

Paper No. 34
Date Filed: March 19, 2026

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SMAXTEC INC. and
SMAXTEC ANIMAL CARE GMBH,

Petitioners,

v.

ST REPRODUCTIVE TECHNOLOGIES, LLC,

Patent Owner,

Case No. IPR2024-01067
Patent No. 10,231,644

ST REPRODUCTIVE TECHNOLOGIES, LLC'S NOTICE OF APPEAL

Patent Owner ST Reproductive Technologies, LLC (“ST”) hereby appeals to the U.S. Court of Appeals for the Federal Circuit from: (i) the Final Written Decision of the Patent Trial and Appeal Board in Case IPR2024-01067, entered on January 16, 2026 (Paper No. 33); and (ii) any underlying orders, decisions, rulings, and opinions. *See* 35 U.S.C. §§ 141(c), 142; 37 C.F.R. §§ 90.2(a), 90.3.

ST files this Notice of Appeal within sixty-three (63) days of the Board’s Final Written Decision. *See* 35 U.S.C. § 142 and 37 C.F.R. § 90.3(a)(1).

In accordance with 37 C.F.R. § 90.2(a)(3)(ii), ST indicates that the issues on appeal include, but may not be limited to: (a) the Board’s determination that claims 5-7, 9, and 10 of U.S. Patent No. 10,231,644 were proven unpatentable, including any underlying questions of law or fact; and (b) any finding, determination, judgment, or order supporting or related to the Final Written Decision and decided adversely to ST.

Pursuant to 37 C.F.R. § 90.2(a), ST is filing this Notice of Appeal with the Director of the United States Patent and Trademark office, *see id.* § 104.2, and a copy of this Notice of Appeal is being filed electronically with the Board, *see id.* § 42.6(b). In addition, pursuant to Federal Circuit Rules 15(a)(1) and 25(b)(1), a copy of this Notice of Appeal is being filed with the Clerk’s Office for the Federal Circuit, along with payment of the required fee.

IPR2024-01067
Patent No. 10,231,644

Respectfully submitted,

Date: March 19, 2026

By: /Daniel L. Moffett/
Daniel L. Moffett
Registration No. 60,715
Counsel for Patent Owner

CERTIFICATE OF FILING

I certify that the foregoing was filed electronically with the Board through the Patent Trial and Appeal Case Tracking System (P-TACTS), and a paper copy was served by Priority Mail Express on March 19, 2026 with the Director of the United States Patent and Trademark Office, at the following address:

Director of the U.S. Patent and Trademark Office
c/o Office of the General Counsel
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, Virginia 22313-1450

I further certify that a true and correct copy of the foregoing Notice of Appeal, along with the required filing fee, was filed electronically with the Court of Appeals for the Federal Circuit via CM/ECF on March 19, 2026. Per Federal Rule of Appellate Procedure 15(c)(3), one copy of this Notice of Appeal is being filed by Priority Mail Express with the Clerk's office of the United States Court of Appeals for the Federal Circuit on March 19, 2026, at the following address:

Clerk of Court
United States Court of Appeals for the Federal Circuit
717 Madison Place NW
Washington, DC 20439

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e), and the parties' agreement to accept electronic service, I certify that a copy of the foregoing ST Reproductive Technologies, LLC's Notice of Appeal was served on counsel of record on March 19, 2026 by delivering a copy via electronic mail to counsel of record for the Petitioners at the following addresses:

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SMAXTEC INC. and SMAXTEC ANIMAL CARE GMBH,
Petitioner,

v.

ST REPRODUCTIVE TECHNOLOGIES, LLC,
Patent Owner.

IPR2024-01067
Patent 10,231,644 B2

Before SHARON FENICK, JAMIE T. WISZ, and
ANDREAS BALTATZIS, *Administrative Patent Judges*.

BALTATZIS, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

smaXtec Inc. and smaXtec Animal Care GmbH (collectively, “Petitioner”) filed a Petition requesting an *inter partes* review of claims 5–7, 9, 10, and 13 (the “challenged claims”) of U.S. Patent No. 10,231,644 B2 (Ex. 1001, “the ’644 patent”). Paper 1 (“Pet.”). ST Reproductive Technologies, LLC (“Patent Owner”) filed a Preliminary Response (Paper 6) and a statutory disclaimer of claim 13 (Ex. 2004).¹ We instituted *inter partes* review under 35 U.S.C. § 314(a). Paper 7 (“Inst. Dec.”).

Patent Owner filed a Response. Paper 12 (“PO Resp.”). Petitioner followed with a Reply (Paper 21, “Pet. Reply”) and Patent Owner followed with a Sur-Reply (Paper 29, “PO Sur-Reply”). We held an oral hearing on October 21, 2025, a transcript of which is in the record. Paper 32 (“Tr.”).

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is entered pursuant to 35 U.S.C. § 318(a). Having reviewed the complete trial record, we determine that Petitioner has shown, by a preponderance of the evidence, that challenged claims 5–7, 9, and 10 are unpatentable.

II. BACKGROUND

A. *Real Parties in Interest*

Petitioner identifies smaXtec Inc. and smaXtec Animal Care GmbH as the real parties-in-interest. *See* Pet. x. Patent Owner identifies ST Reproductive Technologies, LLC and Inguran, LLC as the real parties-in-interest. Paper 10, 1.

¹ Due to Patent Owner’s statutory disclaimer of claim 13, we no longer consider claim 13 and the challenges thereto.

B. Related Matters

The parties identify the following district court litigation involving the '644 patent: *ST Reproductive Technologies, LLC d/b/a STInsight v. smaXtec Inc. and smaXtec Animal Care GmbH*, Case No. 24-cv-00037 (W.D. Wis.) (the “Wisconsin Litigation”), filed on January 18, 2024. Pet. x; Paper 3, 1.

Petitioner further identifies the following *inter partes* review proceedings that “may affect indirectly or may be affected indirectly by the decision in this proceeding due to the involvement of all three patents in the Wisconsin Litigation”: IPR2024-00885 (challenging claims of U.S. Patent No. 8,823,515) and IPR2024-00875 (challenging claims of U.S. Patent No. 9,844,206). Pet. x–xi.

C. The '644 Patent (Ex. 1001)

The '644 patent relates to “[a]n animal monitoring device configured as a bolus.” Ex. 1001, 1:5. The bolus is orally administered “to reside in the reticulorumen of a ruminant animal.” *Id.* at 1:6–7. Reticulorumen “means the first chamber in the alimentary canal of a ruminant animal . . . composed of the rumen and reticulum.” *Id.* at 3:36–38.² Ruminant animals include “mammal[s] of the suborder Ruminantia,” e.g., cattle, goats, and sheep. *Id.* at 3:17–21. Once located in the animal’s reticulorumen, the bolus can monitor one or more physiological parameters over the animal’s lifespan. *See id.* at 1:41–45.

Figure 2 illustrates a block diagram of a bolus and is reproduced below.

² *See also* Ex. 1005, Figure 1 illustrating the location of an ingestible bolus in a ruminant animal’s reticulum or rumen.

FIG. 2

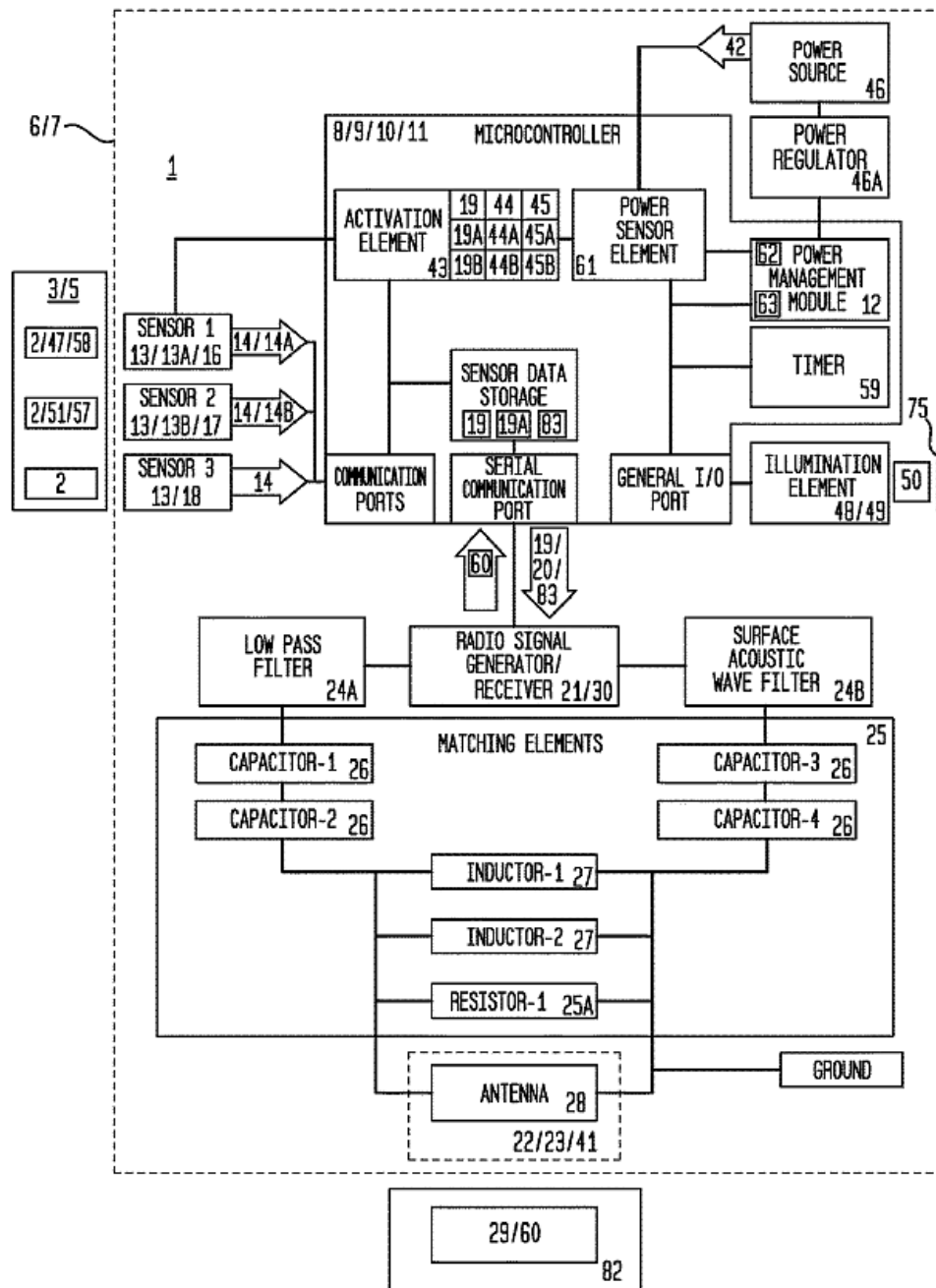


Figure 2 illustrates a block diagram of bolus 1. *Id.* at 2:27–29. Bolus 1 may include sensor(s) 13 capable of generating sensor signal 14. *Id.* at 3:58–60. Sensor signal 14 varies based on a corresponding change of one or more physiological parameters 2 of ruminant animal 3. *Id.* at 3:60–62.

