailing as to the unpatentability of any Challenged Claim.

**VII. Ground 1: Petitioner Fails To Show That Amano Anticipates Claims 1, 12, And 17**

For independent claims 1, 12, and 17 (as well as dependent claims 5 and 7), Petitioner only relies on Amano for anticipation (not obviousness). Petition at 19. Petitioner, however, fails to show a reasonable likelihood of prevailing because Amano does not disclose at least limitations [C], [D], and [E] of each independent claim. Ex. 2001, ¶¶107-121. Indeed, Petitioner’s assertions in Ground 1 cannot be squared with its admission that the Amano device “*prompt[s] a user* through stages of exercise intensity” using “beeps that indicate to the subject the pace they should run” (Petition at 10), in the same manner as the device in Lubell that the Examiner

agreed “fails to disclose . . . all the limitations of the independent claims.” Ex. 1015, at 9 (emphasis added). Petitioner’s arguments contradict its own admissions, and are not supported by any expert testimony.

**A. Claims [1C], [12C], [17C]: Amano does not disclose prompting a user to exercise at exertion levels “based on a level of physical fitness of a user”**

Limitation [C] of each independent claim recites: “prompt[ing] a user to exercise at a plurality of successive exertion levels, wherein an exertion level is based on a level of physical fitness of a user.” Petitioner fails to show that Amano discloses limitation [C] because Amano prompts a user to exercise at exertion levels that are selected by the machine, and are pre-set to automatically increase in 10% increments. Ex. 1002, 13:51–54; Ex. 2001, ¶¶109-114.

First, Petitioner admits that Amano “prompts a user to increase their *intensity by 10% every 120 seconds*,” which plainly are “exertion levels” selected by the machine. Petition at 22 (emphasis added); Ex. 2001, ¶110. But then Petitioner cites a *different* section of Amano to argue that “[t]his *intensity*, as measured and subsequently increased, is *based on* a user’s stride length and weight, aspects of a user’s physical fitness.” *Id.* (citing Ex. 1002, 12:15–20) (emphasis added). In doing so, Petitioner is improperly conflating the “*exertion levels*” required by the claim, which in Amano are selected by the machine using an “alarm sound” synchronized

to each “10% increase over the previous pitch” (i.e., running pace)<sup>3</sup> (Ex. 1002, 14:54–60) (emphasis added), with measures of the subject’s *workout intensity*, which is a different metric (defined as the variable “W”) that Amano calculates by multiplying the “distance run by the test subject per unit time” and the subject’s “body weight.” *Id.*, 12:15–21 (emphasis added); Ex. 2001, ¶¶111-112. That is, Amano uses the word “intensity” in two different contexts—but the subject’s personal characteristics (e.g., weight, and how fast one can run) are only used when the device calculates a “workout intensity” “W,” whereas when Amano paces a subject through a training routine, the *device* “*prompts* a user to increase their *intensity by 10% every 120 seconds*,” as Petitioner admits. Petition at 22 (emphases added); Ex. 2001, ¶¶111-112.

Second, Petitioner is incorrect that in Amano, “a user can choose subjective exertion levels.” Petition at 22. As addressed in the discretionary denial section above, Amano only “prompts” a user to exercise at “successive exertion levels” that are pre-selected by the machine, and that automatically increase in 10% increments. *E.g.*, Ex. 1002, 13:54–55 (the test subject is “*notified* to increase exercise intensity by 10% each time”) (emphasis added); Ex. 2001, ¶¶113-114. Amano only discloses that these pre-set increases are “merely a target” that the subject does not have to

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<sup>3</sup> Amano defines the “pitch during running” as “the number of steps per unit time,” which is analogous to a running pace, e.g., miles per hour. Ex. 1002, 7:24–26.

follow if, for example, he or she cannot maintain the pace. *Id.*, 13:65–66 (the subject “*may* reduce exercise intensity to some extent”) (emphasis added). However, Amano teaches that a subject must “*tr[y]* to *maintain* running” at the machine-directed paces (*id.*, 15:2–5) (emphasis added), and Petitioner does not identify any disclosure where Amano prompts a subject to choose his or her own pace. Ex. 2001, ¶¶113-114.

For these reasons, Petitioner fails to adequately show that Amano discloses Limitation [C].

**B. Claims [1D], [12D], [17D]: Amano does not disclose determining heart rate zones based on “heart rate measurements” of “the user”**

Limitation [D] of each independent claim recites: “determin[ing] a plurality of heart rate zones based on first heart rate measurements received from a sensor while the user exercises at the plurality of successive exertion levels.” Petitioner fails to show that Amano discloses limitation [D] because at most Amano discloses a single heart rate range (not “a plurality”), and that range is set based on estimates of  $VO_{2max}$ , not “heart rate measurements” of “the user.” Ex. 2001, ¶¶115-118.

