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Paper 54
Entered: December 5, 2025

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD., and
SAMSUNG ELECTRONICS AMERICA, INC.,
Petitioner,

v.

OURARING, INC.,
Patent Owner.

PGR2024-00039
Patent 11,874,702 B2

Before LINDA E. HORNER, NEIL T. POWELL, and MICHAEL A. VALEK, *Administrative Patent Judges.*

HORNER, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining No Challenged Claims Unpatentable
35 U.S.C. § 328(a)
Granting Parties' Motions to Seal
37 C.F.R. §§ 42.14, 42.54

I. INTRODUCTION

Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. (collectively, "Petitioner") filed a Petition (Paper 3, "Pet."), seeking post-grant review of claims 1–17 of U.S. Patent No. 11,874,702 B2 (Ex. 1001, "the '702 patent"). Ouraring, Inc. ("Patent Owner") filed a Preliminary Response. Paper 7. We instituted trial on challenged claims 1–17 on all of the grounds in the Petition. Paper 8, 26 ("Dec.").

Patent Owner subsequently filed its Response to the Petition (Paper 18, "Resp." (redacted); Paper 19, "Resp." (sealed)), Petitioner filed its Reply (Paper 28, "Reply" (redacted); Paper 27, "Reply" (sealed)) and Patent Owner filed its Sur-reply (Paper 36, "Sur-reply" (redacted); Paper 37, "Sur-reply" (sealed)). We held a hearing on September 11, 2025, and a transcript is of record. Paper 51 (redacted) ("Tr."); Paper 50 (sealed)("Confidential Tr.").

After considering the parties' arguments and evidence, we find that Petitioner has not shown that challenged claims 1–17 are unpatentable. *See* 35 U.S.C. § 326(e). Our reasoning is explained below.

II. BACKGROUND

A. Real Parties in Interest

Petitioner identifies Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. as the real parties-in-interest. Pet. 1. Patent Owner identifies Oura Health Oy and Ouraring, Inc. as the real parties-in-interest. Paper 5, 1 (Patent Owner's Mandatory Notices).

B. Related Matters

The parties submit that the ’702 patent is not involved in any judicial or administrative matters. Pet. 1; Paper 5, 1.

Petitioner also notes that it challenged eight related patents: U.S. Patent Nos. 11,868,178 (PGR2024-00030), 11,868,179 (PGR2024-00031), 9,582,034 (IPR2024-00928), 11,599,147 (IPR2024-00930), 11,874,701 (PGR2024-00038), 10,139,859 (IPR2024-01077), and 10,281,953 (IPR2024-01078). Pet. 1–2. Petitioner and Patent Owner note that the ’702 patent belongs to the same family as the ’034, ’147, ’178, ’179, ’701, ’859, and ’953 patents. *Id.* at 1; Paper 5, 1. Petitioner also has challenged the following additional patents with related subject matter: U.S. Patent Nos. 10,893,833 (IPR2024-00929), 10,281,953 (IPR2024-01079), 10,842,429 (IPR2024-01080), and 11,188,124 (IPR2025-00147).[1]

The related ’178 patent was also challenged by RingConn LLC in PGR2025-00018 and IPR2025-00412 and by Ultrahuman Healthcare Pvt. Ltd. *et al.* in IPR2025-00411. The Acting Director discretionarily denied these petitions on June 25, 2025.

C. The ’702 Patent

The ’702 patent is titled “Wearable Computing Device” and was issued January 16, 2024, based on an application filed May 24, 2023, that

[1] The Board denied institution in IPR2024-00929, IPR2024-00930, IPR2024-01079, IPR2024-01080, PGR2024-00031, and PGR2024-00038 due to statutory disclaimer by the Patent Owner of all the challenged claims. The Board instituted the remaining six petitions: IPR2024-00928, IPR2024-01077, IPR2024-01078, IPR2025-00147, PGR2024-00030, and PGR2024-00039.

asserts the benefit of a series of provisional and nonprovisional applications, the earliest of which was filed November 29, 2013. Ex. 1001, codes (22), (45), (54), (60).

The ’702 patent discloses a wearable computing device (“WCD”) in the shape of a ring that can be worn on the finger of a user for extended periods of time, take measurements, and perform various functions. Ex. 1001, 1:50–55.

Figures 1A and 1B of the ’702 patent are reproduced below.

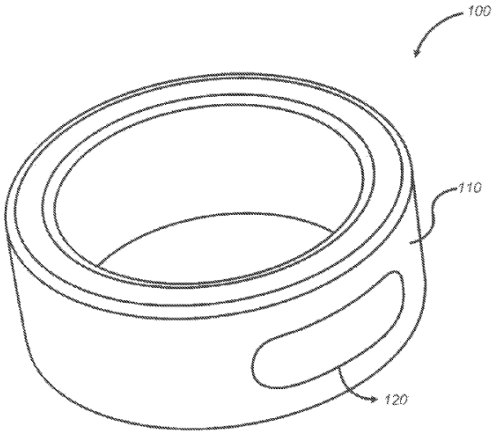

FIG. 1A

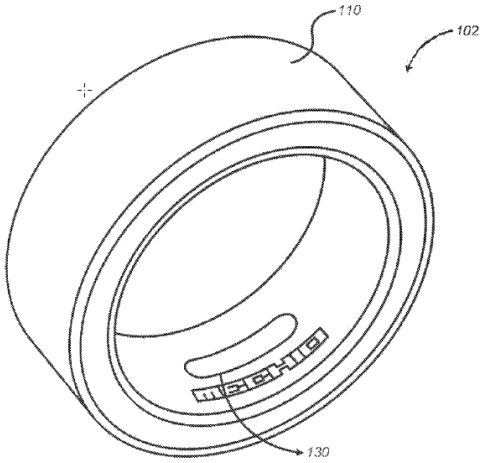

FIG. 1B

Figures 1A and 1B are perspective views of WCD 110. Ex. 1001, 5:8–12, 9:27–30. “[T]he WCD 110 can include the exterior window 120 on its exterior wall for input/output data transmission and reception, battery recharge, or status indication. The WCD 110 can also include the interior window 130 on its interior wall for various monitoring or sensing activities.” *Id.* at 9:60–65.

Figure 4 of the ’702 patent is reproduced below.

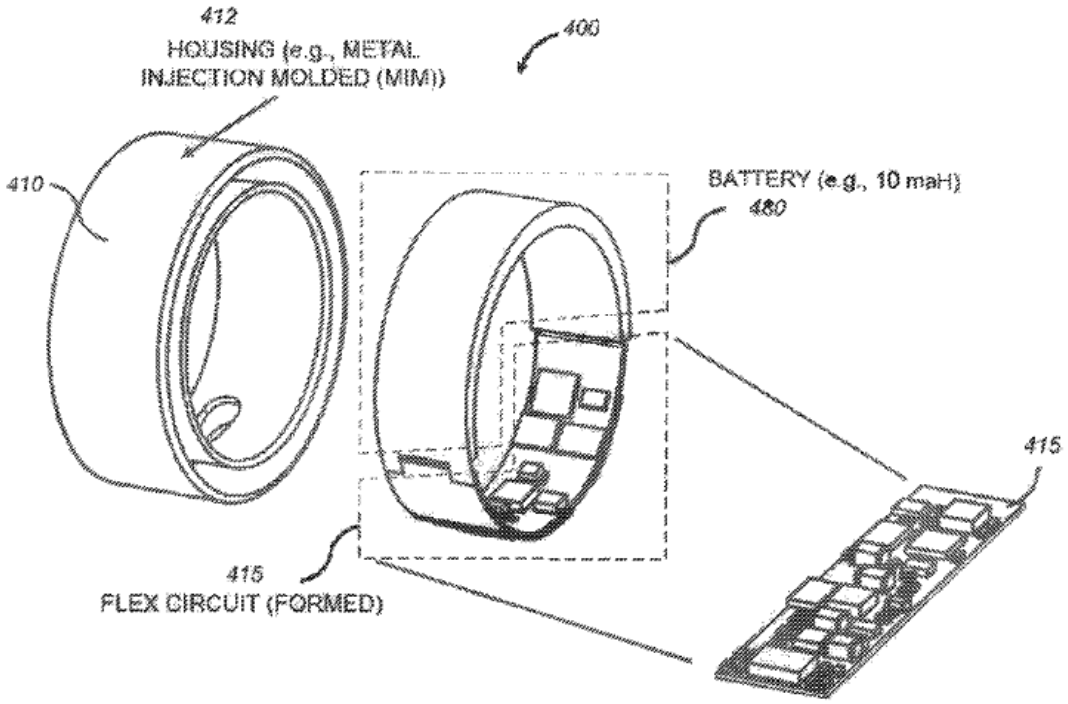

FIG. 4

Figure 4 is an exploded view of WCD 410 illustrating battery 480 and flexible printed circuit board (PCB) 415, which are configured to fit inside the U-shape of ring housing 412 of the WCD. Ex. 1001, 5:28–30, 16:1–4, 16:27–29.

Figures 7 and 8 of the ’178 Patent are reproduced below.

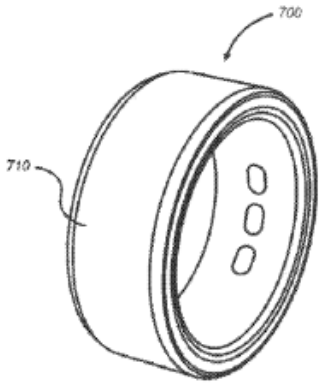

FIG. 7

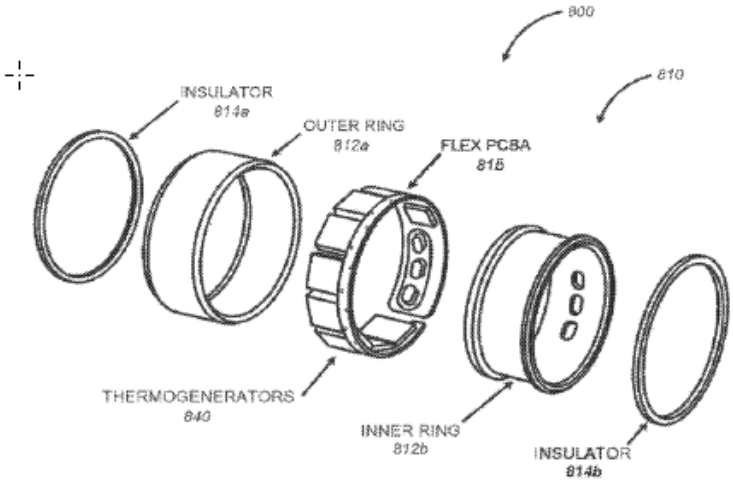

FIG. 8

Figure 7 is a perspective view of a WCD, and Figure 8 is an exploded view of the WCD of Figure 7. Ex. 1001, 5:36–40, 15:1–3. Figures 7 and 8 illustrate a design of the housing for the WCD, where the ring includes outer ring 812a, inner ring 812b, and insulators 814a and 814b. *Id.* at 15:3–6. Also shown in Figure 8 are flexible PCBA 815 and thermogenerators 840. *Id.* at Fig. 8. According to the ’702 patent, a thermoelectric generator charges a battery of the WCD by the difference between a wearer’s body temperature and the ambient temperature. *Id.* at 14:64–15:1, 15:7–15.

D. Challenged Claims

Petitioner challenges all 17 claims of the ’702 Patent, of which only claim 1 is independent. Claim 1 is reproduced below with the same bracketed annotations the Petition includes to identify particular limitations.

1. A finger-worn wearable ring device, comprising:

[a] an external housing component defining an outer circumferential surface of the finger-worn wearable ring device;

[b(i)] an internal housing component coupled to the external housing component, the internal housing component defining an inner circumferential surface of the finger-worn wearable ring device, [(ii)] wherein the internal housing component comprises a substantially transparent material that enables light to pass through the internal housing component;

[c] a printed circuit board disposed within a cavity defined by the external housing component and the internal housing component, wherein the printed circuit board is configured to conform to arc within the cavity;

[e] one or more light-emitting components electrically coupled with the printed circuit board, the one or more light-emitting components configured to emit light through the substantially transparent material of the internal housing component into a tissue of a user;

[f] one or more light-receiving components electrically coupled with the printed circuit board, the one or more light-receiving components configured to receive, through the substantially transparent material of the internal housing component, the light transmitted by the one or more light-emitting components;

[g] one or more processors configured to process data that is based at least in part on the light received by the one or more light-receiving components; and

[h] a communication module communicatively coupled with the one or more processors, the communication module configured to transmit the data processed by the one or more processors.

Ex. 1001, 44:64–45:29.

E. Asserted Grounds of Unpatentability

Petitioner asserts the following grounds of unpatentability:

Ground	Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1	1, 5, 7, 12–15	103	Schröder[2]
2	2–4, 6, 8–11	103	Schröder, LeBoeuf[3]
3	8–11	103	Schröder, LeBoeuf, Niwa[4]
4	16, 17	103	Schröder, Mestas[5]
5	1–15	103	LeBoeuf, Schröder
6	8–11	103	LeBoeuf, Schröder, Niwa
7	16, 17	103	LeBoeuf, Schröder, Mestas

In support of these grounds, Petitioner relies on Declarations from Dr. Brian Anthony submitted with the Petition (Ex. 1002) and Reply (Ex. 1079) and a Declaration from Mr. Michael A. M. Davies (Ex. 1080)

[2] Ex. 1007, US 10,303,867 B2, issued May 28, 2019 ("Schröder"). Petitioner asserts that Schröder qualifies as prior art under 35 U.S.C. § 102(a)(2) based on its foreign priority date of July 25, 2013. Pet. 7–8.
[3] Ex. 1012, US 8,700,111 B2, issued April 15, 2014 ("LeBoeuf"). Petitioner asserts that LeBoeuf qualifies as prior art under 35 U.S.C. § 102(a)(2) based on its filing date of June 21, 2010. Pet. 9.
[4] Ex. 1005, US 2012/0016245 A1, published January 19, 2012 ("Niwa"). Petitioner asserts that Niwa qualifies as prior art under 35 U.S.C. §§ 102(a)(1) and 102(a)(2). Pet. 11.
[5] Ex. 1010, US 2014/0244009 A1, published August 28, 2014 ("Mestas"). Petitioner asserts that Mestas qualifies as prior art under 35 U.S.C. § 102(a)(2) based on its provisional filing date of February 22, 2013. Pet. 12–13.

submitted with the Reply. Patent Owner[6] relies on the Declarations of Dr. Patrick Mercier (Ex. 2018) and Mr. Andrew T. Clarke, CFA (Ex. 2019).

III. ANALYSIS OF THE ASSERTED GROUNDS

A. Legal Standards

Petitioner's asserted grounds of unpatentability are based on obviousness under 35 U.S.C. § 103. Section 103 forbids issuance of a patent when:

> the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains.

35 U.S.C. § 103 (2024); *see also KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in evidence, objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

Additionally, the obviousness inquiry typically requires an analysis of "whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue." *KSR*, 550 U.S. at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (requiring "articulated reasoning with some rational underpinning to support the legal conclusion of

[6] Patent Owner does not dispute that the references relied upon by Petitioner are prior art to the '702 patent.

obviousness")). Petitioner cannot satisfy its burden of proving obviousness by employing "mere conclusory statements," but "must instead articulate specific reasoning, based on evidence of record, to support the legal conclusion of obviousness." *In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016).

B. Level of Ordinary Skill in the Art

Petitioner contends that a person of ordinary skill in the art at the relevant time would have had:

> at least a four-year degree in electrical engineering, mechanical engineering, biomedical engineering, optical engineering, or related field of study, or equivalent experience, and at least two years' experience in academia or industry studying or developing physiological monitoring devices such as non-invasive biosensors.

Pet. 6 (citing Ex. 1002 ¶¶ 26–30). Petitioner also contends that a person of ordinary skill would have been "familiar with, for example, sensor system design and signal processing" and that "[a] higher level of education or skill might make up for less experience, and vice versa." *Id.*

Patent Owner agrees with Petitioner's proposed definition of a person of ordinary skill in the art. Resp. 25.

We adopt this uncontested definition of the level of ordinary skill in the art. This definition is supported by the record and consistent with the disclosure in the '702 patent and the references cited in the Petition.

C. Claim Construction

In an *inter partes* review, claim terms

> shall be construed using the same claim construction standard that would be used to construe the claim in a civil action under

> 35 U.S.C. [§] 282(b), including construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.

37 C.F.R. § 42.100(b).

Petitioner submits that no term requires express construction to resolve this Petition. Pet. 7 (citing Ex. 1002 ¶¶ 31–33).

Patent Owner indicates that, in the ITC proceeding involving the '178 patent, which is related to the '702 patent, the Administrative Law Judge (ALJ) adopted three constructions of terms agreed-upon by the parties[7] and also construed two disputed terms.[8] Resp. 25–26 (citing Ex. 2016, 5, 6, 14). Patent Owner agrees with Petitioner, however, that no terms need to be construed to decide the issues raised in the Petition. *Id.* at 26.

We reviewed the agreed-upon constructions adopted by the ITC and the terms construed by the ITC for the related '178 patent. Ex. 2016, 5, 6, 14. These constructions are not germane to the issues we need to decide to resolve this proceeding, and we have not independently identified any other

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[7] In *Certain Smart Wearable Devices, Systems, and Components Thereof*, Inv. No. 337-TA-1398 (Int'l Trade Comm'n), the ALJ adopted the parties' agreed-upon constructions that: (1) the preamble of claim 1 of the '178 patent [a finger-worn wearable ring device] is limiting; (2) [positioned/configured to fit] within a "cavity" is [positioned/configured to fit] within a "hollow space"; and (3) [the internal housing component] "coupled with" [the external housing component] is [the internal housing component] "connected with" [the external housing component]. Ex. 2016, 5.

[8] In the ITC proceeding, the ALJ construed the claims such that: (1) the internal and external housing components of claims 1, 12, and 17 of the '178 patent enclose space and do not necessarily exclude potting material; and (2) "circumferential," as recited in claims 1, 17, and 18 of the '178 patent, does not require a closed shape. Ex. 2016, 14, 17.

term requiring construction. Thus, we agree that no explicit claim construction is necessary for this decision.

