UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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APPLE, INC.,
Petitioner,

v.

OMNI MEDSCI, INC.,
Patent Owner.

———————

IPR2021-00453
Patent 10,517,484 B2

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Before GRACE KARAFFA OBERMANN, BRIAN J. McNAMARA,
and SHARON FENICK, *Administrative Patent Judges.*

McNAMARA, *Administrative Patent Judge.*

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I.   INTRODUCTION

Apple, Inc. ("Petitioner") filed a petition, Paper 1 ("Petition" or "Pet."), to institute an *inter partes* review of claims 1–23 (the "challenged claims") of U.S. Patent No. 10,517,484 B2 ("the '484 patent"). 35 U.S.C. § 311. Omni MedSci, Inc. ("Patent Owner") filed a Preliminary Response, Paper 6 ("Prelim. Resp."), contending that the Petition should be denied as to all challenged claims. We have jurisdiction under 35 U.S.C. § 314, which provides that an *inter partes* review may not be instituted unless the information presented in the Petition "shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition."

A decision to institute under § 314 may not institute on fewer than all claims challenged in the petition. 37 C.F.R. § 42.208(a) (2021). Having considered the arguments and the associated evidence presented in the Petition and the Preliminary Response, for the reasons described below, we institute *inter partes* review of all challenged claims on all challenge grounds.

II.   REAL PARTIES IN INTEREST

The Petition identifies Apple, Inc. as the sole real party-in-interest. Pet. 1. Patent Owner identifies itself as the sole real party-in-interest. Paper 3, 1.

III.   RELATED MATTERS

The Petition states that the '484 patent is asserted against Petitioner in the following litigation: *Omni MedSci, Inc. v. Apple Inc.*, Action No. 2-20-cv-00563-YGR (N.D. Cal.) (pending). The Petition identifies several related U.S. patents and pending U.S. patent applications (*id.* at 1–2), litigations asserting the related patents against Petitioner (*id.* at 3), and *inter partes*

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reviews concerning the related patents (*id.*). The Petition states "[t]he '484 patent is not subject to any other proceedings before the Office." *Id.*

<h2 style="text-align:center">IV. THE '484 PATENT</h2>

The '484 patent concerns a device that can be placed on a user's ear or wrist to measure a physiological parameter. Ex. 1001 (code 57). A plurality of light emitting diodes generate light at an initial intensity and a receiver with spatially placed detectors receiving reflected light couples analog signals to an analog-to-digital converter ("A/D"). *Id.* Signal-to-noise ratio is improved by increasing light intensity relative to initial light intensity and increasing a pulse rate. *Id.* The system inspects a sample "by comparing different features, such as wavelength (or frequency), spatial location, transmission, absorption, reflectivity, scattering, refractive index, or opacity" of the sample. Ex. 1001 at 10:2–7.

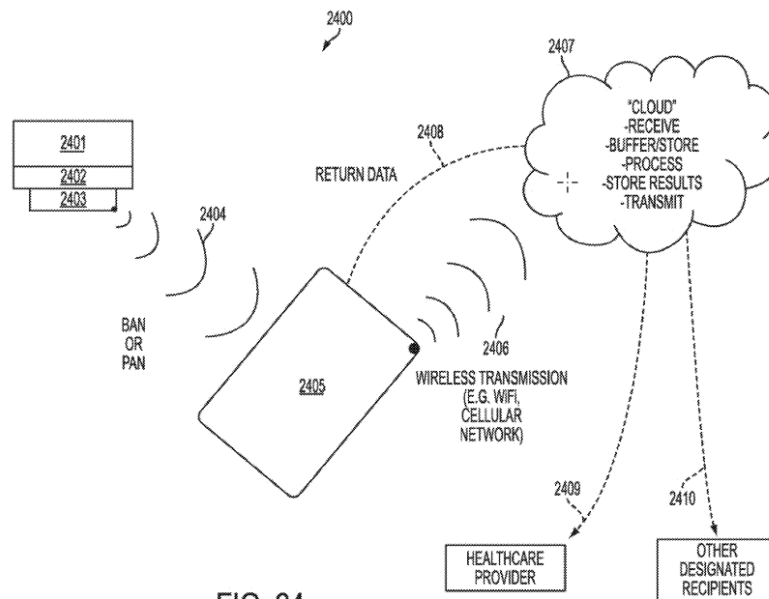Figure 24 of the '484 patent is reproduced below.