Bolus 1 further includes microcontroller 8 with processor 9 communicating with memory element 10 containing computer code 11. *Id.* at 4:24–26. Computer code 11 “can be executed to continuously or intermittently transform the analog or digital sensor signal (14) from the one or more sensors (13) as encoded physiological data (19) (also referred to as ‘encoded sensor signals’).” *Id.* at 4:26–30. Encoded physiological data 19 (encoded sensor signals) is used to make determinations relating to ruminant animal 3. *See id.* at 10:9–11.

Bolus 1 transmits encoded physiological data 19 to radio signal reader(s) 79, by generating radio signal 22 using antenna 28. *Id.* at 6:41–45; 14:9–13. Antenna 28 may include first electrically conductive loop 32 electrically interconnected to second electrically conductive loop 33 electrically connected to radio signal generator 21 or radio signal receiver 30. *Id.* at 6:62–7:2; *see also id.* at Fig. 6. First and second electrically conductive loops can further include circuit board 31/non-electrically conductive substrate 38 disposed between the pair of electrically conductive loops. *Id.* at 7:2–16; *see also id.* at Fig. 6. According to the Specification, the antenna structure “alters the magnetic field and electrical field generation in a manner that reduces the impact of uncontrollable changes in the orientation of the bolus and correspondingly the orientation of the antenna during residence of the bolus in the reticulorumen of the ruminant animal.” *Id.* at 2:10–16.

Bolus 1 also includes power management module 12 that regulates used energy 42 by enabling or disabling one or more sensors 13 based upon a predetermined set of physiological parameters 2. *Id.* at 10:4–9. Power management module 12 can further include timer element 59 that regulates

energy used by the bolus based on elapsed time. *Id.* at 10:55–61. For example:

power management module (12) can function to reduce the period of time between reads of the sensor signal (14) temperature (57) and the sensor signal (14) for movement (58), such as, four times in a twenty-four hour period. Similarly, there may be a lesser period of time between operational periods of the radio signal generator (21), such as every six hours, and the operational period of the radio signal generator (21) may be adjusted to a period of time to transmit the additional encoded physiological data (19).

Id. at 11:12–20.

D. Illustrative Claims

Petitioner challenges claims 5–7, 9, and 10 of the '644 patent. Pet. 1–2. Claims 5 and 9, the challenged independent claims of the '644 patent, are illustrative of the challenged claims, and are reproduced below³:

5. [Pre] A method of monitoring physiological parameters of a ruminant animal, comprising:

[A] generating a sensor signal from one or more sensors contained in a bolus orally administered to said ruminant animal,

[B] said sensor signal varies based on a corresponding change in one or more physiological parameters of said ruminant animal;

[C] encoding said sensor signal from said one or more sensors as encoded physiological data corresponding to said one or more physiological parameters of said ruminant animal; and

[D] storing said encoded physiological data in a non-transitory computer readable media,

[E] enabling a radio signal generator located within said bolus;

³ We adopt Petitioner's bracketed identifiers.

- [F] activating said radio signal generator at pre-determined intervals to generate a radio signal to carry said encoded physiological data; and
- [G] generating said radio signal having a frequency of between about 700 MHz to about 1 GHz.

Ex. 1001, 21:28–47.

9. [Pre] A method of monitoring physiological parameters of a ruminant animal, comprising:

- [A] generating a sensor signal from one or more sensors contained in a bolus orally administered to said ruminant animal,
- [B] said sensor signal varies based on a corresponding change in one or more physiological parameters of said ruminant animal;
- [C] encoding said sensor signal from said one or more sensors as encoded physiological data corresponding to said one or more physiological parameters of said ruminant animal;
- [D] storing said encoded physiological data in a non-transitory computer readable media;
- [E] enabling a radio signal generator located within said bolus;
- [F] activating said radio signal generator to generate a radio signal to carry said encoded physiological data; and
- [G] transmitting said radio signal with an antenna having a pair of electrically conductive loops disposed a distance apart and further comprising transmitting said radio signal through said antenna.

Id. at 22:14–34.

E. Asserted References

Petitioner relies on the following references in its asserted grounds of unpatentability:

Name	Reference	Ex. No.
Riskey	US 2009/0187392 A1	1005
Rettedal	US 2013/0197323 A1	1006
Harvey	WO 2008/108816 A1	1004
Kunda	JP 2004-215061 A	1007 ⁴

F. Prior Art and Asserted Grounds

Petitioner asserts that claims 5–7, 9, and 10 of the ’644 patent are unpatentable in view of the following grounds. Pet. 1–2.

Ground	Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1	5, 6	102	Harvey
2	5, 6	102	Riskey
3	5, 6	103	Harvey, Riskey
4	7	103	Harvey, Rettedal
5	9, 10	103	Harvey, Kunda

Petitioner relies on the Declarations of Darrin J. Young, Ph.D. (Exs. 1002, 1025) in support of its contentions. Patent Owner relies on the Declarations of Edwin C. Kan, Ph.D. (Exs. 2001, 2006) in support of its contentions.

III. ANALYSIS

A. Legal Standards

“In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the

⁴ Kunda is a Japanese-language document. Petitioner relies on an English translation of Kunda. *See* Ex. 1007, 20–60.

grounds for the challenge to each claim”)). This burden never shifts to Patent Owner. *See Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (citing *Tech. Licensing Corp. v. Videotek, Inc.*, 545 F.3d 1316, 1326–27 (Fed. Cir. 2008)) (discussing the burden of proof in *inter partes* review). Furthermore, Petitioner must explain with particularity how the prior art would have rendered the challenged claims unpatentable. 35 U.S.C. § 312(a)(3); 37 C.F.R. § 42.104(b)(4) (“The petition must specify where each element of the claim is found in the prior art patents or printed publications relied upon.”).

A patent claim is unpatentable under 35 U.S.C. § 102 if “the four corners of a single, prior art document describe every element of the claimed invention, either expressly or inherently, such that a person of ordinary skill in the art could practice the invention without undue experimentation.” *Advanced Display Sys., Inc. v. Kent State Univ.*, 212 F.3d 1272, 1282 (Fed. Cir. 2000). “A single prior art reference may anticipate without disclosing a feature of the claimed invention if such feature is necessarily present, or inherent, in that reference.” *Allergan, Inc. v. Apotex Inc.*, 754 F.3d 952, 958 (Fed. Cir. 2014). Moreover, the reference must also “disclose[] within the four corners of the document not only all of the limitations claimed but also all of the limitations arranged or combined in the same way as recited in the claim.” *Net MoneyIN, Inc. v. Verisign, Inc.*, 545 F.3d 1359, 1371 (Fed. Cir. 2008).

A claim is unpatentable under 35 U.S.C. § 103 if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious to a person having ordinary skill in the art to which said subject matter pertains. *See KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (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 skill in the art; and (4) objective evidence of nonobviousness, i.e., secondary considerations.⁵ See *Graham v. John Deere Co. of Kan. City*, 383 U.S. 1, 17–18 (1966).

B. Person of Ordinary Skill in the Art

“The level of skill in the art is a factual determination” that provides a primary guarantee of objectivity in an obviousness analysis. *Al-Site Corp. v. VSI Int’l Inc.*, 174 F.3d 1308, 1324 (Fed. Cir. 1999) (citing *Graham*, 383 U.S. at 17–18; *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991)).

Petitioner asserts that a person of ordinary skill in the art (“POSA”) as of the claimed priority date would have “had *at least* a bachelor’s degree in electrical engineering or a related or equivalent field, and three *or more* years of experience researching, developing, designing and/or evaluating sensor systems for humans or other animals.” Pet. 5 (citing Ex. 1002 ¶ 35) (emphasis added). Patent Owner does not contest Petitioner’s characterization of the level of skill in the art. See PO Resp. 12 (citing Ex. 2006 ¶¶ 19–20).

On the entire record, we determine this level of skill, with the exception of the open-ended phrases “at least” and “or more,” which we remove from Petitioner’s proposal, comports with the qualifications a person

⁵ In the present record, neither party presents arguments or evidence relating to secondary considerations.

would have needed to understand and implement the teachings of the '644 patent and the prior art of record.

C. Claim Construction

We construe claim terms according to the standard set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–17 (Fed. Cir. 2005) (en banc), i.e., as construed in a civil action under 35 U.S.C. § 282(b). *See* 37 C.F.R. § 42.100(b). Under *Phillips*, claim terms are afforded “their ordinary and customary meaning.” *Id.* at 1312. “[T]he ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention.” *Id.* at 1313. “Importantly, the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification.” *Id.*

Neither party expressly seeks a specific claim construction or definition for any claim term. *See* Pet. 10; PO Resp. 12. To the extent Patent Owner seeks to interpret claim 7 in view of the Specification, we address that argument in our discussion of claim 7, below. *See infra*, § III.G.3. For purposes of this Decision, we determine that no claim terms require express construction. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (citing *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (“[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.”)).

D. Asserted Anticipation of Claims 5 and 6 by Risky

Petitioner contends that claims 5 and 6 are anticipated by Risky. Pet. 27–38. Patent Owner disputes Petitioner’s contentions. PO Resp. 31–47.

1. *Riskey (Ex. 1005)*

Riskey relates to a bolus for monitoring a health condition of an animal. Ex. 1005 ¶ 16. The bolus may be ingested and remain within the reticulum or rumen of a ruminant animal. *Id.* ¶ 17; Fig. 1.