D. References Relied Upon

i. Schröder

Schröder discloses an external secure unit comprising a memory, a processor, and an interface for sending and receiving data to and from a communication device, such as a smartphone. Ex. 1007, code (57), 1:5–11, 1:42–47, 1:64–67. The external secure unit stores security-relevant data necessary for executing an application program in the communication device. *Id.* at code (57), 1:56–61. A "finger-ring" can be employed as an external secure unit. *Id.* at 1:61–64.

Schröder's Figures 1 and 2 are reproduced below.

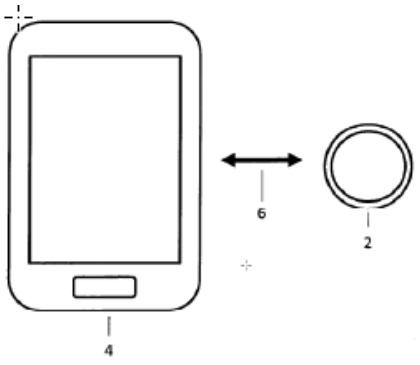


Fig. 1

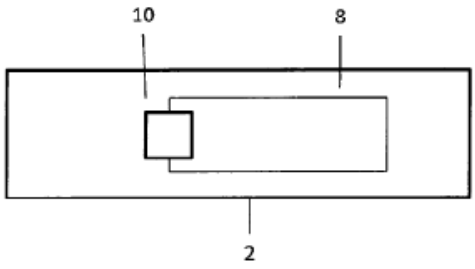


Fig. 2

Figure 1 shows finger-ring 2 as an exemplary external secure unit and smartphone 4 as a communication device, and Figure 2 shows a cross section through finger-ring 2. Ex. 1007, 3:39–44, 3:57–59, 4:58–60.

Schröder discloses a method for authentication by means of finger-ring 2 and smartphone 4. Ex. 1007, 3:59–61. According to Schröder, "[f]inger-ring 2 is worn by a user e.g. permanently on the finger," which is

advantageous as an external secure unit because the ring "cannot be taken away or employed without authorization or get lost." *Id.* at 3:61–62, 4:16–18. Finger-ring 2 and smartphone 4 are interconnected via contactless communication connection 6, *e.g.*, an NFC (near field communication) connection. *Id.* at 3:64–66, 4:18–22. All security-relevant data necessary for executing applications on smartphone 4, such as email, Facebook, and banking, are stored only on finger-ring 2, not on the smartphone. *Id.* at 4:3–5, 4:10–15.

Schröder's Figure 2 is reproduced below.

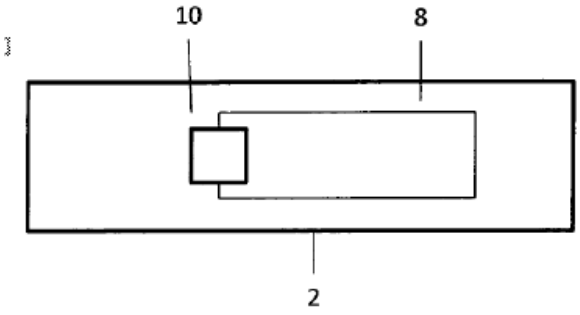


Fig. 2

Figure 2 shows a cross section through finger-ring 2 as an example of an external secure unit. *Id.* at 4:58–60. "In the finger-ring 2 are located an antenna coil 8 and a chip or chip module 10, which are schematically indicated" and used to communicate with an NFC reader, such as an RFID (radio frequency identification) reader. *Id.* at 4:60–62, 5:12–18, 5:49–53.

Schröder's Figure 3 is reproduced below.

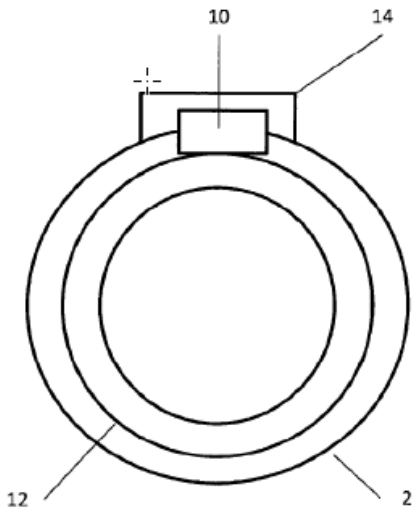


Fig. 3

Figure 3 shows a cross section through an external secure unit in the form of finger-ring 2 with a replaceable chip module 10. Ex. 1007, 3:45–46, 8:54–56. Inlay 12 is inside finger-ring 2 and serves as a carrier for antenna coil 8. *Id.* at 8:56–58. As shown in Figure 3, chip module 10 is inserted into a recess of finger-ring 2. *Id.* at 8:58–59. Chip module 10 is protected by cover 14, which has a hinged or threaded connection to the finger-ring 2. *Id.* at 8:60–63. Chip module 10 is electroconductively connected to antenna coil 8 on inlay 12. *Id.* at 8:63–66. "Advantageously, the chip module 10 is located in a module holder, in order that the contacts of the chip module 10 are properly interconnected to the contacts of a corresponding antenna coil 8." *Id.* at 9:4–7. According to Schröder, the chip module 10 in Figure 3 is "arranged in particular replaceably," but "[a]lternatively, the chip module 10 can . . . be firmly connected to the finger-ring 2." *Id.* at 9:1–4; *see also id.* at 9:13–15 ("Alternatively, it is possible to connect the chip

module 10 permanently to the contacts of the inlay 12, e.g. by soldering, crimping, gluing, etc.").

In a "further embodiment example," Schröder describes external secure unit 2 as having "an energy storage device, e.g., an accumulator or a battery" that is "connected to the chip module 10." Ex. 1007, 11:46–67.

Schröder also discloses "possible construction variants" of a finger-ring 2 in reference to Figures 4 to 10. Ex. 1001, 12:1–3. Schröder's Figures 4 and 5 are reproduced below.

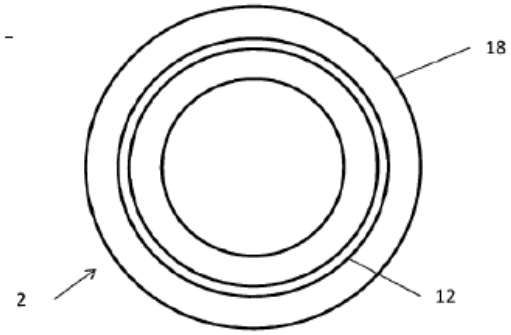


Fig. 4

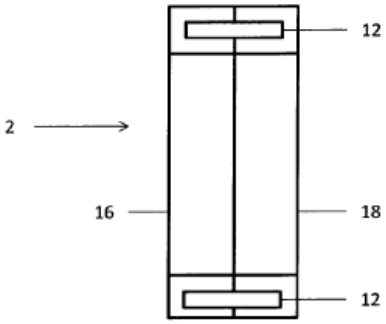
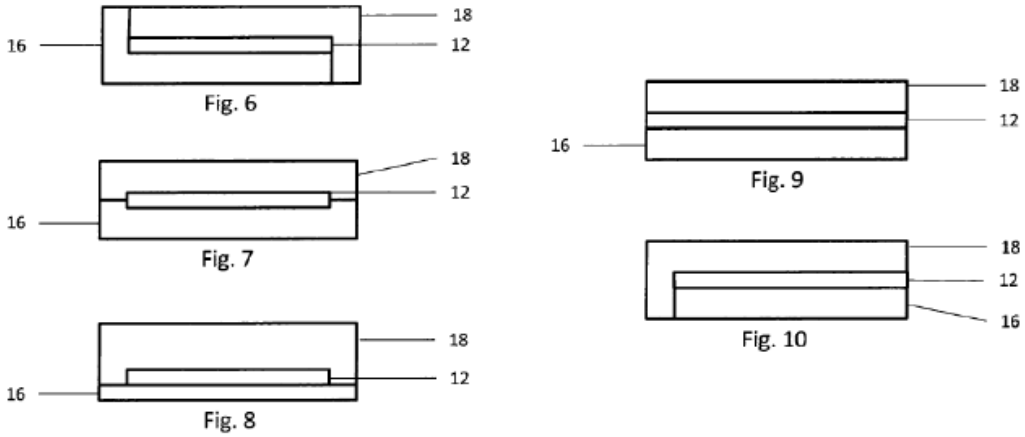


Fig. 5

Figure 4 shows a longitudinal cross-section through finger-ring 2 as an exemplary external unit, and Figure 5 shows a cross-section of the finger-ring of Figure 4. Ex. 1007, 3:46–50, 12:4–7. Figure 4 shows one half 18 of finger-ring 2, and Figure 5 shows two ring halves 16 and 18. *Id.* at 12:5–8. As shown in Figures 4 and 5, ring halves 16 and 18 have a recess into which inlay 12 is inserted. *Id.* at 12:8–9. Components 16 and 18 of finger-ring 2 are interconnected in such a way that the connection can be undone in order to insert or exchange inlay 12. *Id.* at 12:20–26. Inlay 12 consists of a flexible carrier material, with antenna coil 8 and chip module 10 connected to each other on the inlay. *Id.* at 12:28–32.

Schröder's Figures 6 to 10 are reproduced below.



Figures 6 to 10 show different cross sections through a finger-ring, which along with Figures 4 and 5, show "possible construction variants of external secure unit 2 in the form of finger-ring 2." Ex. 1007, 12:1–3; *see also id.* at 3:51–52; 12:43–45 (describing Figures 6–10). In Figures 6 to 10, finger-ring 2 has ring-shaped components 16 and 18, with inlay 12 arranged between the components. *Id.* at 12:43–55.

According to Schröder, "inlay 12 can have at least one chip module 10 with at least one antenna coil 8, with at least one further electronic device, e.g. a display, optionally being arranged on the inlay 12." Ex. 1007, 12:61–65.

ii. LeBoeuf

LeBoeuf discloses light-guiding devices and monitoring devices incorporating the same. Ex. 1012, code (54). Specifically, in one embodiment, LeBoeuf discloses monitoring device 70 with light-guiding regions configured to fit over a finger F, for example, as a finger ring. *Id.* at 27:58–64, Figs. 22A, 22B.

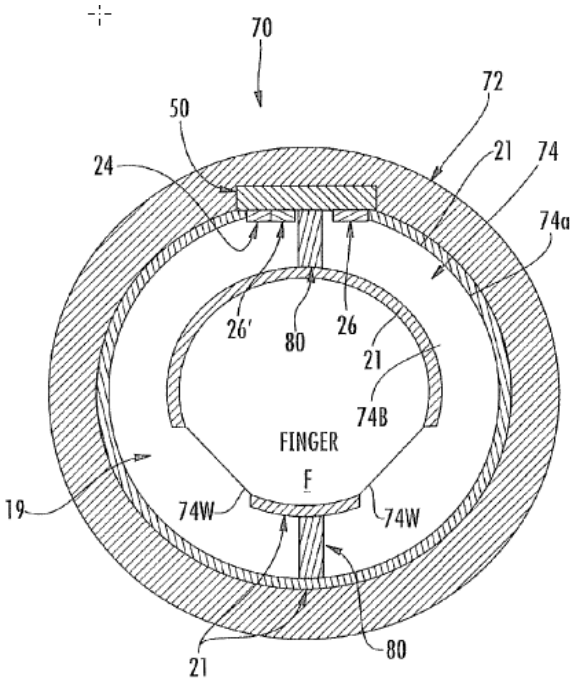


FIG. 22B

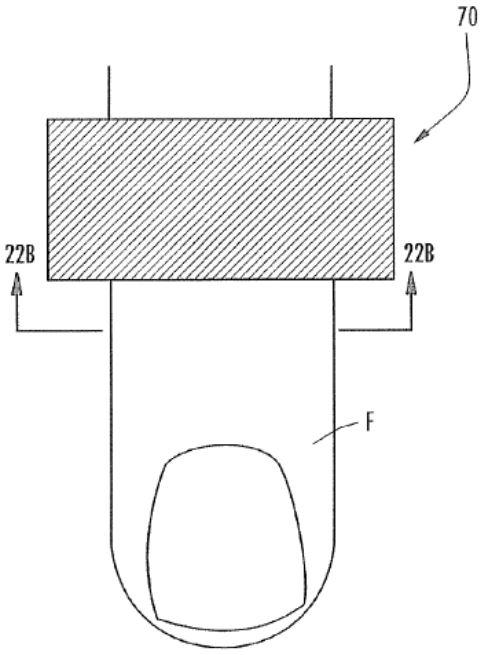


FIG. 22A

Figure 22A, reproduced above right, is a top plan view of monitoring device 70 in the form of a finger-ring and disposed on a finger. Ex. 1012, 8:13–15. Figure 22B, reproduced above left, is a cross-sectional view of monitoring device 70 of Figure 22A taken along lines 22B-22B. *Id.* at 8:16–17.

Monitoring device 70 includes a generally circular band capable of encircling a finger F of a subject, with cylindrical outer body portion 72 and generally cylindrical inner body portion 74 secured together in a concentric relationship. Ex. 1012, 27:64–28:1. Base 50 is secured to inner and outer body portions 74, 72 and provides support for one or more sensors, such as optical emitter 24, optical detector 26, and optical noise detector 26'. *Id.* at 28:11–17. Multiple light emitters 24 may be used, such as light emitters of different wavelengths. *Id.* at 28:60–62. Similarly, multiple light detectors 26,

26' may be used that are configured to measure light at different wavelengths. *Id.* at 28:62–65.

Inner body portion 74 includes light transmissive material, such as silicone. Ex. 2012, 28:18–22. Cladding material 21 applied to outer surface 74*a* of inner body portion 74 and to inner surface 74*b* of inner body portion 74 defines light-guiding region 19. *Id.* at 28:26–30. Windows 74*w* are formed in cladding material 21 and serve as light-guiding interfaces to the finger. *Id.* at 28:40–42. Windows 74*w* may include optical filters, such as IR-pass filters, to selectively pass one or more optical wavelengths and reflect and/or absorb other optical wavelengths. *Id.* at 28:48–50, 29:2–3.

iii. Niwa

Niwa discloses a plethysmogram (PPG) sensor within a housing in the form of a finger ring. Ex. 1005, code (54), ¶ 191, Fig. 22.

Figure 22 is reproduced below.

FIG.22

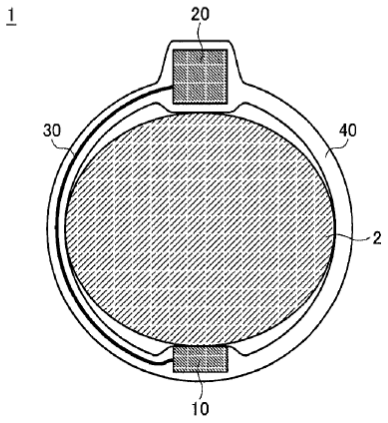


Figure 22 is a cross-section diagram of PPG sensor 1 to measure a plethysmogram at the third joint of finger 2, where PPG sensor 1 includes

first unit 10, second unit 20, cable 30, and finger ring type housing 40. *Id.* ¶ 191. First unit 10 is a unit to measure the plethysmogram and is to be set to the ball side of finger 2 (i.e., palm side) when housing 40 is worn on finger 2 because the ball side is fleshy to provide stable measurement of the plethysmogram. *Id.* ¶ 192. Second unit 20 is a unit to supply power to first unit 10 and is set to the back side of finger 2 so that any noise from second unit 20 for first unit 10 can be minimized. *Id.* ¶¶ 193, 215. Cable 130 electrically connects first unit 10 with second unit 20. *Id.* ¶ 194.

Niwa describes that the thickness of first unit 10 is 1 mm to 5 mm and the thickness of second unit 20 is 4 mm to 20 mm. Ex. 1005 ¶ 199. Niwa describes that it is desirable to construct second unit 20 to be twice as thick as first unit 10 to enhance flexibility for the design (e.g., circuit mounting or package mounting in second unit 20), to make it more difficult to turn sensor 1 around on finger 2 so that the first unit 10 is maintained on the ball side of finger 2, and to provide a visual cue to the wearer of the correct orientation of first unit 10 and second unit 20. *Id.* ¶¶ 199, 202, 203.

Figures 27 and 28 are reproduced below.

FIG.27

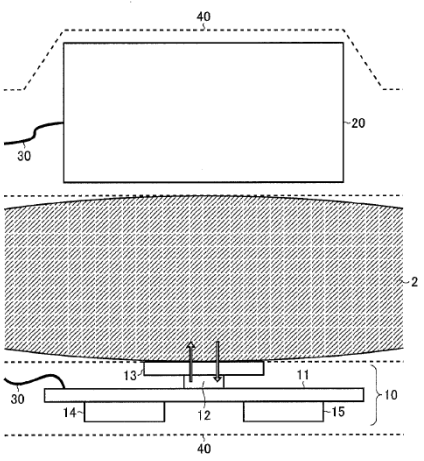


FIG.28

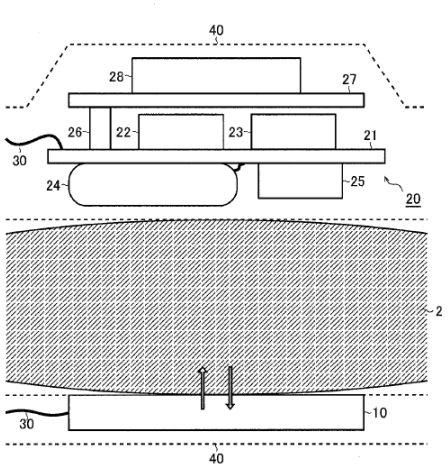


Figure 27 shows a cross-section diagram of first unit 10, which includes substrate 11, light sensor 12, measurement window 13, amplifier circuit 14, and processing circuit 15. Ex. 1005 ¶ 207. Figure 28 shows a cross-section diagram of second unit 20, which includes first substrate 21, power source circuit 22, memory 23, battery 24, charging circuit 25, connector 26, second substrate 27, and wireless communication circuit 28. *Id.* ¶ 213. Niwa describes that power source circuit 22 and memory 23 are equipped to the surface of first substrate 21 directly, and battery 24 and charging circuit 25 are equipped to the back side of substrate 21 directly. *Id.* ¶ 214. Cable 30 establishes an electrical connection between the surface and back side of first substrate 21 by means of a through hole and a via hole. *Id.* Niwa teaches benefits of this configuration:

> In this way, by means of utilizing both side[s] of the first substrate 21 efficiently, the area of the first substrate 21 can be reduced. Therefore, the largeness of the second unit 20 can be restrained not to protrude from the third joint of the finger 2. Furthermore, a consciousness of the examinee for wearing the plethysmogram sensor 1 can be reduced.