First, at most Amano discloses a single heart rate range, which is bounded by an upper and lower heart rate limit. Ex. 2001, ¶116. Petitioner admits that using a subject’s “estimated  $VO_{2max}$ ,” Amano “reads out the pulse rate corresponding to” “50% of  $VO_{2max}$ ” “from the pulse rate table” in Figure 14, and “calculates heart rates

20% above and below this rate and uses them as an upper and lower limit.”<sup>4</sup> Petition at 23; Ex. 1002, 19:40–46, 20:19–28. Then, referring to an entirely different section of Amano, Petitioner annotates Figure 27 with a green section purportedly corresponding to the range between the upper and lower heart rate limits, and argues that Amano also “creates heart rate zones” “below 40%  $VO_{2max}$ ” (labeled yellow) and “greater than 60%”  $VO_{2max}$  (labeled red). Petition at 23–24. Notably, Petitioner *does not cite any support* from the section of Amano that actually discusses Figure 27, which actually reveals that Amano does not disclose what Petitioner claims. For example, there is no teaching in Amano of zones “below 40%  $VO_{2max}$ ” and “greater than 60%”  $VO_{2max}$ , *because Figure 27 does not depict  $VO_{2max}$* .<sup>5</sup> Ex. 1002, 24:63–26:32 (emphasis added); Ex. 2001, ¶117. Instead, Figure 27 is a “timing chart” for the device’s “pitch maker,” which compares a user’s “pulse rate” to “the user’s pitch at the current point in time,” e.g., “160 steps/min for the example shown in FIG. 27.” *Id.*, 25:18–34; Ex. 2001, ¶117. The device uses this comparison to determine the “pitch sound” generated by the “sound releaser.” *Id.* In other words, the vertical

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<sup>4</sup> Amano focuses on  $VO_{2max}$ , and discusses a single “appropriate exercise intensity” range, which is defined by lower and upper heart rate limits set at 80% and 120% of a typical person’s heart rate when exercising at 50% of  $VO_{2max}$ , or in other words as Petitioner describes it, a range that essentially corresponds to 40% and 60% of  $VO_{2max}$ . Ex. 1002, 3:35–38, 19:40–46, 20:14–28; Petition, at 23.

<sup>5</sup> Figure 27 is “a timing chart for explaining the operation of the pitch maker.” Ex. 1002, 5:7–8, Fig. 27.

axes in Figure 27 depict heart rate measurements and pitch rates (i.e., running speeds). *Id.* This section of Amano does not mention anything about different “zones,” and Petitioner’s annotation of Figure 27 with different colors for different  $VO_{2\max}$  levels is pure attorney argument, unsupported by any evidence or citation to expert opinion. Such unsupported attorney argument is insufficient to support Petitioner’s asserted ground.

Second, even if Amano discloses a single heart rate range, the upper and lower limits are set by estimating the user’s  $VO_{2\max}$  (not “heart rate measurements” of “the user”), reading off the “target” heart rate from the table shown in Figure 14 (which corresponds to the heart rate of an “*average person*” at 50% of  $VO_{2\max}$ ), and multiplying that *average person*’s heart rate by 0.8 to obtain the lower limit, and by 1.2 to obtain the upper limit. Ex. 1002, 19:40–46, 20:20–28 (emphases added); Ex. 2001, ¶118. Thus, even if Amano uses various heart rate measurements to estimate a user’s  $VO_{2\max}$ , those measurements are discarded for purposes of selecting the user’s target heart rate, which is simply read from the table in Figure 14 and **does not change** “based ... on the user.” Ex. 2001, ¶118. Further, Petitioner admits that Amano sets the upper and lower limits using a “20%” coefficient that **does not change** for different users. Petition at 23 (emphasis added); Ex. 2001, ¶118.

For these reasons, Petitioner fails to adequately show that Amano discloses Limitation [D].

**C. Claims [1E], [12E], [17E]: Amano does not disclose instructing a user to exercise while maintaining heart rate “within a particular one of the plurality of heart rate zones”**

Limitation [E] of each independent claim recites: “generat[ing] a prompt instructing a user to exercise while maintaining heart rate within a particular one of the plurality of heart rate zones.” Petitioner fails to show that Amano discloses limitation [E], because at most Amano prompts a user to exercise within a single range (*see* Section VII(B)), not “a particular *one of the plurality* of heart rate zones.” Amano only prompts a user to exercise within a single range bounded by an upper and lower heart rate limit, and in fact warns the user with sounds to indicate if the user’s heart rate strays below or above the limits. Ex. 1002, 25:17–26:29; Ex. 2001, ¶¶119-121. Petitioner’s expert agrees, as he opines that Amano “prompts users to exercise while maintaining their heart rate *within the calculated zone*,” singular. Ex. 1009, ¶76 (emphasis added).