Figure 24 of the '484 patent

Figure 24 is a high level overview of physiological measurement system 2400, in which wearable measurement device 2401 with processor 2402 and

transmitter 2403 communicates measurements over link 2404 to smart phone

or tablet 2405. *Id.* at 32:45–33:4. An application program in smart phone or

tablet 2405 communicates some or all of its processed data over link 2406 to

cloud based server 2407, which can augment the data with additional

value-added processing, e.g., historical processing and pattern matching

algorithms. *See, id.* at 33:5–34:21.

The wearable device includes a light source having a plurality of

LEDs, electronically driven to operate in a continuous or pulsed mode, that

generate an output beam at one or more optical wavelengths between 700

and 2500 nanometers. Ex. 1001, 3:34–49, 11:3–9, 28:19–21, 26:29–34, Fig.

20. The '484 patent describes several techniques to improve signal

processing to select the constituents of interest. *See, e.g., id.* at 15:49–17:15.

According to the '484 patent, "using a wider wavelength range and using

more sampling wavelengths may improve the ability to discriminate one

signal from another." *Id.* at 15:64–66. In addition, "a higher light level or

intensity may improve the signal-to-noise ratio for the measurement." *Id.* at

15:53–55. The '484 patent notes that

> it may be advantageous to pulse the light source with a particular
> pulse width and pulse repetition rate, and then the detection
> system can measure the pulsed light returned from or transmitted
> through the tissue. Using a lock-in type technique (e.g., detecting
> at the same frequency as the pulsed light source and also possibly
> phase locked to the same signal), the detection system may be
> able to reject background or spurious signals and increase the
> signal-to-noise ratio of the measurement.

Id. at 15:67–16:8. The '484 patent further explains that variations due to

sunlight, time of day, and weather may also be reduced to improve the

signal-to-noise ratio using a lock-in technique. *Id.* at 16:61–67.

Higher signal-to-noise ratios may be achieved. For example, one way to improve the signal-to-noise ratio would be to use modulation and lock-in techniques. In one embodiment, the light source may be modulated, and then the detection system would be synchronized with the light source. In a particular embodiment, the techniques from lock-in detection may be used, where narrow band filtering around the modulation frequency may be used to reject noise outside the modulation, frequency. In an alternate embodiment, change detection schemes may be used, where the detection system captures the signal with the light source on and with the light source off. Again, for this system the light source may be modulated. Then, the signal with and without the light source is differenced. This may enable the sun light changes to be subtracted out. In addition, change detection may help to identify objects that change in the field of view.

Id. at 16:64–17:13. Patent Owner also notes that the '484 patent incorporates by reference PCT Application Serial No. PCT/US2013/075767 (Publication No. WO/2014/143276) (Ex. 2120), which describes the use of an active illuminator to achieve higher signal-to-noise ratios despite variations due to sunlight and weather, and U.S. Patent Application Serial No. 14/109,007, which discloses the modulation frequency of the light source can range between 0.1–100kHz. Prelim. Resp. 5 (citing Ex. 1001, 2:26–29, 2:36–39; Ex. 2120 ¶ 79; Ex. 2021 ¶ 45).

V. ILLUSTRATIVE CLAIM

Claim 1, reproduced below using the paragraph designations in the Petition, is illustrative of the subject matter of the challenged claims.

1(a). A system for measuring one or more physiological parameters and for use with a smart phone or tablet, the system comprising:

(b) a wearable device adapted to be placed on a wrist or an ear of a user,

(c) including a light source comprising a plurality of semiconductor sources that are light emitting diodes, each of

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