Id.; *see also id.* ¶ 219 (describing that the stack layer construction of first substrate 21 and second substrate 22, compared to mounting all circuit elements on one substrate, allows each area of first substrate 21 and second substrate 22 to be decreased to achieve the benefits described above).

Niwa describes that battery 24 is "formed as highly flat" and is "located right above the finger 2" so that "it is possible to enhance an affinity of the plethysmogram sensor 1 when the pulse sensor 1 is worn on the finger 2" and "the consciousness of the examinee for wearing the plethysmogram sensor 1 can be reduced." Ex. 1005 ¶ 217. Niwa describes that the thickness of battery 24 is 2 mm to 5 mm. *Id.* ¶ 201.

iv. Mestas

Mestas discloses a physical activity monitoring method and system. Ex. 1010, code (57).

Figure 1 is reproduced below.

FIG. 1

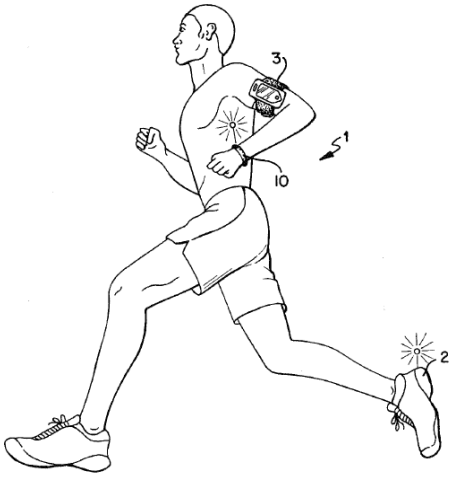


Figure 1 shows a person utilizing an athletic performance monitoring and feedback system 1. Ex. 1010 ¶¶ 9, 148. System 1 includes wearable device 10 for monitoring the user's activity. Device 10 includes a sensor such as an accelerometer. *Id.* ¶ 148.

Figure 6 is reproduced below.

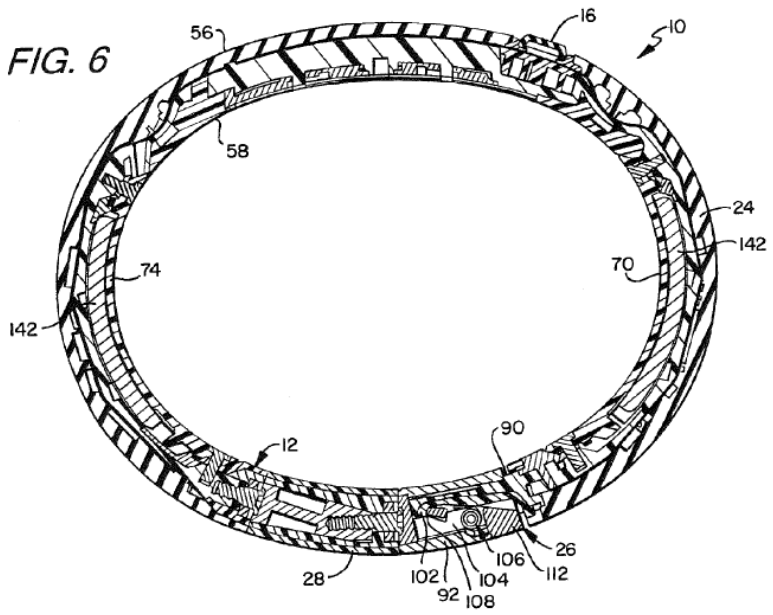
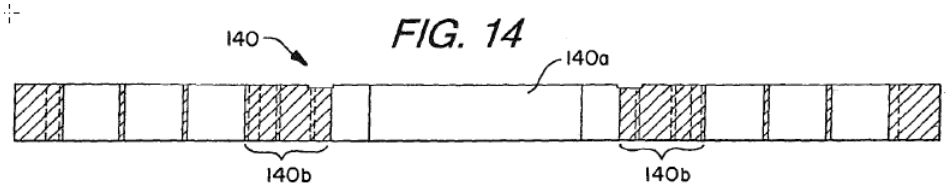
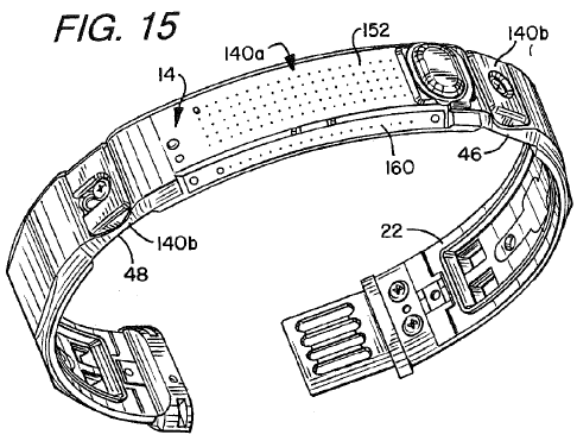


Figure 6 is a cross-section of wearable device 10 including housing 12 in the form of a wearable band such as a wristband. Ex. 1010 ¶¶ 15, 150, 151. Device 10 includes a controller, input button 16, a display, and an indicator system. *Id.* ¶ 150. Housing 12 includes an inner spine member having compartments for power supplies, outer encasement member 24, and fastening mechanism 26. *Id.* ¶ 151. The controller includes batteries 142, which "have a curvilinear or curved configuration." *Id.* ¶¶ 163, 168.

Figures 14, 15, and 16 are reproduced below.





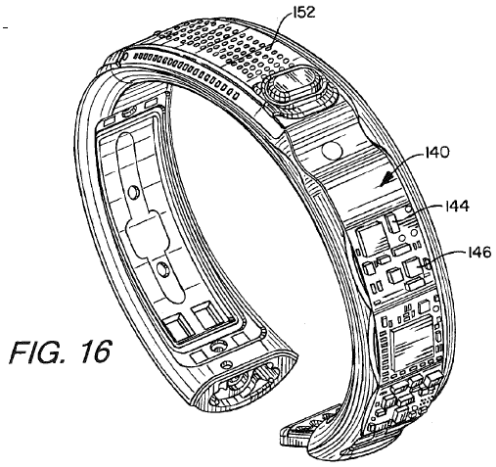


Figure 14 shows flexible PCB member 140, and Figures 15 and 16 show PCB member 140 wrapped around and mounted to spine member 22. Ex. 1010 ¶¶ 25, 26, 164. PCB member 140 is part of controller 14 and supports various components of the controller, including antenna assembly 144, sensor assembly 146, processing units, data storage memory components, and connectors. *Id.* ¶¶ 163, 165.

E. Ground 1: obviousness over Schröder

Petitioner contends claims 1, 5, 7, and 12–15 would have been obvious over Schröder. *See* Pet. 17–34. Patent Owner disputes Petitioner's contentions, raising global arguments for certain elements of claim 1 that also apply to the dependent claims. Resp. 27–34. Patent Owner also raises separate arguments for the additional limitations recited in claims 12 and 13. *Id.* at 35–43. We begin with claim 1.

i. Claim 1

Petitioner asserts that Schröder teaches or suggests all the elements of claim 1. *See generally* Pet. 17–28. To illustrate its position, Petitioner

presents annotated versions of Schröder's figures, including the annotated versions of Figures 4 and 7 reproduced below. *Id.* at 19, 21.

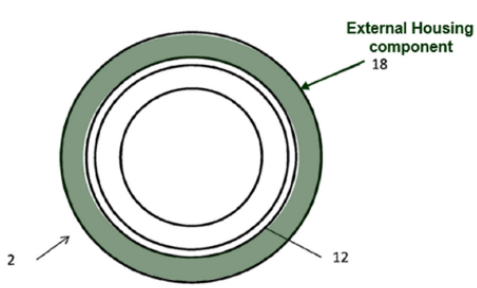


Fig. 4

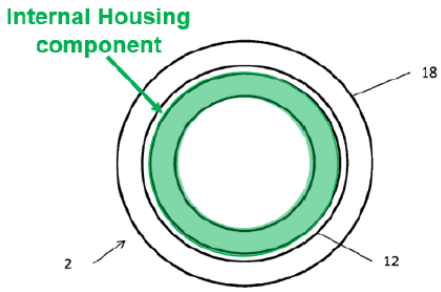


Fig. 4

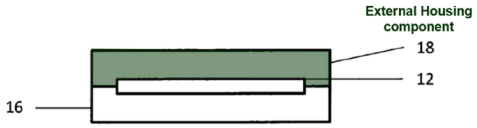


Fig. 7

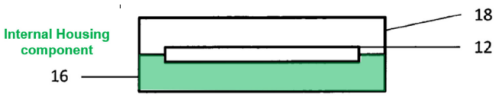


Fig. 7

Id. Schröder's Figures 4 and 7 show cross-sections through different embodiments of a finger ring. Ex. 1007, 12:1–5, 12:43–50. Petitioner highlights and labels the portions of these figures that it maps to the external and internal housing components of claim elements 1[a] and 1[b(i)]. Pet. 18–21.

Petitioner contends, with reference to these annotated Figures, that Schröder's finger-ring 2 is a "finger-worn wearable ring device" that includes ring halves 16 and 18. Pet. 17–21. Petitioner asserts that ring half 18 is an external housing component defining an outer circumferential surface, as recited in claim element 1[a], and that Schröder's ring half 16 is an internal housing component coupled to the external housing component and defining an inner circumferential surface, as recited in claim element 1[b(i)]. *Id.* at 18–21 (citing Ex. 1002 ¶¶ 149–153; Ex. 1007, 12:7–22, 12:45–55).

Petitioner contends that Schröder discloses element 1[b(ii)] because Schröder's finger-ring "may have 'transparent regions, e.g., windows'

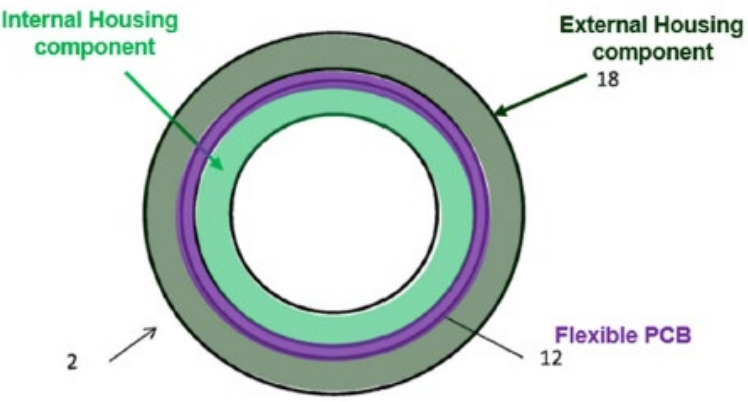
incorporated into the internal housing component to capture 'a partial vein image in the finger'" using biometric sensors. Pet. 21–22 (Ex. 1007, 9:28–34, 9:62–10:4; 1002 ¶¶ 154–155). Petitioner submits that a person having ordinary skill in the art would have understood that this transparent region would allow light to pass and to capture a vein image[9] of the finger. *Id.* at 22. Petitioner also contends that a person having ordinary skill in the art would have understood to provide an infrared transmissive window so that the infrared diode could transmit infrared radiation from the diode to the tissue and then back to the sensor to capture the vein image. *Id.*

With reference to annotated Figures 4, 7, and 8 of Schröder, reproduced below, Petitioner contends that Schröder discloses a PCB disposed within the cavity between the internal and external housing components and that conforms to the arc within the cavity, as recited in element 1[c].[10, 11] Pet. 22–24.

[9] Schröder describes that external secure unit 2 has a biometric sensor to capture "at least a partial vein image in the finger while the finger-ring 2 is being pushed over a finger." Ex. 1007, 9:54–66.

[10] Limitation 1[c] recites, "a printed circuit board disposed within a cavity defined by the external housing component and the internal housing component, wherein the printed circuit board is configured to conform to arc within the cavity."

[11] Petitioner does not assert or present evidence to show that it would have been obvious to a person having ordinary skill in the art to modify Schröder by replacing inlay 12 with a PCB in the event we disagree with its argument that inlay 12 is a PCB.



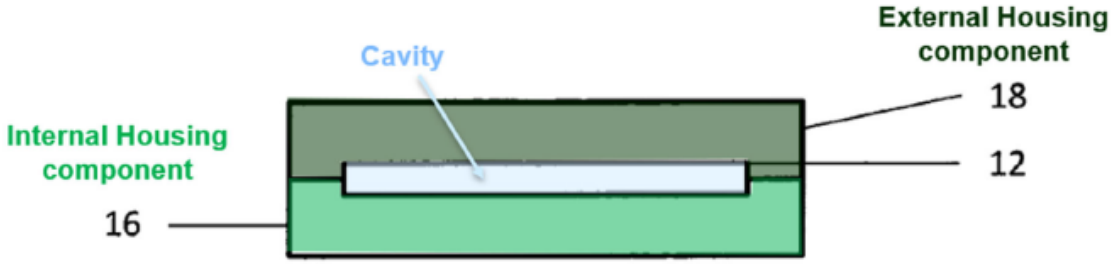


Fig. 7

Fig. 8

Petitioner contends that Schröder's finger-ring includes a light-emitting diode, i.e., the infrared diode of the biometric sensor, electrically coupled to the printed circuit board and configured to emit light through a substantially transparent material, as recited in element 1[d]. Pet. 24–25 (citing Ex. 1002 ¶¶ 160–161; Ex. 1007, 8:32–53, 9:28–34, 9:66–10:5, 12:62–63). Petitioner also contends that Schröder's finger-ring includes a light-receiving component, i.e., the infrared sensor of the biometric sensor, electrically coupled to the printed circuit board and configured to receive light through a substantially transparent material, as recited in element 1[e]. *Id.* at 25–26

(citing Ex. 1002 ¶¶ 162–163; Ex. 1007, 9:66–10:5). Petitioner submits that Schröder's finger-ring includes one or more processors within chip module 10 configured to process biometric data for authentication, as recited in element 1[f]. *Id.* at 26–27 (citing Ex. 1002 ¶ 164; Ex. 1007, 1:45, 9:58–60, 10:4–24, 10:59–62). Finally, Petitioner asserts that Schröder's finger-ring includes a communication module, such as a contactless NFC interface, wireless LAN, or Bluetooth, coupled to the processor via antenna coil 8, and configured to transmit the processed data to smartphone 4, as recited in element 1[g]. *Id.* at 27–28 (citing Ex. 1002 ¶¶ 165–166; Ex. 1007, 3:59–61, 4:37–42, 6:49–50, 10:4–24, 10:59–62, 12:30–32, 16:6–12).

As for limitation 1[c], Patent Owner argues that Petitioner incorrectly relies on Schröder's inlay 12 as both the claimed cavity and the claimed PCB. Resp. 30. With regard to this argument, we disagree that Petitioner is pointing to Schröder's inlay 12 as both the cavity and the PCB. Rather, it is clear from the Petition that Petitioner is pointing to Schröder's inlay 12 as the claimed PCB, and the area defined by the U-shaped components 16 and 18 as the cavity that surrounds inlay 12. Pet. 22–23.

Patent Owner further contends that Schröder's inlay 12 is not a PCB, and is "merely a substance for holding the coil in place." *Id.* at 31 (citing Ex. 1007, 8:57–59 22:48–50; Ex. 2018 ¶ 96; Ex. 2011). Patent Owner argues that Dr. Anthony's testimony fails to adequately support Petitioner's contention that Schröder's inlay 12 is a PCB. *Id.* at 32 (citing Ex. 2020, 73:12–74:11, 76:14–20; Ex. 2023 at 1). Dr. Mercier testified that a person having ordinary skill in the art would not consider Schröder's inlay 12 to be a PCB. *Id.* at 33 (citing Ex. 1007, 22:48–49; Ex. 2018 ¶ 101).

We agree with Patent Owner that Petitioner has not met its burden to show that Schröder's inlay 12 is a PCB. Relying on testimony from Dr. Anthony, Petitioner asserts that inlay 12 is a PCB because it "consists of 'flexible carrier material' like PET and Kapton, which are commonly understood to be printed circuit board materials." Pet. 23 (citing Ex. 1007, 12:28–29; Ex. 1002 ¶ 157). Petitioner states that "[i]nlay 12 carrier provides the substrate for chip module 10, antenna coil 8, and at least one electronic component." *Id.* (citing Ex. 1007, 12:35–42). Petitioner further asserts that inlay 12 is configured to conform to the arc within the cavity "because it is disposed in the cavity defined by the circular internal and external housing components," as shown in its annotated version of Schröder's Figure 4 above. *Id.* (citing Ex. 1002 ¶¶ 157–159).

Patent Owner argues that Dr. Anthony's direct testimony "fails to provide any analysis as to how the inlay 12 of Schröder meets [the Wikipedia] definition." Resp. 32. Patent Owner further asserts that Schröder does not itself refer to inlay 12 as a printed circuit board, calling it instead a "carrier." *Id.* at 31. Patent Owner argues that printed circuit boards have a well-known construction and characteristics not present in inlay 12. *Id.* (citing Ex. 2011) (describing five components and fourteen manufacturing steps for PCBs). Patent Owner contends that "inlay is merely a substance for holding the coil in place, not a printed circuit board." *Id.* (citing Ex. 2018 ¶ 96).

Moreover, Dr. Mercier testifies that Schröder's inlay 12 "does not include the described features" of PCB (i.e., a laminated sandwich structure of conductive and insulating layers, pattern of traces etched on sheet layers of copper, between sheet layers of nonconductive substrate). Ex. 2018 ¶ 101

(citing Ex. 2023, 1). These features are described in a Wikipedia article for "Printed circuit board." Ex. 2023. During cross-examination, Dr. Anthony agreed that the description of a PCB as a "laminated sandwich structure of conductive and insulating layers," in this Wikipedia article was an accurate description of a PCB:

> Q. So is the first sentence of this Wiki page, in your mind, an accurate description of a printed circuit board?
>
> A. So, the first sentence, "A printed circuit board (PCB)[] also called a printed wiring board, []is a laminated sandwich structure of conductive and insulating layers, each with a pattern of traces, planes, and other features (similar to wires on a flat surface) etched from one or more sheets of copper laminated onto or between sheet layers of nonconductive substrate."
>
> And so your question again was?
>
> Q. Is that a fair definition of printed circuit board in your mind?
>
> A. It's a fair description of the general process for circuit boards, layers of conductive traces.