Petitioner’s argument that the LED meter shown in Figure 51 discloses this limitation is also incorrect. Petition at 24–25; Ex. 2001, ¶¶120-121. Figure 51 of Amano discloses an “exercise intensity meter” (element 605, which Petitioner annotates in blue) with LED lights spaced at intervals of 10% within an intensity range of 0%–200%, such that a portion of the “LEDs are illuminated” that correspond to the “exercise intensity target value.” Ex. 1002, 39:7–17. In other words, the meter in Figure 51 does not depict any *heart rate* measurements, let alone

a “plurality of heart rate zones,” and Petitioner cites no support to the contrary. Ex. 2001, ¶¶120-121. Further, Petitioner cites no support for the argument that the meter in Figure 51 “prompts” a user to “maintain[] heart rate” within a zone. In fact, Amano discloses that the meter only displays “the exercise intensity current value,” so that “the user is able to know that the intensity of exercise is too great by looking at the display” and change pace, not maintain it. Ex. 1002, 39:31–32; Ex. 2001, ¶¶120-121.

For these reasons, Petitioner fails to adequately show that Amano discloses Limitation [E].

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Petitioner has not shown a reasonable likelihood of success for any claim challenged in Ground 1 because Amano does not disclose Limitations [C], [D], or [E] of each independent claim.

#### **VIII. Ground 2: Petitioner Fails To Show That Matsumoto Anticipates Claims 1, 12, And 17**

Because Matsumoto has (at least) the same deficiencies as Amano, Petitioner’s Ground 2 arguments largely mirror those in Ground 1, and therefore fail for similar reasons.

For independent claims 1, 12, and 17 (as well as dependent claims 5 and 7), Petitioner also only relies on Matsumoto for anticipation (not obviousness). Petition

at 19. Petitioner fails to show a reasonable likelihood of prevailing because Matsumoto similarly does not disclose at least limitations [C], [D], and [E] of each independent claim. Ex. 2001, ¶¶122-134. Yet again, Petitioner’s assertion of Ground 2 cannot be squared with its admission that the Matsumoto device “*chooses* a workout” for the user, “from warm-up to full-fledged training” (Petition at 12) (emphasis added), in the same manner as the device in Lubell that the Examiner agreed “fails to disclose . . . all the limitations of the independent claims.” Ex. 1015, at 9. Petitioner’s arguments contradict its own admissions, and also are not supported by any expert testimony.

**A. Claims [1C], [12C], [17C]: Matsumoto does not disclose prompting a user to exercise at exertion levels “based on a level of physical fitness of a user”**

Limitation [C] of each independent claim recites: “prompt[ing] a user to exercise at a plurality of successive exertion levels, wherein an exertion level is based on a level of physical fitness of a user.” Petitioner fails to show that Matsumoto discloses limitation [C] because Matsumoto prompts a user to exercise at exertion levels that are selected by the machine from a pre-programmed “exercise standard” table, with successive exertion levels that automatically increase the pace in pre-set increments. Ex. 2001, ¶¶124-127.

First, Petitioner admits that in Matsumoto “the *machine sets* the initial exertion level targets,” and that “the *machine* increases the intensity level.” Petition

at 30–31 (emphases added). Matsumoto discloses pre-set exercise programs that set “target pulse[s]” and “exercise time[s].” Ex. 1003, 1:48–49. To accomplish this, Matsumoto is programmed with an “exercise standard” “table” from which predetermined exercise programs are selected, based only on “age, sex, [and] weight” information entered by the user. Ex. 1003, 3:15–55. Matsumoto expressly discloses that the preset “data in Table 1” is “used to calculate the user’s exercise program,” and the machine continues to select programs of increasing intensity from the table until the “highest level” is reached, at which point “the person continues at this level” for future workouts. *Id.*, at 4:15–18, 5:20–22. In other words, after a user begins exercising at the workout level set by the machine, Matsumoto automatically increases the pace in preset increments, based on the data in the “exercise standard” table. In fact, Petitioner acknowledges that the exercise selected by the machine may only be “*suited to*” a user (Petition at 31) (emphasis added), which is not “based on” the user’s individual “physical fitness,” as required by the claim. Ex. 2001, ¶¶125–127. In addition, Matsumoto discloses warmup routines where the user begins “warming up” at a “target pulse (PN)” that is also set by the machine using a different table (Table 2), and then after a “one minute timer expires,” the machine looks up the current target pulse from Table 2, and increases the pace to the next target pulse selected from that table. Ex. 1003, 5:25–55 (showing target pulses increasing in pre-set increments from 100, to 120, to 130, etc.). In other words,

during warmups Matsumoto also prompts a user to exercise at successive “exertion levels” that are selected by the machine, and do not vary for different users. Ex. 2001, ¶127. Accordingly, Matsumoto does not prompt a user to exercise at levels “based on a level of physical fitness of” the user.