Figure 2 illustrates the bolus and is reproduced below.

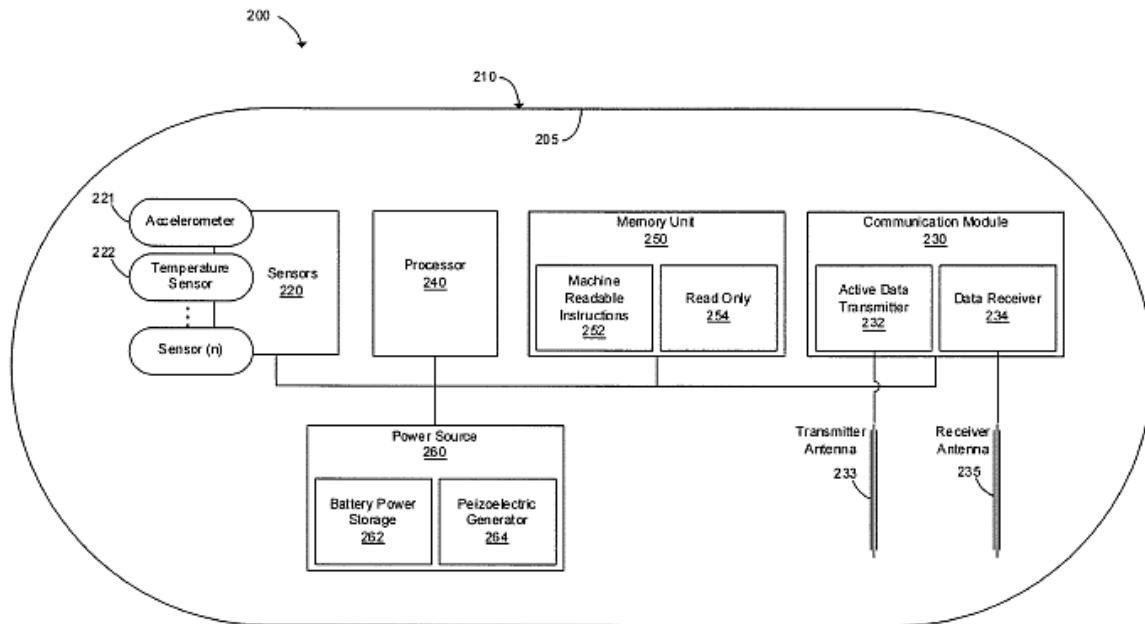


Figure 2 illustrates a block diagram of a bolus comprising one or more sensors. *Id.* ¶ 4.

Bolus 210 includes sensors 220 that “may be used to detect physiological characteristics of an animal including, but not limited to: body temperature; heart rate; respiration; stomach contractions; stomach pH; blood pH; and the like.” *Id.* ¶ 35. Bolus 210 may further include communication module 230, processor 240, memory unit 250, and power source 260. *Id.* ¶¶ 37–44. Communications module 230 may include data transmitter 232 coupled to transmitter antenna 234. *Id.* ¶ 37. Processor 240 is communicatively coupled to memory unit 250 that “may comprise machine readable instructions 252 stored thereon,” read and executed by processor 240. *Id.* ¶ 38. “Machine readable instructions 252 stored on memory unit

250 may specify a sensor sampling frequency for each of the sensors 220.”
Id. ¶ 39.

Riskey discloses different modes of operations whereby “processor 240 may transmit sensor measurements obtained by polling sensors 220 via data transmitter 232.” *Id.* ¶ 49. In one mode of operation

processor 240 may not immediately transmit the sensor readings polled from sensors 220, but instead store them on memory unit 250. In this mode, machine readable instructions 252 may specify a transmission inter[v]al, wherein processor 240 may transmit an animal characteristics message comprising some or all of the measurements stored in memory unit 250 at each transmission interval. This operational mode may be referred to as “burst” mode since sensor 220 readings are transmitted as periodic bursts rather than when sensor polling takes place. Operation in “burst” mode may reduce the power consumed by bolus 210 by reducing the number of transmissions sent from data transmitter 232.

Id.

2. *Independent Claim 5*

a) *Preamble*

The preamble of claim 5 recites “[a] method of monitoring physiological parameters of a ruminant animal.” Ex. 1001, 21:28–29.

Petitioner asserts Risky discloses a method of monitoring the physiological characteristics (parameters) of a cow (ruminant animal), including “animal temperature, stomach pH, blood pH, heart rate, respiration, stomach or rumen contractions, and the like.” Pet. 27 (citing Ex. 1005 ¶¶ 68, 25, 35; Ex. 1002 ¶ 77).

Patent Owner does not dispute that Risky discloses the preamble of claim 5. *See* PO Resp. 39–45.

Considering the entire record, we are persuaded by Petitioner that Risky discloses the preamble of claim 5; thus, we need not decide whether the preamble is limiting.⁶ Ex. 1005 ¶¶ 68, 25, 35; Ex. 1002 ¶ 77.

b) Limitations 5[A] and 5[B]

Limitation 5[A] recites “generating a sensor signal from one or more sensors contained in a bolus orally administered to said ruminant animal.” Ex. 1001, 21:30–32. Limitation 5[B] recites “said sensor signal varies based on a corresponding change in one or more physiological parameters of said ruminant animal.” *Id.* at 21:32–34.

(1) Petitioner’s arguments

As to Limitation 5[A], Petitioner asserts Risky discloses a bolus “ingested via the animal’s esophagus, which requires that it be orally administered to the animal.” Pet. 28–29 (citing Ex. 1005, Abstr., ¶¶ 16, 17, 101; Ex. 1002 ¶ 79). Petitioner further asserts that “Risky’s bolus 210 contains sensors 220—*e.g.*, Accelerometer 221, Temperature Sensor 222, and other sensors—for monitoring the animal’s internal characteristics.” *Id.* at 29–30 (citing Ex. 1005, Fig. 2, Abstr., ¶ 29). According to Petitioner, Risky’s “sensors generate sensor signals representing, *e.g.*, ‘animal temperature, stomach pH, blood pH, heart rate, respiration, [and/or] stomach or rumen contractions. . . .’” *Id.* at 30 (citing Ex. 1005 ¶¶ 25, 35, 63, 67, 68, 75–81, 86, 87, 116, Figs. 1–8) (alternation in original).

As to Limitation 5[B], Petitioner focuses on Risky’s specific example of “thermal sensors which produce signals that vary with temperature.” Pet. 31 (citing Ex. 1005 ¶ 35; Ex. 1002 ¶ 84). According to Petitioner, “[a] POSA would further understand that an animal’s temperature

⁶ *See Nidec*, 868 F.3d at 1017.

. . . will change over time” and “[t]o distinguish different temperature readings over time, the sensor signal must necessarily vary with changes in the temperature.” *Id.* (citing Ex. 1005 ¶ 44). For example, Dr. Young explains “[t]o distinguish a first measured value (*e.g.*, temperature of 101 degrees) from a second measured value (*e.g.*, 103 degrees), the sensor signal must vary in accordance with the two-degree change in temperature.” Ex. 1002 ¶ 84 (citing Ex. 1005 ¶¶ 35, 44). In its Reply, Petitioner emphasizes that a system lacking varied signals in response to temperature changes would defeat Risky’s purpose to monitor and detect changes in animal-health conditions. Pet. Reply 15 (citing Ex. 1005, Abstr.; Ex. 1024, 35:18–37:25; Ex. 1025 ¶ 28).

(2) Patent Owner’s arguments

Patent Owner argues that “Risky does not disclose ‘distinguish[ing] different temperature readings over time,’” and thus Risky’s sensor signal does not “necessarily vary with changes in the temperature.” PO Resp. 46. First, Patent Owner contends that “[a] POSA would understand [a signal that varies when the physiological parameter changes] to require a sensor that generates a signal that directly corresponds to changes in a physiological parameter inside the animal.” *Id.* at 45 (citing Ex. 2006 ¶ 167). Second, Patent Owner contends that Risky’s paragraphs 35 and 44 do “not even contemplate distinguishing between two sensor signals.” *Id.* at 46 (citing Pet. 31; Ex. 1002 ¶ 84; Ex. 2006 ¶ 170). Rather, “as Dr. Kan testifies, Risky is silent with respect to how a sensor signal is generated, processed, or output, let alone how a generated signal would vary based on a corresponding change in the measured physiological parameter.” *Id.* at 46–47 (citing Ex. 2006 ¶¶ 170, 173, 174). Accordingly, Patent Owner argues

that Petitioner relies on an undisclosed assumption “to demonstrate what is *necessarily present* in Risky.” *Id.* at 46.

(3) *Our analysis*

On the full record, we are persuaded by Petitioner’s argument and evidence that Risky discloses “generating a sensor signal from one or more sensors contained in a bolus orally administered to said ruminant animal” (limitation 5[A]). As Petitioner argues, Risky discloses a bolus including sensors for monitoring animal characteristics and wirelessly transmitting data corresponding to the monitored characteristics to a base station.

Ex. 1005 ¶ 25; *see id.* ¶ 101 (“an animal characteristics message from a bolus and/or sensor associated with an animal may be received”).

Accordingly, we find Risky’s animal characteristic message discloses the claimed sensor signal.