Ex. 2020, 73:17–74:11; *see also id.* at 76:14–20 (testifying that the related '178 patent's usage of "PCB" is consistent with the definition from the Wikipedia article); *see also* Ex. 2023, 1.

Responding to Patent Owner's arguments, Petitioner replies that "Dr. Anthony only referenced [the] Wikipedia [article] to confirm the acronym, not its definition." Reply 3 (citing Ex. 202, 73:12–16; Ex. 1079 ¶ 15). Petitioner argues that Schröder's inlay 12 may be made of "flexible carrier material," such as "Kapton," which is a polyimide foil used for flexible printed circuits, similar to the flexible polyimide material disclosed in the '702 patent. *Id.* at 4 (citing Ex. 1007, 12:28–29; Ex. 2023, 9; Ex. 1081, 80:17–81:10; Ex. 1001, 18:46–48). Patent Owner also asserts that Schröder

discloses its foils "are manufactured by 'milling, lasering, etching,' and components are attached to specific foil layers, allowing for multilayer carrier foil composite." *Id.* (citing Ex. 1007, 13:23–51). Petitioner also asserts that Patent Owner's expert Dr. Mercier acknowledged that Schröder teaches multiple layers and a wiring pattern and Schröder's carrier foil may have depressions for inserting electronic devices. *Id.* at 4 n.3 (citing Ex. 1081, 106:17–25, 107:23–108:9); *id.* at 5 (citing Ex. 1081, 105:9–108:9). Petitioner argues that a person having ordinary skill in the art would understand that a substrate with assembled components and connecting circuitry is a PCB. *Id.* (citing Ex. 1079 ¶¶ 17–18).

We are not persuaded by Petitioner's arguments and find that Patent Owner has the better position. Although Schröder describes some aspects that are similar to those of a printed circuit board, Petitioner has not sufficiently demonstrated that a person having ordinary skill in the art would understand Schröder's inlay 12 or carrier foil to be a "printed circuit board," as recited in claim 1. As an initial matter, while Schröder refers to a "circuit board" in another context, it never refers to the carrier foil or inlay in its finger-ring embodiment as such. *See* Ex. 1007, 22:48–49; Ex. 2018 ¶ 101; *see also* Ex. 1079 ¶ 19 (Dr. Anthony acknowledging that Schröder's only reference to a "circuit board" is "unrelated to Schröder's finger-ring teachings"). Instead, Schröder describes features of that inlay, explaining that "[t]he carrier foil itself consists of a flexible plastic material, e.g.[,] PET or Kapton" and "antenna coil 8 can for example be printed on the carrier foil by means of a conductive paste" and "a depression is manufactured in the carrier foil, e.g.[,] by milling, lasering, etching, before the chip module 10, the antenna coil 8 and optional further electronic devices are inserted into

the depression." *Id.* at 13:26–31, 13:35–37. Schröder further describes that "[a]t least one further foil can be applied to the carrier foil or the ring blank on at least one side" to produce a "multilayer foil component" that can be "interconnected" by means of "glue or lamination." *Id.* at 13:48–51. Based on this description, Schröder's inlay 12 may include a printed conductive antenna coil 8, multiple layers of the carrier foil, and components inserted into depressions on the carrier foil.

Schröder, however, does not explicitly describe how, if at all, the components are connected on its carrier foil. This aspect is important in PCB construction. For instance, the Wikipedia description of a PCB recites "a laminated sandwich structure of conductive and insulating layers, each with a pattern of traces, planes, and other features (similar to wires on a flat surface) etched from one or more sheets of copper laminated onto or between sheet layers of nonconductive substrate."[12] Ex. 2020, 73:17–74:11.

[12] Dr. Anthony did not provide a clear explanation of a person having ordinary skill in the art's understanding of a PCB in his direct testimony, but acknowledged that the description in the Wikipedia article was accurate upon cross-examination. *See* Ex. 2020, 73:17–74:11, 76:14–20. In his Reply Declaration, Dr. Anthony asserts that he did not formally adopt the description in the Wikipedia article as an explanation of what he believes is a "printed circuit board." Ex. 1079 ¶ 15. He does not, however, identify anything he believes is inaccurate in the description in that article. *See id.* ¶¶ 16–19 (urging instead that Schröder's inlay is a PCB under the Wikipedia definition). We credit Dr. Mercier's testimony that "Schröder's inlay does not include the described features," which further supports our finding that one of ordinary skill in the art would not consider that inlay to be a PCB. Ex. 2018 ¶ 101.

Petitioner fails to identify in Schröder any copper or other conducting layer from which traces, for example, are etched.[13]

Further, the evidence provided by Patent Owner as to PCB manufacture evinces many specific structural features of a PCB that are missing from Schröder's disclosure and Petitioner's showing. Ex. 2011. For instance, Exhibit 2011 describes that PCBs "are created by placing a thin layer of conductive material onto an insulating board, called the substrate material. Tiny electronic components are then put onto the substrate and connected to these circuits through soldering." *Id.* at 2. The document further describes the "key parts" of a PCB as including a substrate, a prepreg, metal foil, coatings, bonding film, and vias and via fills. *Id.* at 2–3. The document also describes fourteen steps to manufacture a PCB, including etching the board to "eliminate[] exposed copper while keeping just the needed copper traces intact." *Id.* at 3–4 (step five).

Although Schröder describes that "a depression is manufactured in the carrier foil, e.g. by milling, lasering, etching before the chip module 10, the antenna coil 8 and optional further electronic devices are inserted into the depression," (Ex. 1007, 13:27–31), Petitioner has not explained how such step creates the needed traces to electrically connect the electronic devices. The only conductive portions identified by Petitioner are the antenna coils 8, which are printed with conductive paste. Petitioner does not show where Schröder describes how chip module 10, for instance, is electrically connected to any other components, and Petitioner does not adequately

[13] Petitioner's and Patent Owner's counsel agreed at the hearing that inlay 12 made from Kapton, for instance, is an insulating layer. Tr., 65:2–4, 76:6–9.

demonstrate how a person having ordinary skill in the art would have understood Schröder's description to include such connections.

Further, we disagree with Petitioner's assertion that Dr. Mercier acknowledged that Schröder teaches a wiring pattern. Reply 4 n.3 (citing Ex. 1081, 106:17–25). We do not see where in the cited testimony Dr. Mercier discusses a wiring pattern. Instead, he testified that although Schröder says that the antenna coil 8 can be printed on the carrier foil by means of conductive paste, he did not "see reference to printing of other devices onto the carrier foil." Ex. 1081, 106:17–20. Further, we credit Dr. Mercier's testimony that the fact that "the inlay materials are 'commonly understood to be printed circuit board materials' does nothing to support the conclusion that inlay 12 is a printed circuit board" and that Schröder's description of inlay 12 does not include many features of a PCB, such as conductive layers sandwiched with insulating layers and patterns of traces etched on copper layers (Ex. 2018 ¶¶ 96, 100–101) over the competing testimony from Dr. Anthony (Ex. 1002 ¶¶ 156–157; Ex. 1079 ¶¶ 16–19), which is not sufficiently explained in Dr. Anthony's original Declaration and is not supported by the teachings in Schröder or the other evidence of record. Thus, we find that Petitioner has not met its burden to demonstrate that Schröder's inlay 12 is a PCB.

For these reasons, we find that Petitioner has not met its burden to show that Schröder discloses, or at least renders obvious, "a printed circuit board disposed within a cavity defined by the external housing component and the internal housing component, wherein the printed circuit board is configured to conform to arc within the cavity," as recited in element 1[c].

Thus, Petitioner has not met its burden to show by a preponderance of the evidence that claim 1 is unpatentable over Schröder.

ii. Claims 5, 7, and 12–15

Claims 5, 7, and 12–15 depend from claim 1. Ex. 1001, 45:44–47, 45:52–54, 46:23–46. Petitioner presents evidence of unpatentability for these challenged dependent claims based on Schröder. Pet. 28–34. Because these challenges similarly rely on an assertion that Schröder's inlay 12 is a PCB, we likewise find that Petitioner has failed to meet its burden to show that claims 5, 7, and 12–15 are unpatentable over Schröder.

F. Ground 2: obviousness over Schröder and LeBoeuf

Petitioner contends that dependent claims 2–4, 6, and 8–10 would have been obvious over Schröder in view of LeBoeuf. Pet. 35–49. Claims 2–4, 6, and 8–10 depend from claim 1. Ex. 1001, 45:30–43, 45:48–51, 45:55–46:14. Petitioner relies on the same deficient showing that Schröder's inlay 12 is the PCB of claim 1, from which these challenged claims depend, in its challenge based on Schröder in view of LeBoeuf. *See* Pet. 37–49 (relying on LeBoeuf for the features of dependent claims 2–4, 6, and 8–10). For the same reasons discussed above in our analysis of Ground 1, we likewise find that Petitioner has failed to meet its burden to show that claims 2–4, 6, and 8–10 are unpatentable over Schröder in view of LeBoeuf.

G. Ground 3: obviousness over Schröder, LeBoeuf, and Niwa

Petitioner contends that dependent claims 8–11 would have been obvious over Schröder in view of LeBoeuf and Niwa. Pet. 49–58. Claims 8–11 depend from claim 1. Ex. 1001, 45:55–46:22. Petitioner relies on the

same deficient showing that Schröder's inlay 12 is the PCB of claim 1, from which these challenged claims depend, for its challenge based on Schröder in view of LeBoeuf and Niwa. *See* Pet. 51–58 (relying on Niwa for the features recited in claims 8–11). For the same reasons discussed above in our analysis of Ground 1, we likewise find that Petitioner has failed to meet its burden to show that claims 8–11 are unpatentable over Schröder in view of LeBoeuf and Niwa.

H. Ground 4: obviousness over Schröder and Mestas

Petitioner contends that dependent claims 16 and 17 would have been obvious over Schröder in view of Mestas. Pet. 58–63. Claims 16 and 17 depend from claim 1. Ex. 1001, 45:55–46:22.

Petitioner submits that each reference "relates to the same well-known technologies," and they are "analogous art and teach improvements to the same type of electronic wearable devices having similar structure components, including, for example, inner and outer surfaces, a cavity, and a battery and PCB within the cavity." *Id.* at 58–59 (citing Ex. 1002 ¶¶ 212–216; Ex. 1007, 11:46–48 (battery), 12:26–42 (PCB), Figs. 4–10 (structure); Ex. 1010 ¶¶ 150 (cavity, battery), 151 (structure), 154 (cavity), 157 (structure), 164 (PCB), 168 (battery), Figs. 4, 6 (structure)). Petitioner contends "it would have been obvious to modify Schröder's finger ring to include batteries similar to Mestas's that have a 'curvilinear or curved configuration.'" *Id.* at 59 (citing Ex. 1010 ¶ 168; Ex. 1002 ¶ 214).

Patent Owner contends that a person having ordinary skill in the art would not have been led to modify Schröder's finger-ring to use a curved

battery within the cavity between the ring components, based on the teachings of Mestas. Resp. 49–54.

Petitioner relies on the same deficient showing that Schröder's inlay 12 is the PCB of claim 1, from which these challenged claims depend. For the same reasons discussed above in our analysis of Ground 1, we likewise find that Petitioner has failed to meet its burden to show that claims 16 and 17 are unpatentable over Schröder in view of Mestas. We also agree with Patent Owner that Dr. Anthony's proposed combination of Schröder and Mestas is not supported with adequate reasoning.

The record supports Patent Owner's argument that Mestas's batteries are much too large to fit within a ring form factor, and "Mestas's batteries, layout, and other components . . . would have to be scaled down 5 to 10 times to be appropriately sized for a finger worn ring." Resp. 64 (internal quotation marks omitted) (citing Dr. Anthony's cross-examination testimony at Ex. 2021, 313:12). Moreover, we do not credit Dr. Anthony's testimony that miniaturization of the battery would have been "trivial to implement." Ex. 1002 ¶ 215. Dr. Anthony admitted on cross examination that it would not have been within the level of skill of a person having ordinary skill in the art to design a smaller version of Mestas's battery, and that such a person would need to procure a battery of the appropriate size and specifications for implementation in a finger-ring from a battery manufacturer. Ex. 2021, 315:9–318:9. Yet Dr. Anthony had not ascertained, for purposes of his testimony, whether there was a battery available in 2013 that was appropriate to fit within the inlay space of the modified version of Schröder's finger-ring that he and Petitioner allege would have been obvious to one of skill in the art at that time. *Id.* at 321:5–10.

Further, we credit Dr. Mercier's testimony that Dr. Anthony's testimony fails to consider the differences in power requirements between Mestas and Schröder or to account for the constraints of such a substantially smaller form factor in Schröder's finger-ring as compared to Mestas's wrist device. Ex. 2018 ¶¶ 141–142. Although large curved batteries suitable for use in a wrist band or other larger wearable device, such as shown in Mestas, were known at the time of the '702 patent, we also have evidence that prior art "finger ring wearables up to the '702 patent had used 'coin' type batteries." Resp. 52 (citing Ex. 2018 ¶ 143). We credit Dr. Mercier's testimony that a person having ordinary skill in the art would look to a coin type battery for the necessary power requirements of Schröder's device. Ex. 2018 ¶ 143. Indeed, this testimony is consistent with the other art of record that consistently shows the use of flat batteries in finger-ring devices, often stacked above and protruding from the general ring shape of the device. *See, e.g.*, Ex. 1005 (Niwa), Figs. 22, 28; Ex. 2025 (Asada '701 patent), Fig. 4; Ex. 1035 (Rhee), Figs. 7-1, 8-1, 8-2; Ex. 1037 (Asada article), Fig. 9; Ex. 1034 (Asada '199 patent), Fig. 2; Ex. 1028 (Kimura), Fig. 24; Ex. 2018 ¶¶ 61–70. In fact, Oura's first-generation ring design, released in 2015, used a Superbowl ring-type design, with the battery and other components mounted on top of the ring. Ex. 2034; Ex. 2018 ¶ 71.

Based on these findings, Petitioner has not met its burden to show by a preponderance of the evidence that a person having ordinary skill in the art would have been led to modify Schröder's finger-ring to place a curved battery between the internal and external housing components in light of the teachings in Mestas. Thus, Petitioner has not met its burden to show by a

preponderance of the evidence that dependent claims 16 and 17 of the '702 patent are unpatentable over Schröder in view of Mestas.

I. Ground 5: obviousness over LeBoeuf, Schröder

Petitioner contends claims 1–15 would have been obvious over LeBoeuf in view of Schröder. *See* Pet. 63–90. Patent Owner contests Petitioner's motivation to combine these references and the proposed combination and contends that, even if combined, LeBoeuf in view of Schröder does not disclose or suggest the printed circuit board limitation (element 1[c]) of claim 1. *Id.* at 56–59. Patent Owner does not raise any additional arguments for dependent claims 2–15. *Id.*

i. Claim 1

Petitioner contends, with reference to LeBoeuf's Figures 22A and 22B, that LeBoeuf discloses a wearable ring device to be worn on a finger and having cylindrical outer body portion 72 and generally cylindrical inner body portion 74 secured together in concentric relationship, where inner body portion 74 defines an inner circumferential surface of the ring. Pet. 66–69 (citing Ex. 1012, 27:58–28:1, Figs. 22A, 22B; Ex. 1002 ¶¶ 227–230) (addressing preamble and limitations 1[a] and 1[b(i)]). Petitioner further contends that LeBoeuf's inner body portion 74 includes a "light transmissive material" of silicone and that a person having ordinary skill in the art "would have understood that a 'light transmissive material' is substantially transparent to allow the transmission of light waves by guiding light through the ring." *Id.* at 70 (citing Ex. 1012, 28:18–22, 28:26–34; Ex. 1002 ¶ 231) (addressing limitation 1[b(ii)]). Petitioner further submits that LeBoeuf's inner body portion 74 also includes windows 74W, i.e., substantially

transparent materials, that deliver light from a light emitter to the finger and back to the light detector. *Id.* at 71 (citing Ex. 1012, 28:40–42, Fig. 22B; Ex. 1002 ¶ 231).

Petitioner further contends that LeBoeuf's base 50, which is disposed within the cavity defined by the inner and outer body portions 74, 72, may be a printed circuit board. Pet. 71–73 (citing Ex. 1012, 14:28–38, 18:23–27, 28:11–18; 19:3–5, Fig. 22B; Ex. 1002 ¶¶ 232–237) (addressing limitation 1[c]). Further addressing limitation 1[c], Petitioner contends that "LeBoeuf's printed circuit board also is configured to conform to an arc within the cavity, and it would have been obvious for LeBoeuf's printed circuit board to conform to an arc" in light of the teachings of Schröder. *Id.* at 73–77 (citing Ex. 1012, 18:23–27, 27:61–67, 28:3–8, Ex. 1002 ¶¶ 233–237; Ex. 1007, 12:8–9, 12:28–29, Figs. 7, 8).

Petitioner also submits that LeBoeuf's base 50 provides support for one or more light-emitting components, i.e., optical emitter 24, that emits light that is guided by the "transmissive light material," through inner body portion 74 and windows 74W to deliver light to the finger. Pet. 77–79 (citing Ex. 1012, 14:28–38, 28:11–19, 28:30–32, 28:40–42, 28:60–62, Fig. 22B; Ex. 1002 ¶ 238) (addressing limitation 1[d]). Petitioner also submits that LeBoeuf's base 50 provides support for one or more light-receiving components, i.e., optical detector 26 and optical noise detector 26', that receive light from optical emitter 24 through the substantially transparent material of inner body portion 74. Pet. 79–81 (citing Ex. 1012, 14:28–38, 28:11–19, 28:30–34, 28:40–42, 28:53–59, 28:62–65, Fig. 22B; Ex. 1002 ¶¶ 239–240) (addressing limitation 1[e]).

Petitioner further contends that LeBoeuf's ring includes "a signal processor that is configured to receive and process signals produced by" optical detector 26 and optical noise detector 26'. Pet. 81–82 (citing Ex. 1012, 6:5–8, 12:27–30, 28:11–14; Ex. 1002 ¶ 241) (addressing limitation 1[f]). Finally, Petitioner contends that LeBoeuf's ring has a communication module, i.e., a transmitter, configured to transmit signals processed by the signal processor to a remote device. *Id.* at 82 (citing Ex. 1012, 6:6–8, 6:41–45, 12:25–29; Ex. 1002 ¶ 242) (addressing limitation 1[g]).