For these reasons, Petitioner fails to adequately show that Matsumoto discloses Limitation [C].

**B. Claims [1D], [12D], [17D]: Matsumoto does not disclose determining “a plurality of heart rate zones” based on heart rate measurements “received from a sensor while the user exercises”**

Limitation [D] of each independent claim recites: “determin[ing] a plurality of heart rate zones based on first heart rate measurements received from a sensor while the user exercises at the plurality of successive exertion levels.” Petitioner fails to show that Matsumoto discloses limitation [D] because at most Matsumoto only discloses a single “heart rate” range (not “a plurality” of “zones”) around a single target pulse rate, and the target pulse rate of that range is calculated by the machine using a pre-set formula that considers a subject’s *resting* heart rate, not “heart rate measurements received . . . while the user *exercises at the plurality* of successive exertion levels” recited in limitation [C]. Ex. 2001, ¶¶128-131.

As an initial matter, for this limitation’s “heart rate zones,” Petitioner improperly relies (in part) on the same disclosures of Matsumoto that it previously argued disclose the “successive exertion levels” of limitation [C]. Citing different

sections of Matsumoto discussing two different embodiments, Petitioner argues for this limitation that the “target pulses” in Table 2 of Matsumoto are also “heart rate zones,” allegedly because there is a range around each target pulse, “e.g., target pulse  $\pm 5$ .” Petition at 32–33; Ex. 1003, 5:29–33, 7:50–51 (columns 5 and 7 describe different embodiments). There are at least two problems with Petitioner’s argument.

First, Petitioner already argued that the target pulses in Table 2 correspond to the “plurality of successive *exertion levels*” recited in limitation [C]. Petition at 30–31 (emphasis added). Citing the embodiment described in column 5 of Matsumoto (which includes the pre-set target pulses of Table 2) Petitioner argued that the Matsumoto “machine increases the intensity level and prompts the user to reach a new heart rate,” and “repeats this escalation successively,” which according to Petitioner purportedly corresponds to “prompt[ing] a user to exercise at a plurality of *successive exertion levels*.” *Id.* (emphasis added). But this limitation [D] requires a distinct “plurality of *heart rate zones based on* first heart rate measurements” received “while the user exercises at *the plurality of successive exertion levels*” that have their antecedent basis in limitation [C]. The same disclosure in Matsumoto cannot supply this distinct limitation. Ex. 2001, ¶¶130-131.

Second, Petitioner improperly mixes different Matsumoto embodiments in an *anticipation* ground. In the embodiment just discussed, column 5 of Matsumoto discloses a program for “warming up” to “full scale training” that “increase[s] the

user's [target] pulse" "a minute at a time" using preset increments (such as those in Table 2). Ex. 1003, 5:33–61. But in a different embodiment (e.g., "FIG. 10 illustrates another embodiment of this invention"), Matsumoto discloses a different program that calculates a *single* "target pulse" using a pre-set formula (not selecting the target pulse from a table), and tracks the user's pulse against that single "target pulse zone (e.g., target pulse  $\pm 5$ ).” *Id.*, 7:36–55 (emphasis added). This concept of a "target pulse  $\pm 5$ " "zone" is not discussed in Matsumoto with respect to the "target pulses (PN)" in Table 2, which relates to a different embodiment. Ex. 2001, ¶¶130-131.

Accordingly, there is no support for Petitioner's contention that "each of these target pulses (PN)," in Table 2, "are really *zones* around each target." Petition at 33 (emphasis added). Yet Petitioner's apparent first argument for this limitation relies on that misreading of Matsumoto, as Petitioner contends that "[s]ince there are numerous pulse targets in an exercise program, the device is calculating a plurality of these heart rate zones." Petition at 33. But as shown above, the "numerous pulse targets in an exercise program" that Petitioner refers to are the *same* "pulse targets" Petitioner contends supply the "plurality of successive exertion levels" required in limitation [C], and in any case, those "pulse targets" are set by the machine, and are not based on the user's heart rate measurements. Petitioner's first apparent argument fails. Ex. 2001, ¶¶130-131.

Petitioner's second apparent argument is that "heart rates detected in the first exercise session" of Matsumoto are used to "determine the heart rates in the subsequent sessions," which purportedly include "not just a single heart rate but heart rate zones." Petition at 32. Petitioner is incorrect, and the cited portions of Matsumoto do not support this contention. Petitioner refers to an embodiment of Matsumoto that only teaches the use of one "target pulse," where during exercise "the user's pulse is measured and compared with *the target pulse*," singular. Ex. 1003, 7:36–53 (emphasis added). The user's pulse during exercise may be "measured and displayed along with the target pulse" using LED lights, such that green lights show whether the user is exercising at the target pulse, for example a "zone" within  $\pm 5$  beats of the target pulse. *Id.*, 7:50–51, 9:36–40. Therefore, to the extent Matsumoto discloses a "heart rate zone," there is only a single "zone," not "a plurality." Ex. 2001, ¶129. However, even this single "zone" is not determined "*based on first heart rate measurements* received from a sensor *while the user exercises* at the *plurality of successive exertion levels*." Instead, Matsumoto calculates the single "target pulse" with a formula that uses the subject's "pulse at rest." *Id.*, 8:55–60. And the device obtains the "pulse at rest" value either by the user entering it into a keypad (for "people using the machine for the first time"), or by using the resting pulse from "previous data that has been memorized" (for "[p]eople that have used the machine before"). *Id.*, 8:24–31; Ex. 2001, ¶¶130–131.