We are further persuaded by Petitioner’s argument and evidence that Risky discloses “said sensor signal varies based on a corresponding change in one or more physiological parameters of said ruminant animal” (limitation 5[B]). We find Risky’s description of temperature sensors to be persuasive evidence on this issue. Risky discloses sensors for measuring changing animal characteristics, e.g., temperature, over time. Ex. 1005 ¶¶ 35, 44; *see also id.* ¶¶ 75, 76 (detecting temperature changes). We further credit Dr. Young’s testimony that one skilled in the art would understand that generated sensor signals, e.g., temperature, would change over time, whereby the sensor signal varies based on any corresponding change in the ruminant physiological parameter that the signal represents. Ex. 1002 ¶¶ 84, 85; *see Cont’l Can Co. USA v. Monsanto Co.*, 948 F.2d 1264, 1269 (Fed. Cir. 1991) (“This modest flexibility in the rule that ‘anticipation’ requires that every element of the claims appear in a single reference accommodates

situations where the common knowledge of technologists is not recorded in the reference; that is, where technological facts are known to those in the field of the invention.”). We consider Dr. Kan’s testimony that Risky is silent as to details about the sensor signal, but are not persuaded because the testimony appears to contradict Risky’s disclosure of a bolus including sensors for monitoring changes in animal characteristics, generating animal characteristic messages, i.e., signals, and wirelessly transmitting data corresponding to the monitored characteristics. *See* Ex. 2006 ¶¶ 170–174; Ex. 1005 ¶¶ 25, 63, 67, 68, 75–78, 101. Given Risky’s express description of monitoring animal characteristics over time, we agree with Petitioner’s argument that Risky discloses that said sensor signal varies based on changes to the animal’s physiological parameters.

c) Limitations 5[C] and 5[D]

Limitation 5[C] recites “encoding said sensor signal from said one or more sensors as encoded physiological data corresponding to said one or more physiological parameters of said ruminant animal.” Ex. 1001, 21:35–38. Limitation 5[D] recites “storing said encoded physiological data in a non-transitory computer readable media.” *Id.* at 21:39–40.

(1) Petitioner’s arguments

As to limitation 5[C], Petitioner asserts Risky’s sensor signals that correspond to physical phenomena “start out in analog form” but are then “(1) stored in the transponder’s memory . . . ; (2) organized into an ‘Animal Information Data Structure’; and (3) transmitted wirelessly as data—i.e., digital information.” Pet. 32 (citing Ex. 1005, Abstr., ¶¶ 21, 23, 37, 49–51, 58, Fig. 2). Petitioner cites to its discussion of Harvey to explain that one skilled in the art would recognize that physiological sensors “produce signals which start out in analog form since the signals (e.g., voltages)

correspond to physical phenomena that vary continuously.” *Id.* at 32–33 (citing Pet. 20–21; Ex. 1022, Fig. 1, 1:31–2:13, 4:22–5:6; Ex. 1002 ¶ 62).

Petitioner asserts that “[s]ince storage in memory, organization into a data structure, and transmission by a digital protocol all involve digital information, not analog signals, Risky *necessarily* requires the analog signals representing the animal’s physiological parameters to be *encoded into digital form* as physiological data corresponding to the measured physiological parameters.” *Id.* (citing Pet. 20–21; Ex. 1002 ¶ 86) (emphasis added). Petitioner also asserts that “encoding of analog signals into digital signals would occur in an ADC within the bolus—*e.g.*, within processor 240 or one or more of the sensors themselves.” *Id.* at 33 (citing Pet. 20–21; Ex. 1005 ¶¶ 41, 43, 44, Fig. 2).

As to limitation 5[D], Petitioner contends that “Risky teaches storing the encoded physiological data within memory unit 250, which can comprise an Electrically Erasable Programmable Read-Only Memory (‘EEPROM’).” Pet. 34 (citing Ex. 1005 ¶¶ 43, 44, 49, 52, Fig. 2). According to Petitioner, “[a] POSA would know that an EEPROM is a non-transitory computer readable media.” *Id.* (citing Ex. 1002 ¶ 89; Ex. 1021, 30:32–35; Ex. 1023 ¶ 66).

In its Reply, Petitioner argues that “[a] POSA would have understood that Risky teaches, in multiple places, the generation, storage and transmission of digital data, which is encoded data,” therefore “Risky would have disclosed the use of digital data to a POSA.” Pet. Reply 10 (citing Ex. 1025 ¶ 21). First, Petitioner argues that “[a] POSA would have understood that using EEPROM to store physiological data in this field would be a digital storage, which would mean that the analog signals from the sensors are encoded as digital data.” *Id.* (citing Ex. 1002 ¶¶ 88, 89;

Ex. 1025 ¶¶ 11–13, 21, 22). Petitioner argues that Patent Owner’s example of “analog EEPROM is a neuromorphic computing system, which is irrelevant here.” *Id.* (citing Ex. 2006 ¶ 146; Ex. 1025 ¶¶ 12–13).

Second, Petitioner asserts that “Riskey discusses the pre-processing of measurement data by element 240, before storage in memory unit 250.” *Id.* at 11–12 (citing Pet. 32; Ex. 1005, Fig. 2 ¶¶ 44, 45). Riskey’s pre-processing “may comprise calculating . . . measurement characteristics such as mean, standard deviation, etc., compressing the data, and the like. As such, the preprocessing may reduce the amount of data transmitted to the base station (not shown) and thereby reduce power and RF transmission requirements.” *Id.* at 12 (quoting Ex. 1005 ¶¶ 44, 45). According to Petitioner, “[a] POSA would have understood that compressing data to reduce the amount of data is a reference to digital data.” *Id.* (citing Ex. 1025 ¶ 23).

Third, Petitioner contends that “Riskey discloses examples of encoding data outside of digital conversion.” *Id.* at 12. Specifically, Petitioner argues that the sensor, e.g., a thermistor, may report a signal such as a current or voltage, which is converted into data, e.g., temperature. *Id.* at 12–13 (citing Ex. 1024, 156:15–157:24; Ex. 1025 ¶ 24; Ex. 1005 ¶¶ 25, 118).

(2) Patent Owner’s arguments

Patent Owner responds that each of Riskey’s (1) memory storage, (2) data structure, and (3) wireless data transmission, “can use sensor data in a non-digital format, such as analog, and thus the claimed ‘encoding’ step is not necessarily present.” PO Resp. 32. Accordingly, Patent Owner argues that Petitioner fails “to meet the high standard of proof for establishing that Riskey inherently discloses element 5[C].” *Id.*

First, as to memory storage, Patent Owner argues that “Riskey does not limit its transponder to any particular storage type.” *Id.* at 33 (citing Ex. 1005 ¶¶ 41, 43, 44, 49; Ex. 2006 ¶ 146). As to the EEPROM, Patent Owner argues that “both experts recognize, ‘EEPROM’ does not necessarily store encoded data in a digital format.” *Id.* (citing Ex. 2006 ¶¶ 86, 146, 147; Ex. 2007, 214:6–217:17). Relying on Dr. Kan’s testimony, Patent Owner explains that “Riskey’s reference to EEPROM’ would be understood to include analog EEPROM or floating-gate MOSFET that stores analog charge, not encoded data.” *Id.* at 32–33 (citing Ex. 2006 ¶¶ 86, 146, 147). Patent Owner further argues that “Riskey’s brief discussion of read-only memory, such as EEPROM, is narrowly limited to a specific embodiment in which [a unique bolus identifier value] ‘UBID’—not sensor signals corresponding to physiological data—is stored in ‘read-only storage 254’ for a specific purpose.” *Id.* at 34 (citing Ex. 1005 ¶ 52; Ex. 2006 ¶ 147).

Second, as to data structure, Patent Owner argues that “the physiological data in Riskey’s ‘data structures’ are not necessarily digital or encoded.” *Id.* at 35 (citing Pet. 32; Ex. 2006 ¶ 149). Rather, Riskey describes storing and managing “animal information data structure 310” “*using any data storage and/or management technique known in the art.*” *Id.* (quoting Ex. 1005 ¶ 61) (emphasis in original).

Third, as to wireless data transmission, Patent Owner argues that “Riskey never mentions a ‘digital protocol,’ and nothing otherwise requires Riskey’s transmitted signals to be in digital form.” *Id.* at 36. Rather, Patent Owner contends that Riskey describes generic components including “communications unit 230,” “active data transmitter 232,” and “data receiver 234,” all of which are capable of transmitting analog data. *Id.* at 36–37 (citing Ex. 1005 ¶¶ 21, 23, 37, Fig. 2; Ex. 2006 ¶¶ 150–155).

Finally, Patent Owner argues that “Riskey never mentions ‘ADC,’ ‘PCM,’ or ‘converting’ data, and none of the systems it describes necessarily requires these features.” *Id.* at 38 (citing Ex. 2006 ¶ 156). In sum, Patent Owner argues that “Riskey’s memory storage, data structuring, and data transmission do not inherently require digital encoding, and ADC is not necessarily present in Riskey.” *Id.*

In response to Petitioner’s Reply, Patent Owner argues that Petitioner reframes its initial inherency argument, i.e., Riskey “*necessarily requires*” encoding the analog sensor signals to their digital form, into “a disclosure that a POSA ‘would have understood’ encoding to occur.” PO Sur-Reply 11 (citing Pet. 32; Ex. 1002 ¶¶ 86–87; Pet. Reply 10; Ex. 1025 ¶¶ 21–23). Patent Owner argues that Petitioner improperly changes its position from the Petition. *Id.* at 11–12 (citing *Wasica Fin. GmbH v. Cont’l Auto. Sys., Inc.*, 853 F.3d 1272, 1287 (Fed. Cir. 2017)). Accordingly, Patent Owner reiterates that Petitioner fails to show “inherency by not countering that analog sensor signals *could* be transmitted and stored in Riskey’s system, and therefore Riskey does not *necessarily require* encoded signals.” *Id.* at 12.

Patent Owner further argues that Petitioner’s examples of non-digital conversion “is both inconsistent with their prior definition of ‘encoding’ and an acknowledgement that sensor signals in Riskey can be transmitted and stored in their analog form, thus defeating their inherency position.” *Id.* Specifically, “Petitioners defined ‘encoding’ in the Petition as the conversion from an analog signal to its digital form. . . . But current, voltage, and temperature are all analog signals or values measured by the sensor.” *Id.* at 12–13 (citing Pet. 20–22; Ex. 1002 ¶¶ 61, 63, 86, 87; Ex. 2007, 154:3–155:6).

(3) *Our analysis*

We first address whether Petitioner improperly changes its unpatentability position from its Petition to its Reply. “The petitioner’s ‘reply may only respond to arguments raised in the corresponding opposition, patent owner preliminary response, patent owner response, or decision on institution.’” *Corephotonics, Ltd. v. Apple Inc.*, 84 F.4th 990, 1002 (Fed. Cir. 2023) (quoting 37 C.F.R. § 42.23(b)). An IPR petitioner may not raise in reply an entirely new rationale of unpatentability. *See Henny Penny Corp. v. Frymaster LLC*, 938 F.3d 1324, 1330–31 (Fed. Cir. 2019).