After considering the parties' arguments and evidence, we determine that Petitioner has shown that LeBoeuf in view of Schröder discloses or renders obvious all the elements of claim 1, but that this showing is relatively weak in several respects. We address below in detail the aspects of Petitioner's challenge contested by the parties. We also discuss Patent Owner's evidence of objective indicia of non-obviousness, which we find compelling and, when weighed with the record as a whole, sufficient to overcome any prima facie showing of obviousness by Petitioner.

1. *"a printed circuit board disposed within a cavity defined by the external housing component and the internal housing component, wherein the printed circuit board is configured to conform to arc within the cavity." (limitation 1[c])*

Petitioner contends, with reference to LeBoeuf's Figure 22B (reproduced below), that LeBoeuf's ring includes a printed circuit board disposed within a cavity defined by the external housing component and the internal housing component. Pet. 71–73.

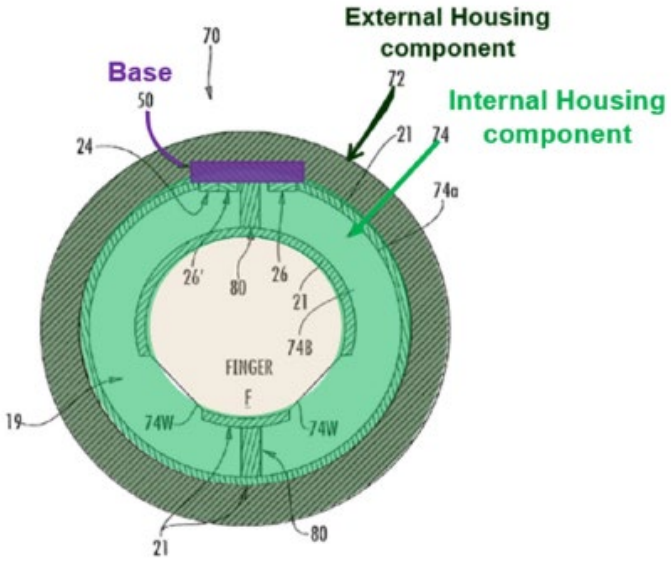


FIG. 22B

Figure 22B, reproduced above, shows a cross-sectional view of LeBoeuf's ring annotated by Petitioner to indicate an "External Housing component" (colored in dark green), an "Internal Housing component" (colored in light green) and a base 50 (in purple). Pet. 73. Petitioner contends that LeBoeuf's base 50, which supports an optical emitter 24, an optical detector 26, and an optical noise detector 26', "may be a printed circuit board." *Id.* at 71–72 (citing Ex. 1012, 28:11–18, 14:28–38, 18:23–27, Fig. 22B). Petitioner also contends that a person having ordinary skill in the art would have understood base 50 to be "disposed within the cavity defined by the internal and external housing components." *Id.* at 72 (citing Ex. 1002 ¶ 232; Ex. 1012, 19:3–5).

Petitioner contends that "it would have been obvious for LeBoeuf's printed circuit board to conform to an arc" in that "LeBoeuf's ring is a 'circular band' that encircles the user's finger 'with a cylindrical outer body portion 72 and a generally cylindrical inner body portion 74.'" Pet. 73 (citing Ex. 1002 ¶ 233; Ex. 1012, 27:61–67). Petitioner contends LeBoeuf

teaches that "external housing component 72 of the ring device may also be 'a flex circuit containing various electronic components, such as a microprocessor, D/A converter, power source, power regulator, and the like.'" Pet. 74 (citing Ex. 1012, 28:3–8). Thus, Petitioner contends a person having ordinary skill in the art "would have understood . . . LeBoeuf's base 50 as a 'flex printed circuit board' disposed between the external and internal housing components of the ring because it has electronic components positioned on it and is arranged inside the ring (i.e., between the ring's outer body portion 72 and interior body portion 74)." *Id.* (citing Ex. 1002 ¶ 234).

Petitioner further submits that "[a]lthough base 50 is depicted as rectilinear in the figures, a [person having ordinary skill in the art] would have also understood that the cavity defined by the circular inner and outer body portions of LeBoeuf is curved and thus the flexible printed circuit board disposed within the cavity would also be curved to conform to the shape of the cavity, as shown in modified Figure 22B'" and thus "conform to the arc of the cavity." *Id.* at 74–75 (citing Ex. 1002 ¶ 234).

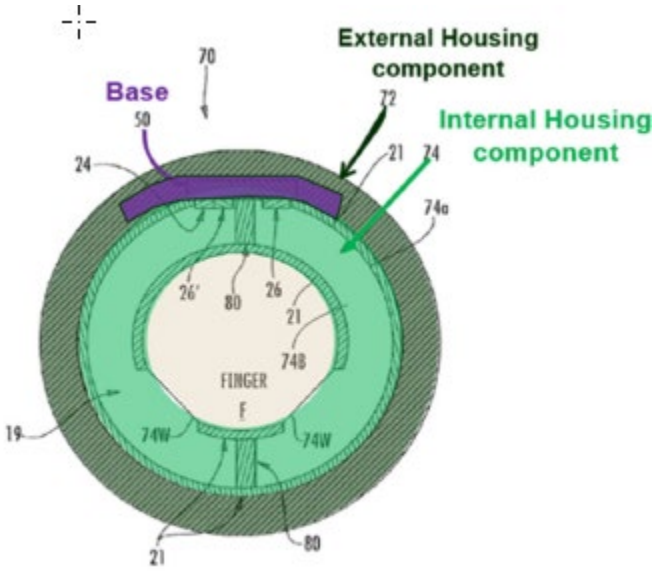


FIG. 22B'

Modified Figure 22B', reproduced above, shows a cross-sectional view of LeBoeuf's ring, annotated by Petitioner to indicate an "External Housing component" (colored in dark green), an "Internal Housing component" (colored in light green) and a "Base" 50 (in purple). Pet. 73. Base 50 has been modified by Petitioner to add curved portions on the ends of the rectilinear portion shown in Figure 22B.

Patent Owner argues "there is no cavity formed between the inner and outer body portions that has an 'arc.'" Resp. 58 (citing Ex. 2018 ¶ 151). Instead, Patent Owner contends that the cavity defined by the inner body and outer body "is rectangular and has no arc." *Id.*

Petitioner replies that "LeBoeuf explicitly teaches its base 50 is a 'flexible printed circuit board'" and that a person having ordinary skill in the art in light of LeBoeuf's teachings as a whole "would have understood base 50 would conform to an arc within the cavity because the ring is a circular band that encircles the finger." Reply 15–16 (citing Ex. 1012,

14:28–38, 18:23–28, 27:61–67; Ex. 2021, 460:19–164:3 [sic, 460:19–464:3]; Ex. 1074 ¶ 52 [sic, Ex. 1079 ¶ 52]).

Petitioner has not shown that "LeBoeuf explicitly teaches its base 50 is a 'flexible printed circuit board.'" LeBoeuf teaches that base 50, in all of the earbud embodiments depicted in Figures 3, 4A–4D, 5, 6, 7A–7B, 8A–8D, 9A–9B, and 11A–11B, "may include any combination of a printed circuit board, electrical connectors, and housing component for a headset." Ex. 1012, 14:28–32. Each of these Figures depicts base 50 as a flat, planar component. *Id.*, Figs. 3, 4A–4D, 5, 6, 7A–7B, 8A–8D, 9A–9B, and 11A–11B. LeBoeuf mentions a flexible printed circuit board only in the context of the construction of flexible optical emitter 24 (as shown in Figs. 7A–7B). *Id.* at 18:9–27. Flexible optical emitter 24 is depicted as being connected to base 50, but these are separate components. *Id.* at Figs. 7A, 7B.

Further, contrary to Petitioner's suggestion, base 50 is not inherently non-planar simply because the ring embodiment of Figures 22A and 22B has a curved exterior, i.e., cylindrical outer body portion 72 and generally cylindrical inner body portion 74 secured together. The cavity existing between these portions to house base 50 could be planar. Indeed, to the extent that cavity is coextensive with base 50, LeBoeuf depicts it as a planar, rectangular cavity in Figure 22B. For this reason, we credit Dr. Mercier's testimony that "[e]ven if the base 50 is construed to occupy a cavity defined by the inner body and outer body, the cavity is rectangular and has no arc." Ex. 2018 ¶ 151.

In contrast, we do not find adequate support in the passages relied on by Dr. Anthony to support his testimony that LeBoeuf "explicitly teaches that its base 50 is a 'flexible printed circuit board.'" Ex. 1002 ¶ 232; Ex.

1079 ¶ 52. Specifically, as explained above, the cited passages support that base 50 can be a printed circuit board, but the flexible printed circuit board discussed in col. 18, lines 23 through 27 of LeBoeuf relate to a separate component, i.e., optical emitter 24, and not base 50.

That said, LeBoeuf suggests that "outer body portion 72 may include a flex circuit containing various electronic components, such as a microprocessor, D/A converter, power source, power regulator, and the like." Ex. 1012, 28:3–6. We agree with Petitioner that this disclosure suggests the use of a flexible PCB within the cavity formed between cylindrical outer body portion 72 and cylindrical inner body portion 74. We find also that Petitioner has articulated some reasoning supporting that an ordinarily-skilled artisan would have been motivated to modify LeBoeuf's base 50 to be a flexible printed circuit board in view of the teachings of Schröder.

Petitioner contends that, to implement the suggestion in LeBoeuf to include multiple light emitters (citing Ex. 1012, 28:16, 28:60–62), a person having ordinary skill "would have placed the additional light emitters along the circumference of the internal housing component of the ring" and "would have modified base 50 (the claimed printed circuit board) to be curved to support the additional light emitters." *Id.* at 75. Petitioner also asserts that Schröder's inlay 12 is configured to conform to the arc of the cavity between the internal and external housing components, and that a person having ordinary skill in the art "would have been motivated to modify LeBoeuf's printed circuit board to include Schröder's flexible carrier material in order to provide electrical connections to all of [the] components inside the ring, such as additional light emitters." Pet. 75–76.

Patent Owner disputes these contentions, urging that Petitioner engages in hindsight reconstruction in attempting to modify LeBoeuf as shown in Petitioner's modified Figure 22B'. Resp. 58. Specifically, Patent Owner characterizes Petitioner's modification as "pure speculation (driven by hindsight)" and notes that "LeBoeuf discloses the use of multiple light emitters and did not make the modification proposed by Petitioner" and "[t]here is no evidence that LeBoeuf's disclosed embodiment could not accommodate the additional emitters" without the proposed modification. *Id.* at 58–59 (citing Ex. 2018 ¶ 153). Patent Owner also argues that Petitioner's modification of LeBoeuf with Schröder "apparently relies on the fact that Schröder discloses that inlay 12 is a printed circuit board, which, as explained above, it is not." *Id*. at 59 (citing Ex. 2018 ¶ 154).

Petitioner replies that a person having ordinary skill in the art "would have been motivated to curve LeBoeuf's PCB in view of Schröder's inlay 12 between the housing components to conform to the ring and thus correspond to an arc." Reply 16 (citing Ex. 1079 ¶ 53; Ex. 2021, 463:4–465:18). Dr. Anthony's supplemental Declaration explains that "[t]he modification of LeBoeuf's base 50 is not just based on a POSITA's understanding, but in view of Schröder, which teaches to arc the PCB to correspond to the ring." Ex. 1079 ¶ 53.

We understand Petitioner's proposed modification of LeBoeuf's base 50 to rely on Schröder's teaching of a flexible carrier to which components are mounted disposed within an arcuate cavity between two ring components and configured to conform to the arc within that cavity. We do not understand Petitioner to rely solely on Schröder for teaching a printed circuit board, but also that Petitioner's showing is premised on LeBoeuf's

teaching of base 50 as a printed circuit board for mounting the components. Thus, our determination above that Petitioner has not met its burden to demonstrate that Schröder's inlay 12 is a printed circuit board does not end the inquiry for Ground 5.

As identified by Petitioner, LeBoeuf teaches the use of a printed circuit board for base 50. For instance, LeBoeuf teaches that "base 50 . . . may include any combination of a printed circuit board, electrical connectors, and housing component." Ex. 1012, 14:28–31, 28:11–14. Moreover, while LeBoeuf does not teach that base 50 is itself a flexible printed circuit board, LeBoeuf does disclose the use of flexible printed circuit boards for other components of its devices. For example, in the earbud embodiments of Figures 7A and 7B, LeBoeuf discloses a flexible optical emitter 24 that "may be a traditional light-emitting diode (LED) and photodetector (PD) integrated onto a flexible printed circuit board. *Id.* at 18:24–27. And LeBoeuf also discloses in the finger-ring embodiment of Figures 22A and 22B that "outer body portion 72 may include a flex circuit containing various electronic components, such as a microprocessor, D/A converter, power source, power regulator, and the like." *Id.* at 28:3–6. Thus, LeBoeuf contemplates using flexible printed circuit boards, which conform to the desired form factor, e.g., earbud or finger-ring, to mount the various electrical components.

Schröder discloses a flexible carrier in the form of inlay 12 that conforms to the arc within the cavity between finger-ring components 16, 18. *See, e.g.*, Schröder, Figs. 4, 7. Schröder describes that electronic devices, such as chip module 10, can be mounted in depressions in the flexible carrier foil. Ex. 1007, 13:23–31.

We agree with Petitioner that these teachings evince a motivation for modifying LeBoeuf to use a flexible PCB configured to conform to the arc within the cavity of the finger-worn wearable ring device. This is because LeBoeuf discloses the use of flexible PCBs designed to conform to the form factor of certain of its embodiments, and Schröder discloses a flexible carrier for electronic components that conforms to the arc within the cavity of a finger-ring and is similar in some respects to a PCB.

As to the configuration of multiple emitters within LeBoeuf's ring embodiment, although LeBoeuf describes having multiple emitters, it does not show a configuration of Figure 22B with multiple emitters. Ex. 1012, 28:60–61 (describing multiple light emitters 24 may be utilized), Fig. 22B (showing a single optical emitter 24). LeBoeuf does depict, however, in the earbud configuration of Figs. 7A and 7B, a way to implement multiple emitters by mounting them on a flexible printed circuit board. Specifically, LeBoeuf describes that "[i]n some embodiments, the flexible optical emitter 24 may be part of a flexible optical circuit comprising the form-factor of 24 shown in FIGS. 7A-7B, where the flexible optical circuit may include one or more optical emitters and detectors as well as amplifiers, microprocessors, wireless circuitry, and signal conditioning electronics." Ex. 1012, 18:9–15, Figs. 7A, 7B. This teaching suggests using a flexible PCB to mount multiple optical emitters. And Schröder shows how to adapt a flexible carrier for a ring form-factor.

For these reasons and on this narrow point, we credit Dr. Anthony's testimony that a person having ordinary skill in the art would have "placed the additional light emitter along the circumference of the internal housing component (rather than stack them at one location in which case the ring's

thickness might increase and the innermost emitter would block those behind) device and would have modified base 50 (claimed printed circuit board) to be curved to support the additional light emitter as well" (Ex. 1002 ¶ 234) over Dr. Mercier's competing testimony that Petitioner's proposed modification for this ground is "pure speculation (driven by hindsight)." Ex. 2018 ¶ 153.

Patent Owner further contends that a person having ordinary skill in the art would not have "look[ed] to combine Schröder's security application with LeBoeuf's physiological sensing application, particularly in light of LeBoeuf's use of a light guiding region that would require a complete redesign of Schröder, with no ascertainable benefit." Resp. 56. This argument is not persuasive because it is premised on a redesign of Schröder; it does not address Petitioner's proposed modification of *LeBoeuf* to incorporate a flexible PCB for base 50 based on the teachings of Schröder's arcuate cavity formed by the U-shaped components 16, 18 and the flexible carrier for inlay 12, as set forth in Petitioner's challenge to claim 1.

Patent Owner further argues that the features relied on by Petitioner in the motivation to combine "have no relevance to the claimed invention" and "no bearing on obviousness." Resp. 56–57 (citing Ex. 1002 ¶¶ 223–224; Ex. 2018 ¶ 149). We disagree as to claim 1. Petitioner cites specifically to the ring components disclosed in Figures 6 through 8 of Schröder that provide for an arcuate cavity between the ring components 16, 18 and a flexible carrier material for inlay 12 that allows the inlay 12 to fit within the arcuate cavity. These components are relevant to the claimed invention which recites a printed circuit board that "conforms to arc within the cavity."

We find that these teachings of Schröder are relevant to and probative of obviousness at the time of the invention.

Patent Owner also asserts that "[t]he manner in which Petitioner is combining the two references is also entirely unclear." Resp. 57. With respect to the challenge to claim 1, we find that Petitioner's proposed modification of LeBoeuf's ring with the teachings of Schröder is clear. Petitioner relies on Schröder for the use of an arcuate cavity between concentric ring components and a flexible carrier that conforms to the arc within the cavity (limitation 1[c]). Pet. 74–77.

2. Objective indicia of non-obviousness

Having considered Petitioner's evidence of obviousness over LeBoeuf in view of Schröder, we now consider and weigh Patent Owner's evidence regarding alleged objective indicia of non-obviousness.

a. Nexus

"[A] patentee is entitled to a rebuttable presumption of nexus between the asserted evidence of secondary considerations and a patent claim if the patentee shows that the asserted evidence is tied to a specific product and that the product '*is* the invention disclosed and claimed.'" *Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1373 (Fed. Cir. 2019) (quoting *Demaco Corp. v. F. Von Langsdorff Licensing Ltd.*, 851 F.3d 1387, 1392 (Fed. Cir. 1988)(emphasis added)). "That is, presuming nexus is appropriate when the patentee shows that the asserted objective evidence is tied to a specific product and that product embodies the claimed features, and is coextensive with them." *Id.* (internal quotation marks omitted). If, on the other hand, "the thing that is commercially successful is not coextensive with the patented invention—for example, if the patented invention is only a component of a

commercially successful machine or process, the patentee is not entitled to a presumption of nexus." *Id.* (internal quotation marks omitted).