In other words, in this second scenario where the device uses data “memorized” from a previous session, it is the subject’s “pulse *at rest*” that is used to set the single “target pulse,” not heart rates measured while the user exercised “at the *plurality of successive exertion levels*” in limitation [C].

For these reasons, Petitioner fails to adequately show that Matsumoto discloses Limitation [D].

**C. Claims [1E], [12E], [17E]: Matsumoto does not disclose prompting a user to exercise within a “a particular one of the plurality of heart rate zones”**

Petitioner’s arguments for limitation [E] fail largely for the same reasons as discussed for limitations [C] and [D]. First, Petitioner contends that “[d]uring the exercise program, the machine will prompt the user” to exercise at one of the preset “Pulse” rates. Petition at 34 (citing Ex. 1003, 5:61). But as discussed above, Petitioner already argued that these target pulse rates (disclosed in column 5 of Matsumoto) correspond to the “plurality of successive *exertion levels*” recited in limitation [C], which therefore cannot also correspond to the separately recited “plurality of *heart rate zones*” in limitation [D]. Accordingly, for the same reasons as discussed for limitation [D], column 5 of Matsumoto does not disclose prompting a user to exercise within a “heart rate zone,” because the machine’s preset target pulse rate “exertion levels” are not heart rate zones. *See* Section VIII(B); Ex. 2001, ¶¶132-134.

Petitioner's second argument is that Matsumoto's use of "a graphical representation and flashing LEDs to show current heart rate compared to target heart rate" (an embodiment discussed in column 9, and Figure 13) discloses "prompt[ing] the user to exercise in the target pulse zone." Petition at 34–35. For multiple reasons, this argument also fails. First, Petitioner does not explain how a display that compares a user's "current heart rate" to a "target heart rate" discloses "a *prompt instructing* a user to *exercise*." Petitioner identifies no such "prompt" or "instructing." Instead, Petitioner points to the display of Figure 13 showing a user's "pulse" compared to the "target pulse" (represented by a "bar graph and digital display"), along with the workout's "elapsed time" and "speed." Petition at 34–35 (citing Ex. 1003, 9:23–26). None of these components relate to generating a prompt. Indeed, and as acknowledged by Petitioner, the display's "red, green, or yellow" LEDs merely indicate "whether a user is above, at, or below the target zone." Petition at 34; Ex. 2001, ¶134.

Second, even if merely informing a user when he or she is exercising within "the target pulse zone" could correspond to "generat[ing] a prompt instructing a user" to exercise in a particular zone, Matsumoto at most only discloses one such "zone," not a plurality. *See* Section VIII(B); Ex. 2001, ¶134. Thus, because Matsumoto does not disclose the "plurality of heart rate zones" in limitation [D],

Matsumoto also cannot disclose prompting exercise “within a particular *one of the plurality* of heart rate zones” in limitation [E].

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Petitioner has not shown a reasonable likelihood of success for any claim challenged in Ground 2 because Matsumoto does not disclose Limitations [C], [D], or [E] of each independent claim.

**IX. Ground 3: Petitioner Fails To Show That Lubell And Ceci Render Obvious Claims 1, 12, And 17**

Petitioner does not dispute the Examiner’s previous finding that Lubell does not anticipate independent claims 1, 12, and 17, at least because Lubell only discloses a “prescribed,” standardized exercise routine with exertion levels that are chosen by the device, not by a user, while all three independent Challenged Claims require exertion levels that are “based on a level of physical fitness of a user.” Petition at 39, 41 (admitting that in Lubell, a user’s physical fitness level “is not used to set the exertion levels of the initial test”). Petitioner relies on a “self-regulated exercise chosen by a user” in Ceci to fill the gap, but does not identify any teaching or suggestion in Lubell that would have led a POSITA to modify its admittedly “prescribed” exercise protocol. *Id.*, 42–44; Ex. 2001, ¶¶140-148. In fact, Lubell expressly teaches away from such combination, as it disparages “previously-proposed fitness monitoring systems” where a user exercises “at whatever speed he

or she desires,” because such an approach was “not universally applicable.” Ex. 1004, 2:1–10; Ex. 2001, ¶143. Instead, Lubell claims “an object of this invention” is a device that “automatically pac[es] the subject through a straightforward training protocol,” and teaches away from other systems allowing “runners to pace themselves at various speeds.” *Id.*, 2:35–51; Ex. 2001, ¶143. Accordingly, Petitioner failed to show a reasonably likelihood of proving that the combination of Lubell and Ceci discloses limitations [C] and [D], and failed to provide a motivation to modify or combine the references sufficient for institution.