We agree with Patent Owner that the Petition addressed “encoding sensor signals” as encoding analog signals to digital form. *See* Pet. 20–21, 32–35; Ex. 1002 ¶¶ 62–66. Petitioner makes a new argument in its Reply that “encoding” may include converting current or voltage to temperature data, including analog data. *See* Pet. Reply 12–13. In making this argument, Petitioner does not explain how its original Petition was correct, and instead presents a new argument absent from the Petition. *See Wasica*, 853 F.3d at 1287. Accordingly, we decline to engage on Petitioner’s new argument that encoding includes any data conversion. *Id.*

We next address Petitioner’s argument that Risky discloses encoding analog to digital data to one of ordinary skill in the art. *See* Pet. Reply 10–12. We disagree with Patent Owner that Petitioner’s anticipation arguments for limitations 5[C] and 5[D] presented in the Petition rely solely on inherency, and that Petitioner’s Reply abandons this position to present an entirely new anticipation argument. We agree that the Petition liberally uses the term “necessarily,” which often relates to inherency, although Petitioner’s Reply entirely omits “necessarily” when discussing Risky. *See* Pet. 32–33; Pet. Reply 9–15; *In re Montgomery*, 677 F.3d 1375, 1379–80

(Fed. Cir. 2012) (“A reference may anticipate inherently if a claim limitation that is not expressly disclosed is necessarily present, or inherent, in the single anticipating reference.”) (internal quotations omitted). However, Petitioner never explicitly argues for “inherency” of limitations 5[C] and 5[D]. In contrast, the Petition uses the term “inherent” when arguing other limitations, *see, e.g.*, Pet. 30 (signals are inherent), 31 (“signal variation is inherent”). Accordingly, it appears that Petitioner did not expressly rely on inherency in the Petition. Taking together Petitioner’s express discussion in the Petition and its clarifications in the Reply, we find that Petitioner does not rely on inherency to show that Risky describes limitations 5[C] and 5[D].

We find that Petitioner’s Reply further explains how Risky’s disclosures would have been understood by one skilled in the art as encoding signals from analog to digital. *See* Pet. Reply 10–12; Tr. 18 (“I think the petition says and disclose, when you see EEPROM, that discloses digital.”). These arguments are responsive to those raised in Patent Owner’s response and simply expand on the arguments raised in the Petition. *See Corephotonics*, 84 F.4th at 1009. In replying to Patent Owner, Petitioner relies on the same legal grounds, anticipation by Risky, applies the same portions of the reference, and makes the same argument that one skilled in the art would understand Risky to disclose encoding analog signals into digital data. *Compare* Pet. 32 (citing Ex. 1005, Abstr., ¶¶ 21, 23, 37, 41, 43, 44, 49–51, 58, Fig. 2); Pet. Reply 10–12 (citing Ex. 1005, Abstr., ¶¶ 21, 23, 35, 37, 41, 43, 44, 45, 49–51, 57, 58, Fig. 2). Because this is a proper reply, we consider Petitioner’s argument and the cited disclosures.

We find that a preponderance of the evidence supports Petitioner’s argument that one skilled in the art would have understood Risky as

disclosing encoding a sensor signal as encoded data corresponding to one or more physiological parameters, and storing the encoding data, despite not using the term “encoding.” Risky discloses processor 240 may read and store sensor measurements on memory unit 250 and transmit sensor measurement via data transmitter 323. Ex. 1005 ¶¶ 43, 44, 49. As Petitioner identifies, Risky further discloses that processor 240 may pre-process measurement data before transmission, including compressing the data to reduce the amount of transmitted data. *See id.* ¶ 44; Ex. 1002 ¶ 87.

Dr. Young explains that one skilled in the art would have understood Risky as referring to encoded data because “[o]nly when a value represented in a digital format is compressed does it result in a reduction in the amount of data (i.e. bits).” Ex. 1025 ¶ 23.

We also find persuasive Risky’s disclosure that the encoded data is stored in non-transitory memory, including EEPROM as a specific type of memory for storing digital data. Pet. 34–35 (citing Ex. 1005 ¶¶ 43, 44, 49, 52; Ex. 1002 ¶¶ 89, 90); Pet. Reply 10–11 (citing Ex. 1025 ¶¶ 22, 23).

Dr. Young explains that “a POSA would have understood this to be a disclosure of the use of digital data, which is an encoded physiological data.” Ex. 1025 ¶¶ 10–13, 22.

We consider Dr. Kan’s contrary testimony, that “[c]ertain types of EEPROM memory are analog, such as those that use Floating Gate MOSFETs as the primary memory element,” whereby a “POSA would recognize that when EEPROM cells are operated in the analog forms, they can store analog values instead of discrete digital bits.” Ex. 2006 ¶ 86. We find Dr. Kan establishes that one skilled in the art would have recognized certain EEPROMs as being capable of storing analog signals instead of digital signals. *See id.* However, both declarants agree that EEPROM was a

known type of memory for storing digital data. *See* Ex. 1024, 93:5–95:22; Ex. 2007, 186:21–187:8. Accordingly, one of ordinary skill in the art would have understood that Risky discloses a memory unit for storing encoded digital data, particularly when combined with a processor configured to store and process, e.g., compress, signal data before transmitting.

Considering the entire record, we are persuaded by Petitioner’s argument and evidence that Risky discloses limitations 5[C] and 5[D].

d) Limitation 5[E]

Limitation 5[E] recites “enabling a radio signal generator located within said bolus.” Ex. 1001, 21:41–42.

Petitioner asserts Risky discloses enabling a data transmitter, i.e., a radio signal generator, to transmit radio signals using an antenna. Pet. 35–36 (citing Ex. 1005, Fig. 2, Abstr., ¶¶ 19, 21, 37, 49, 50, 55, 56, 59; Ex. 1002 ¶ 91).

Patent Owner does not separately address limitation 5[E]. *See* PO Resp. 39–45.

Considering the entire record, we are persuaded by Petitioner’s arguments and evidence that Risky discloses limitation 5[E]. Ex. 1005, Fig. 2, Abstr., ¶¶ 19, 21, 37, 49, 50, 55, 56, 59; Ex. 1002 ¶ 91.

e) Limitation 5[F]

Limitation 5[F] recites “activating said radio signal generator at pre-determined intervals to generate a radio signal to carry said encoded physiological data.” Ex. 1001, 21:43–45.

(1) The Parties’ arguments

Petitioner contends that Risky discloses two examples of generating radio signals carrying physiological data at pre-determined intervals. Pet. 36–37. First, Petitioner cites Risky’s “burst mode” in which “the

transmitter is activated at predetermined, periodic intervals” as opposed to when sensor polling takes place. *Id.* (citing Ex. 1005 ¶ 49). Second, Petitioner cites Risky’s “‘on-line’ mode in which the transmitter is activated at a predetermined ‘transmission frequency’—*i.e.*, transmission interval—specified by the device’s machine readable instructions.” *Id.* at 37 (citing Ex. 1005 ¶¶ 55, 59; Ex. 1002 ¶¶ 92–93). Because we find that Risky’s “burst mode” discloses the claimed pre-determined intervals, we focus our discussion on Patent Owner’s arguments against this disclosure.

Patent Owner responds that “a POSA would understand Risky’s ‘burst mode’ to transmit any alleged ‘physiological data’ at varying intervals based on triggering events, not at ‘pre-determined intervals’ as claimed.” PO Resp. 40. Patent Owner argues that Risky’s paragraph 49, on which Petitioner relies, “does not explain how . . . ‘machine readable instructions 252’ implement the intervals.” *Id.* at 40–41. Accordingly, “Dr. Kan looked to the disclosure as a whole” and “determined that transmission intervals set by machine readable instructions 252—including in ‘burst mode’—are not predetermined, but rather they vary based on triggering events that affect the transmission delay.” *Id.* at 41 (citing Ex. 2006 ¶¶ 158–160). Patent Owner argues that Risky’s paragraph 48, which describes conditions for increasing or decreasing the frequency for polling and transmission intervals, would apply to the burst mode, indicating the transmission intervals “are not pre-determined as claimed.” *Id.* (citing Ex. 100[5] ¶ 48; Ex. 2006 ¶¶ 160–161).

Patent Owner further argues that “a POSA would have understood that an animal monitoring method that transmits physiological data at ‘pre-determined intervals’ operates in a different way, and serves a completely different purpose, than Risky’s ‘burst [mode].’” PO Resp. 42. According to Patent Owner, “[t]he goal of the ’644 Patent was to use less power so that

the bolus can be administered to an animal at birth and operate over the entire lifespan of the animal.” *Id.* at 42–43 (citing Ex. 2006 ¶¶ 163–164). “Riskey’s ‘burst mode,’ on the other hand, is not implemented to save power or reduce the size of the bolus,” but instead sends data at a triggering event “to recognize changes in the animal as soon as possible.” *Id.* (citing Ex. 2006 ¶ 164).

Petitioner replies that Patent Owner relies on a separate embodiment in Riskey to distinguish “burst mode” from the claimed pre-determined intervals. Pet. Reply 13–14 (citing PO Resp. 40–41; Ex. 1005 ¶¶ 48, 49; Ex. 1025 ¶¶ 25, 26). Petitioner argues that “this separate embodiment cannot alter the plain meaning of the teaching that, in the burst mode, the machine readable instructions specify a transmission interval, without any mention of changeability.” *Id.* at 14 (citing Ex. 1005 ¶ 47; Ex. 1025 ¶ 26).

Patent Owner responds that Riskey’s “paragraph 49 does not explain *how* machine readable instructions 252 specify a transmission interval. Instead, Riskey provides that explanation in paragraph 48, which describes that machine readable instructions 252 define and vary the transmission frequency based on the health status or location of the animal.” PO Sur-Reply 14 (citing Ex. 1005 ¶¶ 48, 49). According to Patent Owner, “because paragraph 48 explains that machine readable instructions 252 determines the transmission interval after the conditional occurrence of some external input, such as health status or location, *id.*, the transmission intervals in burst mode are thus not ‘predetermined.’” *Id.* at 15 (citing Ex. 2006 ¶¶ 158–160).