"[T]he degree of correspondence between a product and a patent claim falls along a spectrum. At one end of the spectrum lies 'perfect or near perfect correspondence,' and at the other end lies 'no or very little correspondence.'" *Teva Pharms. Int'l GmbH v. Eli Lilly and Company*, 8 F.4th 1349, 1361 (Fed. Cir. 2021) (quoting *Fox Factory*, 944 F.3d at 1374). "Bound up with the coextensiveness requirement is the issue of 'unclaimed features' in a commercial product." *Id.* "[L]ike the coextensiveness requirement itself, the concept of unclaimed features is best viewed as part of a spectrum." *Id.* On one end of the spectrum, the unclaimed features "amount to nothing more than additional insignificant features," and on the other end, the unclaimed features are "critical," "claimed by a different patent," and "materially impact[] the product's functionality." *Id.* (quoting *Fox Factory*, 944 F.3d at 1375). This analysis "requires the fact finder to consider the unclaimed features of the stated products to determine their level of significance and their impact on the correspondence between the claim and the products." *Id.*

Patent Owner argues its evidence shows that Ouraring's commercial rings, Ring Gen. 3 Horizon[14] and Ring Gen. 4 "are coextensive commercial embodiments of the '702 patent" such that it is entitled to a rebuttable

[14] There are two versions of the Oura Ring Gen. 3 product—the Horizon and the Heritage models. Exs. 2056, 2057. Patent Owner presents evidence in support of presumption of nexus as to the Oura Ring Gen. 3 Horizon product.

presumption of nexus between the asserted evidence of secondary considerations and the patented claims 1, 16, and 17. Resp. 60–78.

Petitioner does not dispute that the Oura Ring Gen. 3 Horizon and Gen. 4 products practice these claims, but argues that the Oura Ring Gen. 3 and Gen. 4 products "include significant unclaimed features that materially impact the product's functionality" such that they are not entitled to a presumption of nexus. Reply 17–19.

Petitioner argues the Oura Ring Application[15] is an essential feature of the products that is not claimed in the '702 patent, but is covered in another of Patent Owner's patents—U.S. Patent No. 10,842,429. *Id.* at 17–18. Petitioner also identifies the Oura Membership[16] that was released with the Oura Ring Gen. 3 product as another unclaimed, but essential feature. *Id.* at 18. Petitioner also contends that the sleek and comfortable design and materials of the Oura Ring Gen. 3 and Ring Gen. 4 products are not claimed in the '702 patent, but are covered in another of Patent Owner's patents—U.S. Patent No. 11,599,147. *Id.* at 18. Finally, Petitioner contends that because Patent Owner points to the same products for objective indicia across multiple patents challenged in related proceedings whose "claims do

[15] Mr. Clarke describes that "[t]he Oura Ring works in conjunction with the Oura application . . . enabling users to review measured data and gain insights into their health and wellness." Ex. 2019 ¶ 20. Specifically, the Oura application provides Oura Ring users with access to daily Sleep, Readiness, and Activity scores. *Id.*

[16] Mr. Clarke describes that "[t]hrough the Oura Membership, a user can receive the additional personalized data and insights in the Oura application, such as an in-depth sleep analysis, live and accurate heart rate monitoring, body temperature readings for early illness detection and period prediction, among others." Ex. 2019 ¶ 21.

not cover the same invention," nexus cannot be presumed. *Id.* (citing *Fox Factory*, 944 F.3d at 1377).

At the outset, we find that the evidence presented by Patent Owner is sufficient to establish that the Oura Ring Gen. 3 Horizon and Gen. 4 products are commercial embodiments of claims 1, 16 and 17 of the '702 patent and that these claims are coextensive in that they encompass the entire structural apparatus of these products. *See* Resp. 60–78; Exs. 2029, 2030; Ex. 2018 ¶¶ 160–188 (comparing the commercial embodiments to each limitation of claims 1, 16, and 17). Mr. Davies (Petitioner's witness on the objective indicia of non-obviousness) did not dispute that the Oura Ring Gen. 3 Horizon and Gen. 4 products practice claims 1, 16, and 17. Ex. 2118, 52:15–17. But more than just practicing the claimed invention, Patent Owner's evidence supports that these claims recite the overall structure that provides for the particular form factor of the Oura Ring Gen. 3 Horizon and Gen. 4 products, i.e., a finger-ring "wedding band" design that allows for the electronic components to be entirely contained within the ring housing with a curved external surface having no protrusions or bulges. Ex. 2018 ¶¶ 159–188, 200.

We do not agree that the Oura Ring Application and/or Oura Membership are essential, unclaimed features such that a presumption of nexus is not appropriate. The Oura Application functions only in conjunction with the Oura Ring. The Oura Application cannot receive or display any information absent the Oura Ring's ability to collect the information from the user. Ex. 2019 ¶¶ 20, 21, 24. Even though the Oura Application may provide additional unclaimed functionality, such as displaying activity, sleep, and readiness scores based on the data collected by the Oura Ring that

allow "a user to take advantage of the ring's offerings," this functionality is secondary to the ring's ability to collect the data, without which, the Oura Application would serve no purpose. Ex. 2019 ¶ 21; Ex. 2024, 93:22–95:22. Also, users are able to access the data online. Ex. 2019 ¶ 21; Ex. 2024, 95:16–21.

"[T]here is rarely a *perfect correspondence* between the claimed invention and the product." *Fox Factory*, 944 F.3d at 1374. We find that on the spectrum of "unclaimed features," the Oura Ring Application is closer to the "insignificant features" end because, while it enhances the user's ability to access and interpret their data, it does not materially impact the functionality of the Oura Ring.[17] *See Teva Pharms. Int'l GmbH v. Eli Lilly and Co.*, 8 F.4th 1349, 1361 (Fed. Cir. 2021) (explaining that "like the coextensiveness requirement itself, the concept of unclaimed features is best viewed as part of a spectrum").

Similarly, the Oura Membership, which provides add-on features such as additional personalized data and insights, is dependent on ring sales and does not materially impact the Oura Ring's functionality in that such membership is optional, and the ring is fully functional without a Membership. Ex. 1083, 192:10–17; Ex. 2019 ¶ 21; Ex. 2024, 95:11–13. Thus, we likewise find that on the spectrum of "unclaimed features," the Oura Ring Membership is closer to the insignificant feature end than to a critical feature end. *See Teva*, 8 F.4th at 1361.

[17] The ALJ in the parallel ITC Investigation, presented with similar arguments as to the related '178 patent, rejected the theory that the existence of the Oura Application countered a presumption of nexus. Ex. 2122, 109–110.

We are likewise not persuaded by Petitioner's arguments that the sleek and comfortable design and materials are essential, unclaimed features. Reply 18. The specific structure claimed in the '702 patent of a finger-ring comprised of internal and external housing components having circumferential surfaces with electronic components disposed within a cavity formed between the housing components creates the sleek and comfortable "wedding band" form factor. Ex. 2018 ¶ 201. Thus, the sleek and comfortable design of the Gen. 3 Horizon and Gen. 4 rings is not an added feature, but is a result of the claimed housing structures and configuration. Further, we do not agree that a specific material for the housing components is an essential, unclaimed feature that would detract substantially from the coextensiveness of the ring products and the claims of the '702 patent. The '702 patent describes a variety of materials from which its ring can be made. *See* Ex. 1001, 17:35–48. Petitioner offers no explanation why the "comfortable" materials it refers to are any different than the materials described in the '702 patent[18], much less show that they are a critical feature that would shift the balance of the coextensiveness analysis in this proceeding. *See* Reply 18.

Finally, Petitioner's argument that there is no nexus because Patent Owner asserts the same objective indicia evidence in multiple proceedings

[18] Petitioner cites evidence that the Oura Ring Gen. 3 Horizon and Gen. 4 products are made of titanium. Reply 18 (citing Ex. 2059, 2; Ex. 2098; Ex. 2102). The '859 patent teaches that its device housing may be made from titanium. Ex. 1001, 17:35–48. Petitioner's bare citation to the '147 patent does not identify any allegedly critical feature missing from the '702 patent, nor show that these products embody that feature, and the testimony it cites is inapposite. *See* Reply 18 (citing Ex. 1082, 216:4–10, 18:24; Ex. 1087).

involving different patents is unavailing. The patents challenged in these proceedings, i.e., Patent Nos. 11,874,702; 10,139,859; 10,281,953; and 11,868,178, are all part of the same patent family. They claim the benefit of the same priority applications, presumably have the same expiration date, and, while there are some differences, many of their claims recite substantially overlapping subject matter, namely the structure of a finger-worn wearable ring device. That the '702 patent recites the inner housing component includes a "substantially transparent material" does not necessarily mean that this patent is directed to a different invention than the others. In fact, the claims of all four patents recite the essential components of the ring device, including internal and external housing components or enclosures or bounding members that when joined, define a circumferential cavity therebetween, and electronic components such as printed circuit boards, sensors, and batteries configured to fit within and/or conform to the cavity. Thus, we find that the identified claims of these patents all cover substantially overlapping subject matter and are entitled to a presumption of nexus for essentially the same reasons. *See WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1324–25, n.3 (Fed. Cir. 2016) (presuming nexus between a product and the asserted claims of two related patents where the patents cover essentially the same or similar inventions); *Fox Factory*, 944 F.3d at 1377 (explaining that "a presumption of nexus can be appropriate" for multiple patents where the claims of those patents "generally cover the same invention").

For these reasons, we find that Patent Owner has successfully shown that the Oura Ring Gen. 3 Horizon and Gen. 4 products are coextensive with claims 1, 16, and 17 of the '702 patent and is thus entitled to a presumption

of nexus between its objective indicia evidence and the patented claims 1, 16, and 17.

b. Commercial Success

For the reasons that follow, we find that Patent Owner's evidence of commercial success is probative of non-obviousness. The Oura Ring is Patent Owner's only product offering. Ex. 2019 ¶ 13. Patent Owner introduced a first generation of the Oura Ring (Gen. 1) in March 2015, a second generation (Gen. 2) in 2018, two versions of a third generation (Gen. 3) in 2021, and a fourth generation (Gen. 4) in 2024. Patent Owner presents evidence of purported commercial success of the Gen. 3 and Gen. 4 products based on absolute sales (both revenue and unit sales) and sales growth, the Oura Ring's contribution to Ouraring as a company, and its marketplace performance relative to competing products. Resp. 78–84; Ex. 2019 ¶¶ 32–50.

Patent Owner's testimony shows Ouraring experienced considerable sales growth since the introduction of the Oura Ring Gen. 3. Mr. Clarke testified that Patent Owner experienced "substantial sales and sales growth, especially since the introduction of the Oura Ring Gen. 3 in October 2021." Ex. 2019 ¶ 33 (citing Appendices 6, 7). Annual gross unit sales and monthly unit sales increased at a substantial rate after the introduction of the Oura Ring Gen. 3 product. *Id.* Patent Owner also produced evidence of substantial growth in Oura Membership subscribers, revenue attributable to the Oura Ring, and total revenues in the years following the release of the Oura Ring Gen. 3 product. *Id.* ¶¶ 34–36 (citing Appendices 8, 9).

Mr. Clarke testified that the Oura Ring is critical to Patent Owner's existence as a company. Ex. 2019 ¶ 37. He testified that after the launch of

Oura Ring Gen. 3, Patent Owner's valuation increased by more than 200% in one year (April, 2021 – April, 2022). *Id.* ¶ 38 (citing Exs. 2084, 2085, 2086). And he testified about partnerships that Patent Owner has entered into with partner companies as evidence of "Oura's marketplace success." Resp. 81–82 (citing Ex. 2019 ¶¶ 39, 40).

Not only has Patent Owner demonstrated revenue and unit sales growth, but it also has shown continued strong market share in view of growing competition in the market. We credit Mr. Clarke's testimony that the Oura Ring has created a new market segment within the wearables marketplace and that Patent Owner has been credited as "one of the market pioneers" for the smart ring marketplace segment among other accolades. Ex. 2019 ¶ 41 (citing Exs. 2036, 2048, 2058, 2089, 2090, 2091, 2092). We also credit Patent Owner's assertion "as of December 2024 that the market share of the Oura Ring within the smart ring marketplace segment was 49 percent, despite the growing competition within the segment." Resp. 83–84 (citing Ex. 2050).

Patent Owner's commercial success arguments are also supported by evidence demonstrating its clear leadership position within the smart ring marketplace segment and its ability to secure corporate partnerships. Ex. 2019 ¶ 39–42 (citing Exs. 2036 (describing Patent Owner as "one of the market pioneers"), 2048 (describing Patent Owner as "the smart ring market leader"), 2050 (demonstrating an industry forecast of Patent Owner's market share to be 49 percent by the end of 2024 after the debut of the Oura Ring Gen. 4 product), 2058 (describing Oura Ring as retaining its spot as "the best smart ring around" despite other competition), 2087–2088 (describing Ouraring partnerships), 2089 (describing Patent Owner as "synonymous

with 'smart ring'"), 2092 (describing that Ouraring's Gen. 4 product "continues to define the category" even amid a much more competitive field).

Petitioner offers a number of arguments against Patent Owner's commercial success showing. *See* Reply 19–24. Petitioner argues that earlier generations of the Oura Ring with the same features as the later rings did not succeed and that sales increases following the release of the Oura Ring Gen. 3 are due to unclaimed features, marketing, and the Oura Membership. Reply 19 (citing Ex. 1079 ¶ 62; Ex. 1080; Ex. 1083, 192:19–193:2); *see also id.* at 19–21. Petitioner further argues that Patent Owner's revenue is not solely from the ring but also from memberships and other sources. *Id.* at 19 (citing Ex. 2019 ¶ 36 n.8; Ex. 1083, 194:17–195:23); *see also id.* at 22. Petitioner also contends that Patent Owner did not create a new market segment because similar products and designs existed before Oura's Ring Gen. 3 products and the market growth follows general trends, not Oura's innovation. *Id.* at 19 (citing Ex. 2089; Ex. 1018, 15:11–14; Ex. 1080); *see also id.* at 23–24.

We do not find persuasive Petitioner's contention that Oura Ring's increased sales were due to increases in marketing expenditures. Even though Patent Owner increased its marketing expenditure from FY 2021 onward (Ex. 2107, 5; Ex. 2108, 5; Ex. 2109, 6; Ex. 2110, 6), its cost of sales, which includes marketing expenses, as a percent of revenue decreased over that same time period (Ex. 1083, 183:23–185:11; Ex. 2019 (Appx. 4)).

We also are not persuaded by Petitioner's argument that sales of Oura memberships detract from the overall substantial increases in sales and revenue after the launch of the Oura Ring Gen. 3. More than 80 percent of

Oura's revenue is directly attributable to ring sales. Ex. 2019 (Appx. 4). Almost all of Patent Owner's other revenue comes from Oura Membership subscriptions (*see id.*), which is a service that allows the user to receive "detailed performance metrics tracked by the Oura Ring." Ex. 2019 ¶¶ 20–21. Accordingly, we find Mr. Clarke's testimony that 100 percent of Patent Owner's overall revenue is attributable to the Oura Ring product to be credible. Ex. 2019 ¶ 37.

Further, we disagree with Petitioner that the relevant market for assessing commercial success is overall wearables as opposed to wearable smart rings. Mr. Davies bases his opinions regarding lack of commercial success on the fact that the entire smart ring product category is a relatively small component of the much broader wearables market, which includes unrelated devices such as smart watches, for example. Ex. 2118, 32:5–35:1. But the evidence of record shows that the industry recognizes smart rings as a distinct submarket of the broader wearables market. For instance, CNBC recognized the "smart ring market" as a separate market from other wearables and characterized Samsung's debut of its smart ring as Samsung's entry into the smart ring market, despite Samsung also selling smartwatches. Ex. 2036, 3–4. Similarly, Zdnet identified a separate smart ring market, describing Oura as "the smart ring market leader." Ex. 2048, 2; *see also* Ex. 2089, 2 (describing that "[t]he smart ring market size could surpass $1 billion by the 2030s"); Ex. 2091, 2 (discussing the smart ring market). Although the smart ring market is smaller than the smart watch market, it is nonetheless a distinct market segment, and the appropriate market to consider in determining Patent Owner's market share for purposes of commercial success. *See* Ex. 2019 ¶¶ 23–26.

It is undisputed that Patent Owner is a market leader and holds a substantial share of the smart market segment that it helped to establish. Ex. 2118, 23:18–22 (Mr. Davies acknowledging that Patent Owner has a "significant share within [the smart ring category of the market]"); Ex. 2019 ¶¶ 26, 42; Ex. 2036, 4 (describing Patent Owner as "one of the market pioneers."). We are not persuaded that Patent Owner's success in the smart ring market is simply due to serendipitous timing, as asserted by Petitioner. Reply 20–21 (citing Ex. 1080 ¶¶ 222–254). Indeed, as Patent Owner points out, Petitioner does not explain in its Reply what exactly it considers serendipitous about the timing of these products' entry into the market or seriously dispute the evidence showing substantially increased sales and revenues since their launch. *See* Sur-reply 20–21, 23–24 (bullet-pointing unrebutted aspects of its showing and noting that Petitioner's "serendipitous timing" argument is premised on incorporating lengthy expert testimony with little explanation).

We also disagree with Petitioner's argument that there is "little difference from Gens. 1–2 to Gens. 3–4" of the Oura Ring, yet the former "were not as commercially successful." Reply 20 (citing Ex. 1079, ¶¶ 63–67; Ex. 1080, ¶¶ 143–146; Ex. 2019, 54, 59). The evidence Petitioner cites does not show that the Gen. 1 and 2 rings actually practice claim 1, or any other claim, of the '702 patent. *See* Ex. 1079 ¶¶ 63–67; Ex. 1080 ¶ 143–146. For example, Petitioner's evidence does not show these products had an "external housing component defining an outer circumferential surface of the finger-worn wearable ring device" and "an internal housing component coupled to the external housing component, the internal housing component defining an inner circumferential surface of the finger-worn wearable ring

device." *See* Ex. 1079 ¶ 66 (stating only that Gen. 1 and 2 rings had "external and internal housing components, where the internal housing components contacts the user's tissue"); Ex. 1080 ¶ 143 (declaring only that "a portion of" the external housing component of the Gen. 1 and 2 rings "defines an 'outer circumferential surface'").