Further, Petitioner also fails to show a reasonable likelihood of prevailing because Lubell does not disclose limitations [E] and [G] of the independent claims (for which Petitioner relies only on Lubell, not Ceci), which require “a prompt instructing a user to exercise” within “a particular one of the plurality of heart rate zones” determined “based on” “heart rate measurements.” Ex. 2001, ¶¶135-139.

**A. A POSITA Would Not Have Been Motivated To Combine Lubell With Ceci To Meet Limitations [C] Or [D]**

For limitation [C], Petitioner admits that the “test described in Lubell is the same for every user, regardless of their fitness level” and thus Lubell does not disclose exertion levels “based on a level of physical fitness of a user.” Petition at 39. However, Petitioner argues it would have been obvious “to direct a user to

choose their exertion level, based on a perceived level of exertion tied to their innate fitness ability.” *Id.*

To fill the gap, Petitioner relies on Ceci for its “self-regulated exercise” protocol “chosen by a user.” Petition at 42. Ceci is a journal article about runners exercising at subjective exertion levels. *Id.* Ceci discloses a study that used a Ratings of Perceived Exertion (“RPE”) scale to “to compare the outcome of running exercise performed on a treadmill (laboratory) and an outdoor track (field).” Ex. 1005, at 1. Ceci studied self-monitored exercise at three different RPE intensities, directing its subjects to run at speeds they subjectively experienced as “light exertion,” “somewhat hard” exertion, and “hard” exertion. *Id.*, at 3. The subjects’ heart rates were measured at each level. *Id.*, at 2.

Petitioner’s purported motivation to combine Lubell and Ceci is insufficient to support institution. For obviousness grounds, Petitioner must demonstrate not only that a POSITA *could* have made the proposed combination, but that a POSITA *would* have been motivated to do so. *See InTouch Techs., Inc. v. VGO Commc’ns, Inc.*, 751 F.3d 1327, 1352 (Fed. Cir. 2014) (emphasis added). Petitioner fails to provide a reason why a POSITA would have been motivated to combine Lubell with Ceci’s “self-regulated exercise” protocol.

First, there is no support for Petitioner’s argument that there “is motivation in Lubell to use *other tests* in other circumstances,” where such “other tests” could

encompass “a self-regulated exercise” “test protocol” “chosen by a user.” *See* Petition at 42 (emphasis added); Ex. 2001, ¶¶142-143. Petitioner cites a portion of Lubell disclosing that the claimed invention is “intended for use with a human subject using *running*,” but also “could be suitably adapted for use when *cycling, swimming, or some other exercise* . . . [using] a *suitable submaximal exercise test protocol*.” *Id.*; Ex. 1004, 5:6–13 (emphases added). Petitioner argues that this “suitable” “test protocol could be a self-regulated exercise chosen by a user” (Petition at 42), but Lubell does not mention “self-regulated exercise.” This excerpt merely refers to tests used for exercises *other than running*. And Lubell only describes a “submaximal exercise tolerance test” as one using “a predetermined pacing rate”—and thus any “other” “suitable” test protocols would also use pacing rates *set by the device*. Ex. 1004, 3:32–34 (emphasis added). Indeed, this section of Lubell goes on to discuss that the claimed invention “could be adapted for monitoring the training of non-human subjects, such as race horse or dogs,” and it would be non-sensical to suggest that a dog or race horse could choose a “self-regulated exercise” protocol. *Id.*, 5:14–16; Ex. 2001, ¶¶142-143.

Petitioner’s expert provides no support for the argument that a POSITA would have been motivated to use self-regulated test protocols with Lubell. *Id.*, at 42 (citing Ex. 1009, ¶¶ 89–93); Ex. 2001, ¶¶142-147. First, citing the same section as Petitioner, Dr. Lynch opines that Lubell “teaches that another ‘suitable submaximal

exercise test protocol could be used.” Ex. 1009, ¶ 90. Dr. Lynch provides no further explanation, and does not point to any teaching or suggestion in Lubell relating to self-regulated test protocols. *Id.* Second, Dr. Lynch offers the conclusory opinion that the “architecture already exists in the device of Lubell to support” a different test protocol, which he presumably means would include a self-regulated test protocol. *Id.*, ¶ 93. But again, Dr. Lynch provides no further explanation of this so-called “architecture,” or how Lubell would support the use of a self-regulated test protocol. Dr. Lynch’s conclusory opinions should be afforded no weight. *See Xerox Corp.*, IPR2022-00624, Paper 9 at 15 (precedential); Ex. 2001, ¶¶146-147.