(2) *Our analysis*

On the full record, we are persuaded by Petitioner’s argument and evidence that Riskey’s “burst mode” discloses the claimed “pre-determined intervals.” Riskey describes various embodiments of polling and

transmission frequency. *See* Ex. 1005 ¶¶ 47–49. As noted by Patent Owner, “[i]n one embodiment” the polling and transmission frequency may vary based on changing animal health conditions. *See id.* ¶ 48. But Risky describes a different embodiment for transmitting sensor measurements. *See id.* ¶ 49. In this separate embodiment for transmitting sensor measurements, Risky discloses “one mode of operation” for “instantaneous” transmission and “another mode of operation,” i.e. “burst mode.” *Id.* Contrary to Patent Owner’s argument, Risky describes “burst mode” as “machine readable instructions 252 [that] may specify a transmission interval, wherein processor 240 may transmit an animal characteristics message comprising some or all of the measurements stored in memory unit 250 at each transmission interval.” *Id.*

We disagree with Patent Owner that one skilled in the art would read in limitations from other embodiments to understand Risky’s burst mode for transmitting at pre-determined intervals, because it is unnecessary to understand Risky’s burst mode disclosure. Further, we disagree with Patent Owner that the claimed pre-determined intervals function in a different way with a different purpose than Risky’s “burst mode.” Rather, Risky expressly describes the same method for the same purpose, transmitting sensor readings as “periodic bursts” to “reduce the power consumed by bolus 210 by reducing the number of transmissions sent from data transmitter 232.” Ex. 1005 ¶ 49. Accordingly, we find that Risky discloses limitation 5[F].

f) Limitation 5[G]

Limitation 5[G] recites “generating said radio signal having a frequency of between about 700 MHz to about 1 GHz.” Ex. 1001, 21:46–47.

Petitioner asserts that Risky discloses operating a radio signal transmitter at a frequency of 900 MHz, within the claimed range of about 700 MHz to about 1 GHz. Pet. 37 (citing Ex. 1005 ¶¶ 21, 23, 37; Ex. 1002 ¶ 94).

Patent Owner does not dispute that Risky discloses limitation 5[G]. *See* PO Resp. 31–47.

On the full record, we are persuaded by Petitioner’s argument and evidence that Risky discloses the claimed frequency of limitation 5[G]. Ex. 1005 ¶¶ 21, 23, 37; Ex. 1002 ¶ 94.

g) Conclusion as to Claim 5

Based on our review of the complete trial record, we determine that Petitioner establishes by a preponderance of the evidence that Risky anticipates claim 5.

3. Dependent Claim 6

Claim 6 depends from claim 5 and requires that the radio signal “frequency is selected from the group consisting of: between about 700 MHz to about 800 MHz, 750 MHz to about 850 MHz, about 800 MHz to about 900 MHz, 850 MHz to about 950 MHz, 900 MHz to about 1 GHz.” Ex. 1001, 21:48–52.

Petitioner presents evidence that Risky discloses a radio signal having a frequency range of 850 MHz to 950 MHz that is identical to one of the claimed ranges recited by Claim 6. Pet. 37–38 (citing Ex. 1005 ¶¶ 21, 23, 37; Ex. 1002 ¶ 95).

Patent Owner does not dispute Petitioner’s showing that Risky discloses one of the alternative frequency ranges recited by claim 6. *See* PO Resp. 31–47.

We find that Risky discloses the frequency range recited by claim 6. Ex. 1005 ¶¶ 21, 23, 37; Ex. 1002 ¶ 95. Accordingly, we find that Risky anticipates claim 6.

E. Asserted Anticipation of Claims 5 and 6 by Harvey

Petitioner contends that claims 5 and 6 are anticipated by Harvey. Pet. 16–27. Patent Owner disputes Petitioner’s contentions. PO Resp. 12–31.

1. Harvey (Ex. 1004)

Harvey relates to a livestock management system. Ex. 1004, 1:16–18. Harvey’s livestock management system includes “an active [Radio Frequency (RF)] tag and corresponding interrogator, configured to infer a monitored subject state from a sensed physical quantity of a monitored subject, relative to a monitored subject group.” *Id.* The monitored subject group may include a cattle herd with individual monitored subjects. *Id.* at 7:25–28.

The monitored subjects “may bear a respective incorporated telemetry device, as represented by respective intelligent active tags (IAT) 1110–1113 (generally IAT 1110).” *Id.* at 8:5–7; *see also id.* at Fig. 1. “Incorporated telemetry device 1110–1113 (generally, intelligent active tag, or IAT 1110) can be a telemetry device coupled to a respective monitored subject 1010, which may be disposed internally or externally to a monitored subject” *Id.* at 11:4–6. In “non-limiting implementations, IAT 1110 may be restrained or moveable within monitored subject 1010, for example, as a digestive tract bolus device, or as a miniature transponder In ruminant monitored subjects such as cattle, a digestive tract bolus tag may be retained indefinitely within the animal.” *Id.* at 11:10–14.

Harvey further describes intelligent transponder (XPDR) 5000 “which may be used as a constituent element of multi-modal intelligent active tag

2000. . . . A suitable active tag may be an intelligent active tag, such as IAT 1110 in FIG.1 and tag 2000 in FIGS. 2 and 3.” *Id.* at 22:29–34. XPDR 5000 is illustrated in Figure 5, reproduced below.

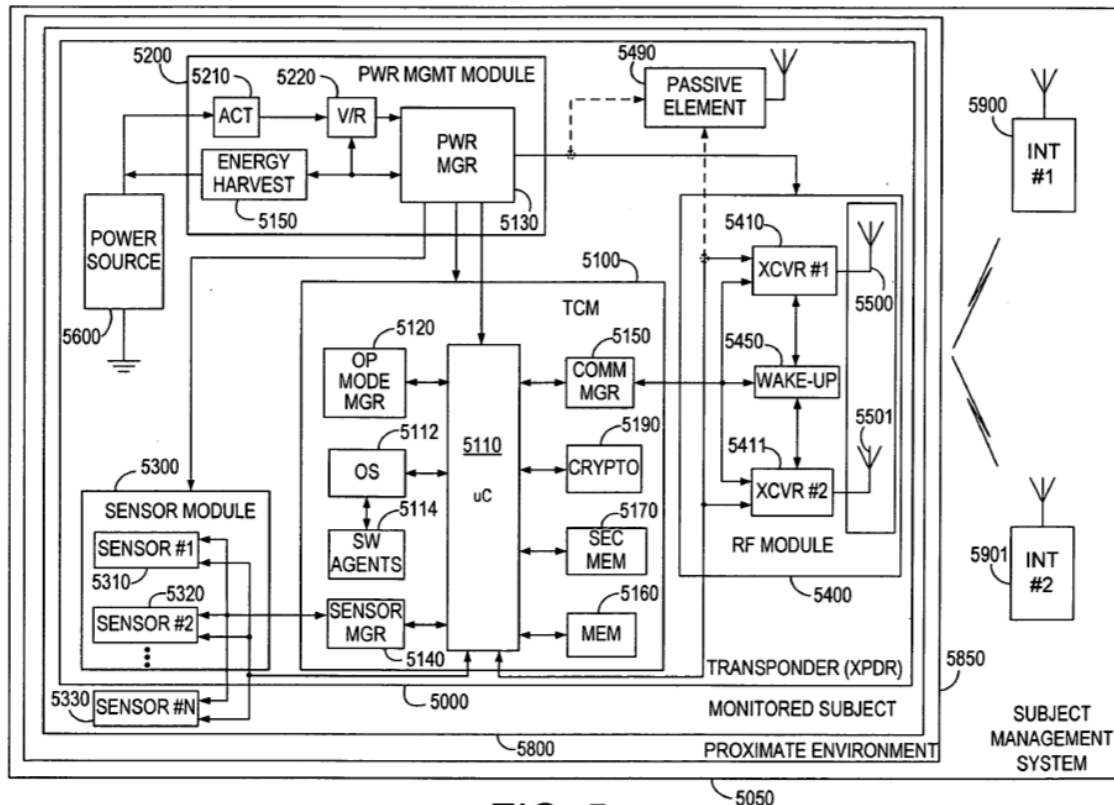


FIG. 5

Figure 5 illustrates a logical block diagram of XPDR 5000. *Id.* at 6:25–26.

“XPDR 5000 can include transponder controller module (TCM) 5100, power management module (PMM) 5200, sensor module (SDM) 5300, and RF module (RFM) 5400.” *Id.* at 29:17–18. “TCM 5100 may include microcontroller (uC) 5110 and memory (MEM) 5160.” *Id.* at 29:21–22. XPDR 5000 further includes sensor module 5300 that transforms a “sensed physical quantity representation to a sensed data signal, which may be communicated to [interrogator (INT)] 5900.” *Id.* at 37:35–38:1. Sensor module 5300 may include one or more sensors 5310, 5320, and 5330. *Id.* at

38:1–2. “A sensor can be a transducer configured to sense a measurable physical property of a physical system, and to produce a measurand representative of an attribute of the measurable physical property.” *Id.* at 38:2–4.

2. *Independent Claim 5*

a) *Preamble*

Petitioner asserts that Harvey discloses “[a] method of monitoring physiological parameters of a ruminant animal.” *See* Pet. 16. Specifically, Petitioner asserts “Harvey teaches a method of monitoring physiological parameters—*e.g.*, body temperature, heart rate, respiration, humidity, hydration state, and EEG, ECG or EMG waves—of one or more ruminant animals, *e.g.*, cattle.” *Id.* (citing Ex. 1004, 1:16–19, 11:10–14; Ex. 1002 ¶ 55).

Patent Owner does not dispute that Harvey discloses the preamble of claim 5. *See* PO Resp. 12–31.

Considering the entire record, we are persuaded by Petitioner’s argument and evidence that Harvey discloses the preamble of claim 5; thus, we need not decide whether the preamble is limiting.⁷ Ex. 1004, 1:16–19, 11:10–14; Ex. 1002 ¶ 55.

b) *Limitation 5[A]*

Petitioner asserts Harvey discloses the step of “generating a sensor signal from one or more sensors contained in a bolus orally administered to said ruminant animal.” Pet. 17–19 (citing Ex. 1004, 11:10–14, 11:20–24, 37:35–38:18, 38:25–31, 39:15–36, 40:17–20, 40:25–37, 41:1–6, 41:24–25, 71:17–21, 73:6–8, 74:6–7, 75:18–22, Figs 5, 12; Ex. 1002 ¶¶ 56–57).