Dr. Anthony (Ex. 1079 ¶ 66) cites Dr. Mercier's cross-examination in support of his assertion that the Gens. 1 and 2 rings included the claimed external and internal housing components. Ex. 1079 ¶ 66 (citing Ex. 1081, 49:20–68:3 and Ex. 1082, 229:7–230:2)[19]. This reliance is misplaced. In fact, Dr. Mercier testified that he could not tell from the schematics of the Gen. 1 ring whether it had distinct internal and external housing components, and he testified that the Gen. 1 ring does not practice claim 1 of the related '178 patent because the internal surface of the ring had a flat portion on it such that it was not a circumferential surface. Ex. 1082, 54:17–62:23 (referring to Ex. 2034). Moreover, one readily discernable difference between the earlier Gen. 1 and Gen. 2 products and the later Gen. 3 Horizon and Gen. 4 products is that the later products embody a wedding ring outer housing (i.e., the claimed outer circumferential surface), while the earlier products had a flat surface on the top of the ring (a "plateau design"). *Compare* Ex. 2034 (Gen. 1), Ex. 1333, 1 (Gen. 2), *with* Ex. 2029 (Gen. 3), Ex. 2030 (Gen. 4)[20], *see also* Ex. 2098, 1 ("plateau design"). This difference suggests that there are significant differences in the housing of the earlier

[19] In the cited portion in Exhibit 1082, Dr. Mercier is testifying as to Exhibit 2121, which is not of record in this proceeding. Thus, we can draw no conclusions from this portion of his cross-examination.
[20] The Oura Ring Gen. 3 Heritage Ring, similar to the Gen. 2 ring, had a flat surface on the top of the ring. Ex. 1138.

Gen. 1 and Gen. 2 products, which may indicate that they do not practice the '702 patent claims. In any event, Petitioner's arguments and evidence, which fail to demonstrate that the Oura Ring Gen. 1 and Gen. 2 products actually embody any of the claims of the '702 patent, are not persuasive.

Petitioner's evidence of other, unclaimed features in the Gen. 3 and Gen. 4 products are not sufficient to rebut the presumption of nexus. Reply 20 (citing Ex. 2043, 1; Ex. 1079 ¶ 71). As noted above, the existence of these unclaimed features standing alone does not defeat the presumption of nexus. *See Fox Factory*, 944 F.3d at 1374 ("We have never held that the existence of one or more unclaimed features, standing alone, means nexus may not be presumed. Indeed, there is rarely a *perfect correspondence* between the claimed invention and the product."); *Continental Can Co. USA, Inc. v. Monsanto Co.*, 948 F.2d 1264, 1273 (Fed. Cir. 1991) ("It is not necessary . . . that the patented invention be solely responsible for the commercial success, in order for this factor to be given weight appropriate to the evidence, along with other pertinent factors"). And Petitioner does not persuasively show that the features it refers to are critical such that they would overcome Patent Owner's nexus showing.

Despite the presumption of nexus and the fact that the sales and revenue figures appear to be attributable to sales of the patented Gen. 3 and Gen. 4 ring products, Patent Owner's evidence of commercial success is weakened to some extent by the fact that Mr. Clarke apparently relies on *all* Gen. 3 product sales for commercial success, i.e., both the Gen. 3 Heritage and Gen. 3 Horizon product sales, yet Patent Owner shows coextensiveness only for the Gen. 3 Horizon product. Ex. 1080 ¶¶ 273–288; Ex. 2019 (Appendix 7); *see also* Ex. 2099, 3 (describing the Gen. 3 Heritage ring as

having "a flat top that houses the battery" while the Gen. 3 Horizon ring has a "fully round" design with a "*flexible* battery"); Exs. 2056 (Gen. 3 Heritage ring) and 2057 (Gen. 3 Horizon ring).[21] Based on the record before us, we discern no way to clearly distinguish those sales attributed to the Gen. 3 Horizon product from the general Gen. 3 ring sales figures. And, importantly, the Oura Ring Gen. 3 Heritage product had a similar structure and external profile (i.e., not a wedding band, but with a flat area on top) as the Oura Ring Gen. 2 products. Ex. 1080 ¶ 143 (photos of Gen. 1, Gen. 2 and Gen. 3 Heritage products); Ex. 2056. This issue does not arise for the Gen 4 product, which apparently is not offered in a Heritage product design. For this reason, we partially discount the weight of Patent Owner's commercial success evidence, particularly as it relates to the Gen. 3 ring product sales, while the overall showing remains probative of non-obviousness.

Further, we note that we are addressing only those arguments clearly presented in Petitioner's briefing. *See* Reply 17–25 (addressing objective indicia). We agree with Patent Owner that some of Petitioner's broad citations in the Reply suggest that Petitioner is attempting to improperly incorporate additional arguments presented only in Mr. Davies's and Dr. Anthony's Declarations. Sur-reply 16. For instance, Petitioner offers just

[21] Although the ITC did not note any such weakness in Patent Owner's evidence of commercial success, it appears that in the ITC proceeding, Patent Owner had presented evidence of coextensiveness for both versions of the Gen. 3 ring product to certain claims of the related '178 patent. Ex. 2122, 69–80 (reviewing both the Gen. 3 Horizon product and the Gen. 3 Heritage product to determine whether they practice the claimed invention of the related '178 patent), 108 (referring to the technical domestic industry analysis in the determination of nexus).

nine pages of argument pertaining to objective indicia in the Reply Brief, yet purports to incorporate the entirety of Mr. Davies's 185-page, 341-paragraph Declaration by reference. Reply 19. Elsewhere, Petitioner cites to large portions of Mr. Davies's reply Declaration without sufficiently explaining how that testimony supports the arguments actually presented in the Reply. *See, e.g.*, Reply Br. 21 (citing Ex. 1080 ¶¶ 222–254), *id.* at 23 (citing Ex. 1080 ¶¶ 197–312), *id.* at 25 (citing Ex. 1080 ¶¶ 32–138). While it is undoubtably proper to cite expert testimony to support an argument in a party's brief, our rules prohibit incorporation by reference of arguments from one document into another document. 37 C.F.R. § 42.6(a)(3). *See also Cisco Sys., Inc. v. C-Cation Techs., LLC*, IPR2014-00454, Paper 12 (PTAB 2014) (informative) (holding that the practice of citing a declaration to support conclusory statements that are not otherwise supported in the Petition amounts to improper incorporation by reference and explaining that such incorporation by reference circumvents the page limits imposed by our rules, while imposing on the Board's time). Here, Petitioner's citations to broad swaths of testimony, raising a variety of issues that are not clearly presented in the Reply, itself crosses the line to improper incorporation. We do not consider this improperly incorporated evidence and argument.

Therefore, on balance, we find Patent Owner's commercial success showing to be moderately probative of non-obviousness.

c. Copying

For the reasons that follow, we find that Patent Owner's evidence of copying is probative of non-obviousness. Patent Owner asserts that evidence of copying by new entrants into the market is further evidence of non-obviousness of the claimed ring. Resp. 85–92. "Not every competing

product that arguably falls within the scope of a patent is evidence of copying. Otherwise every infringement suit would automatically confirm the nonobviousness of the patent. Rather, copying requires the replication of a specific product." *Iron Grip Barbell Co. v. USA Sports, Inc.*, 392 F.3d 1317, 1325 (Fed. Cir. 2004). The Court in *Iron Grip* explained that evidence of copying "may be demonstrated either through internal documents, direct evidence such as disassembling a patented prototype, photographing its features, and using the photograph as a blueprint to build a virtually identical replica, or access to, and substantial similarity to, the patented product (as opposed to the patent)." *Id.* (internal citations omitted).[22]

Patent Owner submits that Ultrahuman Healthcare and Shenzhen Ninenovo Technology Ltd. each had access to the Oura Ring Gen. 3 product launched in 2021, and each subsequently launched a nearly identical product to the Oura Ring. Resp. 85–92. As evidence of copying, Patent Owner provides side-by-side photographic comparisons of a torn-down, i.e., disassembled, Oura Ring Gen. 3 Horizon product with a torn-down Ultrahuman Ring AIR product (*id.* at 87–89) and with a torn-down Shenzhen Ninenovo RingConn Smart Ring (*id.* at 91–92). *See also* Exs. 2027, 2028, 2029, 2031, 2032, 2113, 2114. Patent Owner also provides evidence that "[m]ultiple competitors admitted to purchasing Oura Rings,

[22] These competing products were the subject of the related ITC proceeding in which Patent Owner accused Ultrahuman and RingConn of infringing the related '178 patent. Ex. 2122. The ITC held that the issue of copying was "a close case" but that the evidence before it did "not demonstrate replication." *Id.* at 113. The ITC did not, however, identify in its decision any differences between the accused products and the Oura Ring product on which it based that finding. *Id.*

tearing them down, and creating competing rings with remarkable similarities to Oura Ring." Sur-reply 27; *see also* Resp. 90 (citing Ex. 2024 (Transcript from ITC Hearing), 683:19–21, 685:16–24, 686:15–24, 692:19–693:8, 695:1–21, 696:12–698:24, 699:2–5).

Petitioner argues that this evidence is not sufficient to show copying because Patent Owner failed to show the Gen. 3 ring is coextensive with the challenged claims and failed to provide evidence of actual copying because the "copied" features were well-known in the prior art. Reply 24–25.

We find that Petitioner's evidence is persuasive to show copying. For instance, as it relates to the Ultrahuman ring, the evidence of record shows that Ultrahuman had access to, and disassembled, the Oura Ring Gen. 3 ring product prior to launching its own ring. The Chief Executive Officer of Ultrahuman testified at the ITC hearing that he owned an Oura Ring Gen. 1 product before he founded Ultrahuman (Ex. 2024, 683:19–21, 686:15–24), and purchased an Oura Ring Gen. 2 product in 2018 (*id.* at 685:16–24) and another 5–10 Oura Ring Gen. 3 rings before Ultrahuman launched its own ring product:

> Q. Do you remember that during your deposition, you testified that during the Ultrahuman ring development process, you might have reverse-engineered other wearable devices?
>
> A. We did a comparative analysis. We looked at a lot of watches. We opened up a lot of watches, yes. That's what we did.
>
> Q. Okay.
>
> A. Yeah.
>
> Q. And Ultrahuman also bought an Oura Ring for comparison?
>
> A. That's correct.
>
> Q. How many?

A. I think I know about one which was analyzed.

Q. You only know about one Oura Ring that was purchased for analysis?

A. I think a few might have been purchased, but I don't remember exactly how many, but then I know about the one that was analyzed.

Q. Okay. A few. Five to ten? 20 to 30?

A. Maybe five to ten. I don't know. Somewhere in that range. But maybe like just one as well. I -- I don't really know the number, but I know about the one that was analyzed. That's what I'm saying.

Q. So your testimony is you might have bought five to ten rings but only one was used for analysis?

A. Yeah. So I'm not sure what the number exactly, that's why I'm just saying that it could be any number, but I know a lot more about the one that was analyzed.

…

Q. And during this analysis, Ultrahuman actually took an Oura Ring apart, correct?

A. Yeah. We looked at what's inside the Oura Ring.

…

Q. Okay. So which month and year was the analysis happening of the Oura Ring?

A. November 2021 -- November, December 2021, somewhere around that range.

Q. November, December of 2021?

A. Yes.

Ex. 2024, 692:10–694:25. The CEO also testified that Ultrahuman's entire R&D team analyzed the Oura Rings to learn their structure and design, and reviewed videos of teardowns of the Oura Ring Gen. 3 product. *Id.* at 695:1–21, 696:12–698:2, 698:3–24.

As it relates to both competing ring products, the side-by-side photographs comparing the Oura Ring Gen. 3 Horizon product, for which Patent Owner established a presumption of nexus, and the Ultrahuman and RingConn products demonstrate a striking resemblance in not only the external housing components but also the placement of the internal components (e.g., battery, PCB, and sensors) within the cavity formed by the housings. Resp. 87–88, 91 (citing Exs. 2027, 2028, 2029). The evidence of copying also includes strikingly similar marketing materials depicting exploded views of the Ultrahuman and RingConn rings that closely resemble an exploded view of the Oura Ring that Patent Owner used in its marketing materials. *Id.* at 89, 91 (citing Ex. 2032, 2113, 2114 at 8). Dr. Mercier also testified as to the similarities between the Oura Ring Gen. 3 Horizon ring and the competing Ultrahuman and RingConn rings and the marketing materials. Ex. 2018 ¶¶ 189–197.

In our view, Patent Owner's evidence of access, disassembly, and substantial similarity of the products is sufficient to demonstrate replication of the Oura Ring Gen. 3 Horizon product. *See Medtronic, Inc. v. Teleflex Innovations S.a.r.l.*, 70 F.4th 1331, 1340 (Fed. Cir. 2023) ("Evidence of access and substantial similarity is evidence of copying."). While such evidence is circumstantial, as opposed to direct evidence, of copying, the Federal Circuit has made clear that such evidence is not "second-class to direct evidence" and may even be "more certain, satisfying and persuasive than direct evidence." *Id.* (quotations omitted). Indeed, here we find that Patent Owner has presented a compelling case of copying based on such evidence.

We are not persuaded by Petitioner's arguments to the contrary. First, as we found above, Patent Owner demonstrated coextensiveness of the Oura Ring Gen. 3 Horizon product and claims 1, 16, and 17 of the '702 patent. This is the same ring product that Patent Owner used for the side-by-side comparison to demonstrate copying. Second, we disagree that the "copied" features were well-known in the prior art. For instance, as discussed above, Petitioner has not demonstrated that the use of the curved battery or even a flexible PCB within a ring form factor was well-known in the prior art.

For these reasons, we find Patent Owner's evidence of copying to be strongly probative of non-obviousness.

d. Long-felt need

Patent Owner also asserts that its evidence that the '702 patent fulfilled a long-felt need for a comfortable and compact wearable smart ring that a user would want to wear around the clock weighs in favor of non-obviousness of the claimed ring. Resp. 93–95. Specifically, Patent Owner asserts that prior efforts to develop a smart ring yielded rings that were too large to be used and put the components and battery atop the ring. *Id.* at 93. Patent Owner notes that even its own first-generation product used a "Superbowl ring-type design." *Id.* at 94.

Petitioner argues that Patent Owner's reliance on earlier unsuccessful attempts to commercialize a wearable ring with a curved battery is not sufficient to show that a person having ordinary skill in the art recognized a need that was long felt or that others had tried and failed to solve the problems known in the art. Reply 25.

Establishing long-felt but unsolved need requires objective evidence that an art-recognized problem existed in the art for a long period of time

without solution, *Newell Cos. v. Kenney Mfg. Co.*, 864 F.2d 757, 768 (Fed. Cir. 1988), and that the claimed invention satisfies the long-felt need, *Sjolund v. Musland*, 847 F.2d 1573, 1582 (Fed. Cir. 1988). Moreover, the alleged long-felt need must not have been satisfied by another before the claimed invention. *See Newell*, 864 F.2d at 768 ("[O]nce another supplied the key element, there was no long-felt need or, indeed, a problem to be solved . . . ."). Consideration of objective indicia also includes "the failure of others to produce alternatives to the patented invention." *In re GPAC Inc.*, 57 F.3d 1573, 1580 (Fed. Cir. 1995). As with other objective indicia, this evidence must demonstrate that any "inability or unwillingness of competitors" to develop alternative products "is rooted in the subject matter" of the challenged claims. *See id.*

On record before us in this proceeding, we agree with Petitioner that Patent Owner has not adequately established a compelling case of a long-felt need in the industry or that others had tried and failed to solve the problems. Patent Owner's evidence that Dr. Asada recognized advantages of a wearable ring over other wearables (Ex. 1025, 1:56–58) and recognized that comfort and compactness were key in a wearable ring (Ex. 1035, 9–10; Ex. 1037, 3) is not adequate to establish a long-felt need in the art. This anecdotal evidence of a few researchers is not sufficient to establish a long-felt need in the art.

Also, the fact that Dr. Asada found his initial prototype to be "too large to be of use in real life" (Ex. 1035, 74) does not demonstrate failure of others. It is not clear that this prototype was designed for other than a testing environment, and it appears that this initial prototype was only his first attempt to construct such a ring. Ex. 1035 at 10 (describing that a goal of the

thesis was to develop "technology for obtaining reliable measurements of vital signs for long-term use" and addressing issues including motion artifact minimization and power consumption requirements), *id.* at 74 (noting that "to be practical, [the ring sensor] had to be reduced to a size no larger than a college ring").

Further, Dr. Mercier's testimony on his own efforts in developing a smart ring as part of the Center of Wearable Sensors at UCSD is not persuasive of failure of others because the evidence does not reflect that Dr. Mercier was working on a commercial design, as opposed to a ring used for academic research, in which case the packaging and overall structure of the ring may not have been a paramount concern. Ex. 2018 ¶ 199. In other words, it is not clear from Dr. Mercier's testimony whether he and his colleagues chose to design a ring similar to Asada because that was the most expedient route or because they were unable to design a more compact ring.

The anecdotal evidence that Dr. Asada and Dr. Mercier did not commercialize a wearable ring with a curved battery is not sufficient to establish long-felt need in the industry. Likewise, the assertion that Oura used a "Superbowl ring-type design" in its initial product offering is insufficient evidence, standing alone, to show that the industry was unable to design a different ring design.[23] Thus, Patent Owner's evidence on long-felt need is entitled to little weight.

[23] Although the ITC in the parallel ITC proceeding determined that the evidence presented in that proceeding weighed in favor of non-obviousness, we are presented with different evidence in this case. Ex. 2122, 116 (citing evidence that has not been presented here).

3. Conclusion as to Claim 1

Considering the totality of the evidence regarding claim 1, including objective indicia of non-obviousness, we determine that Petitioner has not established, by a preponderance of the evidence, that this claim would have been obvious over LeBoeuf in view of Schröder. Petitioner's showing of obviousness is relatively weak because it is premised on a modification of LeBoeuf's base 50 that is not specifically taught in the cited references and premised, at least in part, on assertions that we do not credit. For instance, Petitioner's challenge is based, in part, on its unsupported assertions that LeBoeuf teaches that its base 50 is a flexible printed circuit board and that Schröder's inlay 12 is a printed circuit board. While Petitioner has presented some evidence of a rationale for the proposed modification to LeBoeuf's base 50, Patent Owner's arguments to the contrary (*see* Resp. 56–59) are not entirely without merit and serve to weaken Petitioner's showing. In contrast, Patent Owner has established a sufficient nexus between the challenged claims and presented commercial success and copying evidence that is substantially probative of non-obviousness. On balance, the relative strength of Petitioner's showing as compared to Patent Owner's objective indicia evidence of non-obviousness leads us to conclude that the claimed subject matter would not have been obvious to a person having ordinary skill in the art.[24]

[24] While we consider both the commercial success and copying showing in weighing the totality of the evidence, we note that our overall conclusion on obviousness would be the same based on either of those objective indicia considered alone.

ii. Claims 2–15

Claims 2–15 depend from and incorporate all of the limitations of independent claim 1. Ex. 1001, 45:30–46:46. Petitioner's showing of unpatentability for these dependent claims relies on the evidence and arguments that we determined above failed to show unpatentability of claim 1. Thus, for the same reasons, we conclude that Petitioner has not shown that the claimed subject matter of dependent claims 2–15 would have been obvious to a person having ordinary skill in the art. In addition, we add the following analysis of Petitioner's evidence and argument of unpatentability of dependent claims 5, 12, and 13.