Second, Lubell actually disparages the use of self-regulated test protocols. Indeed, Lubell explains that “previously proposed fitness monitors” allowed “runners to *pace themselves* at various speeds.” Ex. 1004, 2:35–37 (emphasis added). Lubell, in contrast, claims that an object of the invention is “*automatically* pacing the subject through a straightforward training protocol,” in order to “*avoid[] the drawbacks* of the previously proposed devices.” *Id.*, 2:45–51 (emphases added). Lubell therefore teaches away from the self-regulated exercise protocols of Ceci, where the subject exercises “at whatever speed he or she desired.” *Id.*, 2:1–4; Ex. 2001, ¶¶142-144.

Third, Petitioner’s conclusory arguments that a POSITA could have combined Lubell with Ceci “because it is a simple substitution of one test for another,” and

because “it is applying a known technique (RPE test protocol) to a known device (Lubell health fitness monitor),” also lack support. Petition at 43–44; Ex. 2001, ¶146. As an initial matter, Petitioner relies on the same incorrect argument (discussed above) that Lubell teaches “that a different exercise protocol could be used.” *Id.* Petitioner also relies on Dr. Lynch, who does not provide sufficient support. *Id.* (citing Ex. 1009, ¶¶ 89–93). Dr. Lynch again repeats the same incorrect reading of Lubell (*id.*, ¶ 92 (a POSITA “would have had the motivation to add another test to Lubell, since Lubell explicitly mentions the possibility”)). Ex. 2001, ¶146. Next, Dr. Lynch opines that a “POSITA would have been aware of the existence of the RPE scale and its effectiveness at prompting exercise at various levels” (*id.*), but offers no explanation why a POSITA **would have** considered such a different test protocol, when Lubell already teaches a protocol where the user is automatically paced through an exercise program with increasing exertion levels. Ex. 2001, ¶147. Further, while Dr. Lynch opines that a POSITA supposedly “would have recognized that an RPE test protocol,” like in Ceci, “would give the device in Lubell more flexibility and would be a way to base the graded levels of the initial test on the physical fitness of the user” (*id.*), he provides no support or explanation for why a POSITA **would have** sought out such alleged “flexibility,” when Lubell teaches a protocol for estimating  $VO_{2max}$  using equations that take advantage of the Van der Walt relationship, which requires exercise until the subject “attains his

maximum heart rate, or simply becomes too exhausted to continue.” Ex. 1004, 9:8–9; Ex. 2001, ¶¶144, 146-147. Neither Petitioner nor Dr. Lynch provides any support or explanation for how the Lubell device and protocol could be compatible with self-regulated exercise protocols, like the one in Ceci. *Id.*

For limitation [D], which recites “a plurality of heart rate zones based on first heart rate measurements received from a sensor while the user exercises,” Petitioner argues that Lubell only discloses “heart rate zones” based on “VO<sub>2max</sub>,” not “heart rate measurements.” Petition at 43. To fill this admitted gap, Petitioner argues it would have been obvious to “use the heart rate zones found in an RPE test” like Ceci. *Id.*, at 44. This argument fails for two reasons.

First, Ceci does not disclose the claimed “heart rate zones.” Petitioner acknowledges that Ceci directed subjects to exercise at different *exertion* levels (not “heart rate zones”), including “light, somewhat hard, and hard exertion,” where the “heart rate was tracked.” Petition at 45 (citing Ex. 1005, at 3). Ceci only discloses the “mean values” for subjects’ heart rates measured during each exertion level, e.g., “105.3” beats per minute on a treadmill, compared to “140.7” beats per minute on the field, at RPE exertion level 11. Ex. 1005, at 4 (Figure 2, Session 1). Ceci does not actually refer to any “heart rate *zones*,” and Petitioner does not contend otherwise.

Instead, citing only to Dr. Lynch, Petitioner contends that a POSITA could “*use* [Ceci’s] measured heart rates to directly determine heart rate zones.” Petition at 45 (citing Ex. 1009, ¶¶ 91–92) (emphasis added). But Dr. Lynch only describes Ceci as teaching that “optimal” exercise intensity “should vary between 65% and 90% of maximal heart rate,” and offers the conclusory opinion that a POSITA would have been “motivated to use the heart rates measured at different RPE levels, as described in Ceci, *as the basis for* the heart rate zones in Lubell [correlating to]  $VO_{2max}$ .”<sup>6</sup> Ex. 1009, ¶¶ 91–92 (emphasis added). Dr. Lynch does not explain how Ceci’s mean heart rates could be used as the basis for setting Lubell’s  $VO_{2max}$  “zones,” particularly where Ceci did not measure  $VO_{2max}$ .<sup>7</sup> See also Ex. 1009, ¶¶ 65–69; Ex. 2001, ¶148. Dr. Lynch also does not provide any support for motivation to combine, merely opining that the “results of Ceci indicate that the heart rate and the perceived exertion, which is related to the user’s physical fitness, are closely linked for a given user.” *Id.*, ¶ 92. But even if true, Lubell teaches that  $VO_{2max}$  is also

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<sup>6</sup> Other than Dr. Lynch’s conclusory opinion, Petitioner offers the same insufficient motivation to combine arguments as for limitation [C] above. Petition at 45 (“a POSITA would have been motivated to combine Ceci with Lubell” for “the same reasons described above”).