⁷ *See Nidec*, 868 F.3d at 1017.

Considering the entire record, we find that Petitioner shows that a person of skill in the art, reading Harvey, would have envisaged the claimed arrangement of an intelligent active tag IAT 1110 in the form of a bolus, including a transponder, e.g., XPDR 5000, as a constituent part, as discussed in more detail below.

(1) Petitioner's arguments

In the Petition, Petitioner asserts Harvey teaches intelligent active tag “IAT . . . may be . . . a digestive tract bolus device In ruminant monitored subjects such as cattle, a digestive tract bolus tag may be retained indefinitely within the animal.” Pet. 17 (quoting Ex. 1004, 11:10–14) (alterations in original); *see also id.* at 10–11 (identifying IAT 1110). Petitioner asserts “Harvey’s bolus includes a transponder containing multiple sensors, as illustrated in Fig. 5.” *Id.* at 18; *see also id.* at 10–11 (identifying XPDR 5000). According to Petitioner, “[e]xamples of signal-producing sensors in Harvey’s bolus include a body temperature sensor, a heart-rate sensor, an accelerometer, a humidity sensor, and/or electrical sensors” *Id.* (citing Ex. 1004, 38:25–31, 40:25–37, 39:15–36, 40:17–20, 41:1–6). In view of these teachings, Petitioner argues that “a POSA would understand that the sensors in the orally administered bolus generate sensor signals.” *Id.* at 19 (citing Ex. 1002 ¶ 58).

In the Reply, Petitioner further explains the connection between Harvey’s IAT, e.g., IAT 1110, and transponder, e.g., XPDR 5000. For example, Petitioner argues that Harvey teaches IAT 1110 can be implemented as a digestive track bolus and that “an IAT includes, at a minimum, a transponder and a power source.” Pet. Reply 2 (citing Ex. 1004, 11:4–19; Ex. 2006 ¶ 62 (citing Ex. 1004, 18:3–17, 18:34–19:9)). According to Petitioner, Harvey’s IAT transponder may include XPDR 5000 that

“contains radio signal generator that generates the signal that carries the animal data to the receiver.” *Id.* at 2–3 (citing Ex. 1002 ¶¶ 44–45). For example, Petitioner explains that “Harvey teaches ***XPDR 5000 as a constituent of IAT 1110.***” *Id.* at 3 (citing Pet. 11; Ex. 1004, 70:22–23). Petitioner argues that Harvey thus “expressly connects XPDR 5000 with IAT 1110.” *Id.* at 3–4 (citing Ex. 1004, 48:31–33; Ex. 1025 ¶¶ 6, 7). In making this argument, Petitioner directs our attention to the Petition’s overview of Harvey rather than the element-by-element discussion of Limitation 5[A]. *See* Pet. 10–11; *see also* Tr. 8:13–22 (pages “10 and 11 are from the overview of what Harvey discloses as opposed to the element-by-element analysis where all of these elements were then explained”).

(2) *Patent Owner’s arguments*

Patent Owner responds that “[t]he Petition never connects the disparate teachings of a ‘bolus’ and ‘XPDR 5000’ and fails to provide any evidence that a POSA would interpret Harvey to teach a single method or system that includes both features.” PO Resp. 13. First, Patent Owner argues that Harvey discusses a particular “IAT” embodiment as a digestive tract bolus, but “never discloses or otherwise suggests that this particular ‘IAT’ incorporates a ‘sensor’ or ‘radio signal generator’ as claimed.” *Id.* at 14 (citing Pet. 17; Ex. 1004, 11:10–14; Ex. 2006 ¶¶ 94–98). Second, Patent Owner argues that Petitioner fails “to connect the distinct XPDR 5000 embodiment to the alleged ‘bolus’ embodiment in Harvey, or explain why they would be combined.” *Id.* at 15–16 (citing Pet. 17–19, 23–26; Ex. 1004, 11:4–14, 22:29–30, Fig. 1; Ex. 2006 ¶ 97). Without this explanation, Patent Owner argues that “Harvey’s very general reference to a bolus with ‘no guidance’ on how to implement the configuration cannot establish anticipation.” *Id.* at 16 (citing *Minnesota Mining & Manufacturing Co. v.*

Johnson & Johnson Orthopaedics, Inc., 976 F.2d 1559, 1572 (Fed. Cir. 1992). In contrast, Patent Owner argues that Harvey consistently describes XPDR 5000 as part of an external ear tag device. *See id.* at 16–20 (citing Ex. 1004, 8:19–20, 17:31–33, 18:3–17, 19:13–14, 19:16–17, 19:19–21, 23:30–33, 40:19–20, 40:28–30, 41:1–6, Figs. 1, 2A–2C, 3A, 3B; Ex. 2006 ¶¶ 103–107).

In its Sur-Reply, Patent Owner argues that “Harvey expressly separates IAT 1110 into distinct ‘embodiments’ and ‘implementations,’” rather than “a ‘single embodiment’ that includes XPDR 5000.” PO Sur-Reply 3 (citing Pet. Reply 4; Ex. 1004 ¶¶ 34, 38, 40, 42, 45, 49, 51). Within these embodiments, Patent Owner argues that “Harvey’s description of XPDR 5000 as an IAT 1110 component only occurs in the context of various ear tag IAT embodiments” specifically the ear tags shown in Figures 1–4. *Id.* (citing Pet. Reply 3–4; Ex. 1004, 48:31–33, 70:22–23; Ex. 2008, 43:1–44:12). Accordingly, Patent Owner argues that Petitioner improperly argues anticipation by combining multiple distinct disclosures from one reference. *Id.* at 4 (citing *Microsoft*, 878 F.3d at 1069; *BlephEx*, 24 F.4th at 1402).

(3) *Our analysis*

First, we address the scope of Petitioner’s Reply and whether it responds to issues raised in the Institution Decision and Patent Owner’s Response or makes a new argument not presented in the Petition. *See Corephotonics*, 84 F.4th at 1002. Our Institution Decision identified potential weaknesses in the Petition’s element-by-element discussion of limitation 5[A]. *See* Inst. Dec. 23–24 (citing Pet. 17–19). In the Reply, Petitioner cites additional parts of the Petition, specifically the prior art overview, to argue that Harvey expressly connects IAT 1110 to XPDR 5000.

See Pet. Reply 2–3 (citing Pet. 10–11). Although, “[t]he IPR petition . . . must provide an understandable explanation of the element-by-element specifics of the patentability challenges, including the identification of particular portions of prior art on which the petitioner is relying,” *Corephotonics*, 84 F.4th at 1001, our reviewing court has cautioned us not to parse “arguments on reply with too fine of a filter.” *Ericsson Inc. v. Intell. Ventures I LLC*, 901 F.3d 1374, 1380 (Fed. Cir. 2018).

Applying this standard, we determine that Petitioner fairly presented the argument connecting IAT 1110 to XPDR 5000 in the Petition as a whole, and Petitioner’s Reply responded to issues raised in the Institution Decision and Patent Owner’s Response. *See Corephotonics*, 84 F.4th at 1002. In doing so, Petitioner further explained its position while relying on previously presented evidence and arguments. *See id.* at 1009. Accordingly, we consider “all evidence and argument properly submitted in connection with the petitioner’s reply, as well as all that is submitted in connection with the petition.” *Id.* at 1003.

Harvey discloses “intelligent active tag, or IAT[] 1110[,] can be a telemetry device coupled to a respective monitored subject 1010, which may be disposed internally or externally to a monitored subject.” Ex. 1004, 11:4–6. “In certain . . . non-limiting implementations, an active tag, such as IAT 1110, may be secured to monitored subject . . . as an ear tag,” *inter alia. Id.* at 11:8–10. “In yet other non-limiting implementations, IAT 1110 may be restrained or moveable within monitored subject 1010, for example, as a digestive tract bolus device,” *inter alia. Id.* “In ruminant monitored subjects such as cattle, a digestive tract bolus tag may be retained indefinitely within the animal.” *Id.* at 11:13–14. Based on these disclosures, we find that Harvey discloses a digestive tract bolus device as one of several non-limiting

embodiments of IAT 1110. We next consider whether Harvey’s disclosures are limited to implementing XPDR 5000 in IAT 1110 as an ear tag only, or whether it discloses, in other non-limiting embodiments, implementation in other forms, e.g., a bolus.

Harvey describes Figure 5 as illustrating “intelligent transponder (XPDR) 5000, which may be used as a constituent element of multi-modal intelligent active tag 2000.” Ex. 1004, 22:29–34. “[I]n one embodiment,” active tag 2000 is an ear tag. *Id.* at 17:29–33, *see also* 22:30–32 (describing XPDR 5000 coupled to a subject as an ear tag in Figure 3). Harvey also discloses that “[a] suitable active tag may be an intelligent active tag, such as IAT 1110 in FIG. 1 and tag 2000 in FIGS. 2 and 3.” *Id.* at 22:32–33.

Elsewhere, Harvey discloses “XPDR 5000 may be a constituent of an intelligent active tag, such as IAT 1110 in FIG. 1, and tag 2000 in FIG. 2C and FIG. 3B.” *Id.* at 70:22–23. And Harvey explains “[l]ike XPDR 5000 in FIG. 5, XPDR 7020 may be included in an embodiment of an intelligent active tag, such as IAT 1110 in FIG. 1, and may be additionally described with respect to tag 2000 in FIGS. 2A–2C and FIG. 4.” *Id.* at 48:31–33.

Each of these disclosures describes XPDR 5000 as a constituent of an IAT. Although the cited disclosures provide specific examples of IAT 1110 as an ear tag⁸ shown in Figure 1, Harvey does not require that XPDR 5000 be used only in an ear tag. Rather, the ear tag implementation appears to be Harvey’s preferred embodiment, where Harvey describes other “non-limiting implementations” for IAT 1110, e.g. a bolus, further including XPDR 5000 as a constituent part. Ex. 1004, 11:4–19, 22:29–35, Fig. 5.

⁸ In his deposition, Dr. Young acknowledged that Figure 1 shows an ear tag. *See* Ex. 2008, 44:9–12.