Dependent claim 5 recites,

> The finger-worn wearable ring device of claim 1, wherein the substantially transparent material comprises a clear material that enables the light to pass through the internal housing component.

Ex. 1001, 45:44–47.

Petitioner relies on Schröder to teach a substantially transparent material comprising a clear material in that Schröder's "transparent regions, e.g., windows" are "a clear material so as to not interfere with the 'infrared diode and the infrared sensor' arranged to capture, for example, 'a vein image of the ring finger.'" Pet. 84 (citing Ex. 1007 9:28–34, 10:1–9); Ex. 1002 ¶ 246 (stating that a person having ordinary skill in the art "would have understood that the windows include a clear material that enables light to pass through the internal housing component."). Petitioner does not, however, provide a cogent reason to modify LeBoeuf's windows 74W based on this teaching of Schröder. Resp. 56 (Patent Owner arguing that "Petitioner's general statement that the references are the 'same type of electronic wearable devices' does not suffice.").

For instance, in the discussion of the combination, Petitioner proposes specifically "to implement LeBoeuf's ring with a structure similar to Schröder's 'consisting of ring-shaped components 16, 18.'" Pet. 64. Petitioner fails to adequately explain what would have led a person having ordinary skill in the art to have modified LeBoeuf's windows 74W to comprise a clear material as recited in claim 5. Thus, Petitioner has not met its burden to show that claim 5 would have been obvious over LeBoeuf in view of Schröder.

Dependent claim 12 recites,

> The finger-worn wearable ring device of claim 1, further comprising:
>
> a power management module disposed within the cavity between the inner circumferential surface and the outer circumferential surface, the power management module configured to wirelessly transfer energy from an external energy source to a battery of the finger-worn wearable ring device through the inner circumferential surface, the outer circumferential surface, or both.

Ex. 1001, 46:22–30.

Dependent claim 13 recites,

> The finger-worn wearable ring device of claim 12, wherein the power management module comprises an inductive charging component configured to transfer energy from the external energy source to the battery via an inductive charging process.

Ex. 1001, 46:31–35.

Petitioner contends that LeBoeuf discloses that outer body portion 74 "may include a flex circuit containing various electronic components, such as a microprocessor, D/A converter, ***power source, power regulator***, and the like." Pet. 88 (citing Ex. 1012, 28:4–6). Petitioner further contends that Schröder's energy storage device (e.g., battery) is "within the same cavity as

part of or connected to inlay 12" and is "charged by means of the reader's electromagnetic field," which is "wireless energy transfer" through one or both of the inner and outer circumferential ring surfaces." *Id.* at 88–89 (citing Ex. 1007, 11:46–55, 12:46–50; Ex. 1002 ¶¶ 254–255); *see also id.* at 89 (asserting that the wireless energy transfer is accomplished via an inductive charging process). Petitioner does not, however, provide a cogent reason to modify LeBoeuf's power source or power regulator based on these asserted teachings of Schröder. Resp. 56 (Patent Owner arguing that "Petitioner's general statement that the references are the 'same type of electronic wearable devices' does not suffice.").

For instance, in the discussion of the combination, Petitioner proposes specifically "to implement LeBoeuf's ring with a structure similar to Schröder's 'consisting of ring[-]shaped components 16, 18.'" Pet. 64. Petitioner fails to adequately explain what would have led a person having ordinary skill in the art to have modified LeBoeuf's power source to be charged by means of the reader's electromagnetic field for wireless energy transfer as recited in claim 12 or via an inductive charging process as recited in claim 13. Thus, Petitioner has not met its burden to show that claims 12 and 13 would have been obvious over LeBoeuf in view of Schröder.

J. Ground 6: obviousness over LeBoeuf, Schröder, and Niwa

Petitioner proposes to further modify LeBoeuf's ring in view of the teachings of Niwa to include multiple light emitters and light receivers "to provide accurate and real-time information to the user about the user's health," "allow for redundancy, avoid the risk of an emitter or receiver being blocked by a skin occlusion, allow for better visualization of vascular tissue

(because visualization is enabled at multiple locations), enhance signal-to-noise ratio, and help to offset noise due to ambient environment light." Pet. 91–92 (citing Ex. 1005 ¶¶ 117, 164; Ex. 1002 ¶ 262). Petitioner asserts that a person having ordinary skill in the art would have a reasonable expectation of success because "all three references disclose interrelated teachings based on routine technologies that would have been amenable to various well-understood and predictable combinations to provide more features and enhance user interest." *Id.* at 92 (citing Ex. 1002 ¶ 263).

i. Claim 8

Petitioner contends that "Niwa's ring includes 'measurement window 13' . . . 'constructed with the translucency portion (i.e., a glass plate or an acrylic plate)' that contacts and covers the 'light emitting/receiving surface of the light sensor 12'" and "allows light sensor 12 to 'perform[] the measurement of the plethysmogram." Pet. 52–53 (citing Ex. 1005 ¶ 210, Fig. 27; Ex. 1002 ¶¶ 203–204); *see also id.* at 93 (citing Ex. 1005 ¶¶ 119, 210, Figs. 3, 7). Petitioner contends that a person having ordinary skill in the art "would have been motivated to add a measurement window to Schröder-LeBoeuf, as taught in Niwa, such that the window contacts and covers the light-emitting and light-receiving components in Schröder-LeBoeuf's ring." *Id.* at 53 (citing Ex. 1002 ¶ 205).

Patent Owner argues that this combination "is directly contrary to the teachings of LeBoeuf," which teaches the use of a light-guiding region in which light is guided through a channel to the window. Resp. 48 (citing Ex. 1012, 17:26-29, 27:58–61; Ex. 2018 ¶ 132). Patent Owner asserts that a person having ordinary skill in the art "would not modify LeBoeuf to have

the window 'contact and cover' the light emitter as such a modification would result in a complete redesign of LeBoeuf that eliminates its most prominent feature." *Id.* at 49.

We agree with Patent Owner that Petitioner has not met its burden to show obviousness of claim 8 over LeBoeuf in view of Schröder and Niwa. Although Petitioner provides reasoning to further modify LeBoeuf to add multiple light emitters and receivers, the Petition fails to provide a clear reason to further modify LeBoeuf's ring device to include Niwa's measurement window that contacts and covers the light emitting/receiving components. Pet. 91–92. For instance, Petitioner fails to explain why such a modification would offer a design or manufacturing benefit to LeBoeuf's ring. *Id.* As such, Petitioner fails to adequately explain what would have led a person having ordinary skill in the art to have modified LeBoeuf's ring in the manner recited in claim 8. Thus, Petitioner has not met its burden to show that claim 8 would have been obvious over LeBoeuf in view of Schröder and Niwa.

Further, claim 8 depends from and incorporates all of the limitations of independent claim 1, and Petitioner's showing of unpatentability for this dependent claim relies on the evidence and arguments that we determined above failed to show unpatentability of claim 1. Thus, for the same reasons provided above in our analysis of Ground 5, we also conclude that Petitioner has not shown that the claimed subject matter of dependent claim 8 would have been obvious to a person having ordinary skill in the art.

ii. Claims 9–11

As discussed above, claims 9 through 11 relate to using first and second light-emitting components configured to emit light at different wavelengths (claim 9), wherein the first wavelength is visible light and the second wavelength is infrared light (claim 10), and wherein the first and second light-emitting components are positioned at different radial positions within the ring (claim 11). Petitioner asserts that Niwa teaches that its ring includes multiple light portions (LED1 to LED8) that output wavelengths ranging from a visible light region to a near-infrared region and being placed at first and second radial positions. Pet. 93–94 (citing Ex. 1005 ¶¶ 120, 147); *see also id.* at 53–55 (further citing Ex. 1005, Fig. 3 ("Layout of the Light Emitting Portion and the Light Receiving Portion" of the first unit's light sensor 12); Ex. 1002 ¶ 209).

Claims 9–11 depend from and incorporate all of the limitations of independent claim 1, and Petitioner's showing of unpatentability for these dependent claims relies on the evidence and arguments that we determined above failed to show unpatentability of claim 1. For the same reasons provided above in our analysis of Ground 5, we also conclude that Petitioner has not shown that the claimed subject matter of dependent claims 9–11 would have been obvious to a person having ordinary skill in the art.

Thus, Petitioner has not met its burden to show by a preponderance of the evidence that dependent claims 8–11 of the '702 patent are unpatentable over LeBoeuf in view of Schröder and Niwa.

K. Ground 7: obviousness over LeBoeuf, Schröder, and Mestas

i. Claims 16 and 17

Dependent claim 16 recites,

> The finger-worn wearable ring device of claim 1, further comprising: a curved battery electrically coupled with the one or more light-emitting components, the one or more light-receiving components, the one or more processors, and the communication module.

Ex. 1001, 46:47–52.

Dependent claim 17 recites,

> The finger-worn wearable ring device of claim 16, wherein the curved battery comprises an arc that approximates an arc of the cavity.

Ex. 1001, 46:53–55.

Petitioner contends that dependent claims 16 and 17 would have been obvious over LeBoeuf in view of Schröder and Mestas. Pet. 58–63. Petitioner submits that each reference "relates to the same well-known technologies," and they are "analogous art and teach improvements to the same type of wearable biometric sensing devices having a processor, battery, and various components." *Id.* at 95 (citing Ex. 1002 ¶¶ 268–273; Ex. 1007, 9:67–10:1 (infrared diode and infrared sensor), 10:61 (processor), 11:48 (battery); Ex. 1010 ¶¶ 150 (cavity, battery), 151 (structure); Ex. 1012, 28:3–8 (processor, battery), 28:60–62 (light emitters and sensors), 27:61–28:1 (structure)). Petitioner contends "it would have been obvious to modify LeBoeuf-Schröder's ring to include batteries similar to Mestas's that have a 'curvilinear or curved configuration'" because "having a curved battery would allow for a larger battery that conforms to the circular shape of the

ring without stressing the battery or the ring's housing." *Id.* at 95–96 (citing Ex. 1010 ¶ 168; Ex. 1002 ¶ 271). Dr. Anthony opines that a person having ordinary skill in the art "would have found it trivial to implement Mestas's teachings into a ring form like that of LeBoeuf's ring." *Id.* at 96 (citing Ex. 1002 ¶ 272).

Patent Owner contends that for the same reasons rebutting Ground 4 based on Schröder in view of Mestas, a person having ordinary skill in the art would not have been led to modify LeBoeuf-Schröder's finger-ring to use a curved battery within the cavity between the ring components, based on the teachings of Mestas. Resp. 59.

For the same reasons provided above in our analysis of Ground 4, we agree with Patent Owner that Dr. Anthony's proposed modification of the LeBoeuf-Schröder ring in view of Mestas is not supported with adequate reasoning.

The record supports Patent Owner's argument that Mestas's batteries are much too large to fit within a ring form factor, and "Mestas's batteries, layout, and other components . . . would have to be scaled down 5 to 10 times to be appropriately sized for a finger worn ring." Resp. 49 (internal quotation marks omitted) (citing Dr. Anthony's cross-examination testimony at Ex. 2021, 313:12). Moreover, we do not credit Dr. Anthony's testimony that miniaturization of the battery would have been "trivial to implement." Ex. 1002 ¶ 272. Dr. Anthony admitted on cross examination that it would not have been within the level of skill of a person having ordinary skill in the art to design a smaller version of Mestas's battery, and that such a person would need to procure a battery of the appropriate size and specifications for implementation in a finger-ring from a battery manufacturer. Ex. 2021,

315:9–318:9. Yet Dr. Anthony had not ascertained, for purposes of his testimony, whether there was a battery available in 2013 that was appropriate to fit within cavity of the modified version of LeBoeuf finger-ring that he and Petitioner allege would have been obvious to one of skill in the art at that time. *Id.* at 321:5–10.

Further, we credit Dr. Mercier's testimony that Dr. Anthony's testimony fails to account for the constraints of such a substantially smaller form factor in LeBoeuf-Schröder's finger-ring as compared to Mestas's wrist device. Ex. 2018 ¶ 142. Although large curved batteries suitable for use in a wrist band or other larger wearable device, such as shown in Mestas, were known at the time of the '702 patent, we also have evidence that prior art "finger ring wearables up to the '702 patent had used 'coin' type batteries." Resp. 52 (citing Ex. 2018 ¶ 143). We credit Dr. Mercier's testimony that a person having ordinary skill in the art would have looked to a coin type battery for the necessary power requirements of Schröder's device. Ex. 2018 ¶ 143. Indeed, this testimony is consistent with the other art of record that consistently shows the use of flat batteries in finger-ring devices, often stacked above and protruding from the general ring shape of the device. *See, e.g.*, Ex. 1005 (Niwa), Figs. 22, 28; Ex. 2025 (Asada '701 patent), Fig. 4; Ex. 1035 (Rhee), Figs. 7-1, 8-1, 8-2; Ex. 1037 (Asada article), Fig. 9; Ex. 1034 (Asada '199 patent), Fig. 2; Ex. 1028 (Kimura), Fig. 24; Ex. 2018 ¶¶ 61–70. In fact, Oura's first-generation ring design, released in 2015, used a Superbowl ring-type design, with the battery and other components mounted on top of the ring. Ex. 2034; Ex. 2018 ¶ 71.

Based on these findings, Petitioner has not met its burden to show by a preponderance of the evidence that a person having ordinary skill in the art

would have been led to modify the LeBoeuf-Schröder finger-ring to place a curved battery between the internal and external housing components in light of the teachings in Mestas.

Further, claims 16 and 17 depend from and incorporate all of the limitations of independent claim 1, and Petitioner's showing of unpatentability for these dependent claims relies on the evidence and arguments that we determined above failed to show unpatentability of claim 1. Thus, for the same reasons provided above in our analysis of Ground 5, we also conclude that Petitioner has not shown that the claimed subject matter of dependent claims 16 and 17 would have been obvious to a person having ordinary skill in the art.

Thus, Petitioner has not met its burden to show by a preponderance of the evidence that dependent claims 16 and 17 of the '702 patent are unpatentable over LeBoeuf in view of Schröder and Mestas.

IV. MOTIONS TO SEAL

The Board previously granted Patent Owner's motion for entry of a Stipulated Protective Order. Papers 15, 16. Pursuant to this Stipulated Protective Order, Patent Owner requests to seal designated information in its Patent Owner Response (Paper 19) and certain confidential versions of exhibits to the same (Exs. 2019, 2024, 2034, 2063, 2107, 2108, 2109, 2110, 2111, and 2112), Patent Owner Sur-Reply (Paper 37) and the confidential version of Exhibit 2118, and the confidential version of its demonstratives (Exhibit 2119). Papers 17, 35, 44. Petitioner likewise requests to seal designated information in its Petitioner Reply (Paper 27) and certain confidential versions of exhibits to the same (Exs. 1079, 1080, 1081, and 1083). Paper 26.

These papers and exhibits contain information designated by Patent Owner under the Stipulated Protective Order as containing "Outside Attorney's Eyes Only—Protective Order Material." Specifically, Patent Owner and Petitioner submit that the designated material includes Patent Owner's sensitive and confidential business information, including Patent Owner's financial information. Paper 17, 3–5; Paper 26, 2–3; Paper 35, 2; Paper 44, 2.

A party may move to seal confidential information including, e.g., trade secret or other confidential research, development, or commercial information. 37 C.F.R. § 42.54(a)(7). It is the movant's burden to show good cause for sealing such information, and we balance the party's asserted need for confidentiality with the strong public interest in open proceedings. *Argentum Pharms. LLC v. Alcon Research, Ltd.*, IPR2017-01053, Paper 27 at 4 (PTAB Jan. 19, 2018) (informative). The parties provide a sufficient explanation and have shown good cause for sealing the designated portions of Exhibits 1079, 1080, 1081, 1083, 2019, 2024, 2034, 2063, 2107, 2108, 2109, 2110, 2111, 2112, 2118, and 2119 and the related portions of Patent Owner's Response, Petitioner's Reply, Patent Owner's Sur-Reply. Moreover, the parties provide a public version of each Paper (Papers 18, 28, and 36) and of each Exhibit with redactions limited to Patent Owner's business confidential information so the record may remain clear and reasonably open. Accordingly, the confidential versions of Exhibits 1079, 1080, 1081, 1083, 2019, 2024, 2034, 2063, 2107, 2108, 2109, 2110, 2111, 2112, 2118, and 2119, Patent Owner's Response (Paper 19), Petitioner's Reply (Paper 27), and Patent Owner's Sur-reply (Paper 37) are sealed. We likewise seal the confidential version of Petitioner's demonstratives, which

were filed as Exhibit 1339 and contain information from the sealed Papers and Exhibits discussed above.

V. CONCLUSION

Petitioner has not shown, by a preponderance of the evidence, that claims 1–17 of the '702 patent are unpatentable.

Claims	35 U.S.C. §	Reference(s)/ Basis	Claims Shown Unpatentable	Claims Not shown Unpatentable
1, 5, 7, 12–15	103	Schröder		1, 5, 7, 12–15
2–4, 6, 8–11	103	Schröder, LeBoeuf		2–4, 6, 8–11
8–11	103	Schröder, LeBoeuf, Niwa		8–11
16, 17	103	Schröder, Mestas		16, 17
1–15	103	LeBoeuf, Schröder		1–15
8–11	103	LeBoeuf, Schröder, Niwa		8–11
16, 17	103	LeBoeuf, Schröder, Mestas		16, 17
Overall Outcome				1–17

VI. ORDER

Accordingly, it is:

ORDERED that Petitioner has not shown that claims 1–17 of U.S. Patent 11,874,702 B2 are unpatentable;

FURTHER ORDERED that the confidential versions of Papers 19, 27, and 37 and Exhibits 1079, 1080, 1081, 1083, 1339, 2019, 2024, 2034, 2063, 2107, 2108, 2109, 2110, 2111, 2112, 2118, and 2119 are sealed; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to this proceeding seeking judicial review of our Decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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