<sup>7</sup> In fact, Ceci’s only reference to  $VO_{2max}$  is that “[p]revious studies” investigated “different physiological parameters,” including “oxygen uptake.” Ex. 1005, at 6.

related to a user's physical fitness,<sup>8</sup> and Dr. Lynch does not explain why a POSITA would have been motivated to modify the  $VO_{2max}$ -based “zone” of Lubell with the entirely different mean heart rate parameters measured in Ceci. Ex. 2001, ¶148.

Petitioner has not adequately shown that the combined teachings of Lubell and Ceci meet limitations [C] and [D] or that a POSITA would have been motivated to combine with relied upon teachings.

**B. Lubell Does Not Disclose Limitations [E] Or [G]**

For Ground 3, Petitioner relies only on Lubell (not Ceci) for limitations [E] and [G], and Petitioner does not show Lubell discloses these limitations. Ex. 2001, ¶¶135-139.

First, Lubell does not disclose limitation [E] (“generat[ing] a prompt instructing a user to exercise while maintaining heart rate within a particular one of the plurality of heart rate zones”), or limitation [G] (“determin[ing] whether the second heart rate measurements are within the particular heart rate zone”) because Lubell does not disclose limitation [D] – namely, Lubell does not disclose “heart rate zones” that are *based on* heart rate measurements. See Section IX(A); Ex. 2001, ¶¶137-139.

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<sup>8</sup> According to Lubell, “[g]enerally, this fitness index  $VO_{2max}$  is higher, the greater the level of fitness is for a given individual.” Ex. 1004, 1:49–51.

Second, Lubell also does not disclose limitation [E] because it does not generate “a prompt instructing a user to exercise” within “*one of the plurality* of heart rate zones.” As Petitioner admits, in a “pacer mode” Lubell “prompt[s] a user to run *at a particular velocity*,” which is not a “heart rate zone,” and while running at that velocity warns the user if the  $VO_{2max}$  deviates “above 80%” or “below 60%.” Petition at 45–46 (emphasis added). Indeed, if the user’s  $VO_{2max}$  rises “above 80%,” Lubell sounds a “higher pitch pacer tone” instructing the user to “*slow down*, as necessary, to maintain his speed within the training range of 60 to 80 percent.” Ex. 1004, 10:33–38 (emphasis added); Ex. 2001, ¶138. In other words, at most Lubell teaches a “prompt instructing” a user to exercise at a single range corresponding to “60 to 80 percent”  $VO_{2max}$ , and Petitioner fails to show that Lubell instructs a user to exercise within any other  $VO_{2max}$  range. *Id.* Thus, Lubell also does not disclose “a prompt instructing a user to exercise” within “*one of the plurality*” of “zones.”

For these reasons, Petitioner has not shown a reasonable likelihood of success in proving unpatentability for any claim challenged in Ground 3.

## **X. CONCLUSION**

For the reasons set forth above, Nike respectfully requests that the Board deny institution of the Petition for all Challenged Claims of the '413 Patent.

Dated: April 20, 2023

Respectfully submitted,

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**CERTIFICATE OF WORD COUNT**

The undersigned certifies that this preliminary response complies with the type-volume limitations of 37 C.F.R. § 42.24(a)(1)(i). This preliminary response (including figure labels and annotations) contains 13,698 words as calculated by the “Word Count” feature of Microsoft Office 365 Word application, the word processing program used to create it, and manual counting of the annotations in the figures.

The undersigned further certifies that this preliminary response complies with the typeface requirements of 37 C.F.R. § 42.6(a)(2)(ii) and typestyle requirements of 37 C.F.R. § 42.6(a)(2)(iii). This preliminary response has been prepared in a proportionally spaced typeface using Microsoft Office 365 Word application in Times New Roman 14 point font.

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**CERTIFICATE OF SERVICE**

Pursuant to 37 CFR §§42.6(e)(4)(i) et seq. and 42.105(b), the undersigned certifies that on April 20, 2023, a true and entire copy of this **PRELIMINARY RESPONSE OF PATENT OWNER NIKE, INC TO IPR2023-00438**, and all supporting exhibits, were served via e-mail to the Petitioner by serving the correspondence address of record, indicated below.

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