We consider Dr. Kan’s testimony that “[a] POSA reading Harvey’s description of the transponder depicted in Figure 5 would have understood it to be describing an ‘ear tag’ device, and not a bolus, based on the sensors disclosed as part of the tag.” Ex. 2001 ¶ 74. For example, Dr. Kan identifies Harvey’s thermal sensors that measure subject body temperature or an ambient temperature as describing temperatures outside the animal’s body. *Id.* (citing Ex. 1004, 40:25–28). Likewise, Dr. Kan identifies Harvey’s sensors for identifying vocalized or ambient sounds that are outside an animal’s body. *Id.* ¶ 75 (citing Ex. 1004, 40:19–20). And in another example, Dr. Kan identifies Harvey’s biopotential sensors “used to measure physiological parameters from intimate affixment to the *exterior* surface of an animal and that . . . are not feasible or practical in a bolus that resides freely *inside* the reticulum of an animal.” Ex. 2006 ¶ 106 (citing Ex. 1004, 41:1–6).

We are not persuaded that Dr. Kan’s cited use-examples require that Harvey’s IAT 1110 is limited to an external sensor, e.g., an ear tag, as opposed to Harvey describing an ear tag as a preferred embodiment. Rather, we agree with Dr. Young, that Harvey describes a variety of sensor configurations for XPDR 5000 considering various factors “including, without limitation, intended transponder environment, transponder application, or expected transponder lifespan; monitored subject lifespan; power availability, power renewability, or energy harvesting availability; sensor type, location, or sturdiness; data generation, data storage, or data offloading; telemetry burden; or cost.” *See* Ex. 1025 ¶¶ 7–9 (citing Ex. 1004, 41:7–15) (internal quotations omitted). Throughout the reference, Harvey teaches that the disclosed components or functionalities may be combined such that one skilled in the art would choose a combination depending on the

desired implementation for IAT 1110, including XPDR 5000. *See* Ex. 1004, 11:4–19, 22:29–33, 41:7–15, 48:31–49:3. Accordingly, we are persuaded by Petitioner’s arguments and evidence that Harvey expressly contemplates the combination of disclosed functionalities, including an external or internal IAT combined with XPDR 5000. *See Blue Calypso*, 815 F.3d at 1343–44 (citing *Kennametal*, 780 F.3d at 1383).

Accordingly, based on the entire record, we find that Harvey discloses limitation 5[A].

c) Limitation 5[B]

Petitioner asserts that Harvey discloses signal-producing sensors that sense a measurable physical property to produce a measured representative of a dynamic attribute, i.e., a changing physical parameter. Pet. 19–20 (citing Ex. 1004, 11:20–24, 38:2–6; Ex. 1002 ¶¶ 59, 60).

Patent Owner does not dispute that Harvey discloses limitation 5[B]. *See* PO Resp.

On the full record, we are persuaded by Petitioner’s argument and evidence that Harvey discloses a sensor signal that varies based on a corresponding change corresponding change in one or more physiological parameters of a ruminant animal. Specifically, Harvey discloses IAT 1110, that can include a digestive tract bolus, may be provided with at least one sensor to monitor dynamic, i.e., varying, information including a sensed physiological parameter. Ex. 1004, 11:10–14, 11:20–24; Ex. 1002 ¶¶ 59, 60.

d) Limitations 5[C] and 5[D]

(1) Petitioner’s arguments

Petitioner asserts Harvey discloses the steps of “encoding said sensor signal from said one or more sensors as encoded physiological data corresponding to said one or more physiological parameters of said ruminant

animal” (limitation 5[C]) and “storing said encoded physiological data in a non-transitory computer readable media” (limitation 5[D]). Pet. 20–23 (citing Ex. 1004, 29:16–28, 30:6–9, 39:4–5, 10:3–11:3, 24:20–23, 42:36–43:20, Fig. 5; Ex. 1002 ¶¶ 62–66). Specifically, as to limitation 5[C], Petitioner asserts that Harvey’s sensors produce signals, which start in analog form, and are sent into the transponder’s microcontroller and then stored in the transponder’s memory. *Id.* at 20–22 (citing Ex. 1004, 29:16–28, 39:4–5, Fig. 5). Petitioner asserts that only digital information can be transmitted and stored in memory by a digital protocol, so that “Harvey necessarily requires the analog signals to be encoded into digital form as physiological data corresponding to the measured physiological parameters.” *Id.* at 21 (citing Ex. 1004, 10:3–11:3, 24:20–23, 42:36–43:30). Dr. Young testifies that Harvey’s encoding “would occur in an analog-to-digital converter (‘ADC’)” that would be “necessarily present to produce the digital signals.” Ex. 1002 ¶ 63 (citing Ex. 1014, 9:17–20; Ex. 1015, 1:49–60; Ex. 1020, 3).

In its Reply, Petitioner argues that it does not rely on inherency for the encoding limitations and instead argues “that Harvey discloses the use of digital (and otherwise encoded) data in XPDR 5000 embodiments and applications, not that every embodiment and application is digital.” Pet. Reply 5 (citing Ex. 1025 ¶ 11). Specifically, Petitioner argues that “Harvey disclosed to a POSA that the XPDR 5000 transponder stores and transmits digitized data.” *Id.* (citing Pet. 20–23; Ex. 1004, 39:4–5; 10:3–11:3, 24:20–23, 42:36–43:20, 11:20–24, 29:16–24, 30:6–9). Among these citations, Petitioner highlights Harvey’s description of EEPROM, arguing that “a POSA in this field would have understood Harvey’s use of EEPROM as a disclosure of stored digital data.” *Id.* at 5–6 (citing Ex. 1025 ¶¶ 12–13).

Also in the Reply, Petitioner argues that Harvey discloses “encoding methods *other* than analog to digital conversion.” *Id.* at 6. Petitioner provides the example of measuring “a signal that corresponds to the temperature of the subject (such as the thermocouple voltage),” and encoding the “result as a signal indicating whether that temperature is above, below or within a defined range.” *Id.* at 6–7 (citing Ex. 1004, 40:30–33; Ex. 1025 ¶¶ 14, 15).

(2) Patent Owner’s arguments

Patent Owner argues that Petitioner relies on inherency to show encoding, and “chose not to address this limitation in their obviousness grounds.” PO Resp. 21. As to inherency, Patent Owner argues that “analog signals are *not* necessarily encoded into ‘digital form’ because analog data could be stored and transmitted in analog form—such as by using analog EEPROM storage and a nondigital wireless protocol—and Harvey does not rule out those possibilities.” *Id.* (citing Ex. 2006 ¶¶ 85–92, 110–111, 114–117; Ex. 2007, 180:20–181:2). Accordingly, Patent Owner argues that Petitioner “cannot satisfy the high burden of establishing inherency because encoding analog data into digital form for storage or transmission is not necessarily present in Harvey.” *Id.* at 22. Likewise, Patent Owner argues that Petitioner fails to establish that Harvey’s memory “components store ‘encoded’ physiological data, and Harvey does not rule out the possibility of storing sensor data in a nonencoded form, such as analog.” *Id.* at 23 (citing Ex. 2006 ¶¶ 114–117, 119, 122). Finally, Patent Owner argues that even if Harvey’s data is encoded before transmission “Harvey never states that such data was encoded when it was stored,” and “Dr. Kan testifies, [that] it is possible for physiological data to be encoded after storage and before or during transmission.” *Id.* (citing Ex. 2006 ¶¶ 123–124, 127–128).

In its Sur-Reply, Patent Owner argues that the Petition only advanced an inherency argument for encoding, and Petitioner improperly raises a new argument in its Reply. *See* PO Sur-Reply 6. For example, Patent Owner argues that “neither Petitioners nor their expert address how or why a POSA would have understood Harvey’s discussion of unspecified processors or transmission methods to disclose the use of the digital sensor signal representations. . . . Their conclusory allegations concerning what a POSA would have ‘understood’ cannot establish anticipation.” *Id.* Patent Owner reiterates that “Harvey does not require digital transmission or storage” and Harvey’s sensor signals can be transmitted and stored in their analog form. *Id.* at 7 (citing Ex. 2006 ¶¶ 85–92, 110–111, 114–117; Ex. 2007, 180:20–181:2, 191:8–193:15, 198:6–203:17, 214:6–217:17, 276:10–15). Accordingly, Patent Owner argues that “[a] POSA’s preference for storing digital data is at best an obviousness consideration that cannot satisfy the high burden of establishing that the transmission and storage of sensor data is *necessarily* digital or encoded.” *Id.* at 7–8.

Finally, Patent Owner contends that Petitioner raises a new argument in its Reply, that encoding does not require analog-to-digital conversion. *Id.* at 8. Patent Owner argues that this new argument is made for the first time in the Reply and should be rejected as improper. *Id.* (citing *Wasica*, 853 F.3d at 1286–87).

(3) Our analysis

We first address whether Petitioner improperly changes its unpatentability position from its Petition to its Reply. “The petitioner's reply may only respond to arguments raised in the corresponding opposition, patent owner preliminary response, patent owner response, or decision on institution.” *Corephotonics*, 84 F.4th at 1002. An IPR petitioner may not

raise in reply an entirely new rationale of unpatentability. *See Henny Penny*, 938 F.3d at 1330–31.

Similar to our previous discussion as to the Risky anticipation ground, we agree with Patent Owner that Petitioner argued in the Petition that “encoding sensor signals” refers to encoding analog signals to digital form. *See* Pet. 20–21, 32–35; Ex. 1002 ¶¶ 62–66. Petitioner makes a new argument in its Reply that “encoding” may include converting voltage to temperature data, including analog data. *See* Pet. Reply 6–7. In making this argument, Petitioner does not explain how its original Petition was correct, and instead presents a new argument absent from the Petition. *See Wasica*, 853 F.3d at 1287. Accordingly, we decline to engage on this improper new argument, that encoding includes any data conversion. *Id.*

We next address Petitioner’s argument that Harvey discloses encoding analog to digital data to one of ordinary skill in the art. *See* Pet. Reply 4–6. Similar to our discussion as to Risky above, we disagree with Patent Owner that Petitioner’s anticipation arguments for limitations 5[C] and 5[D] presented in the Petition rely solely on inherency, and that Petitioner’s Reply abandons this position to present an entirely new anticipation argument. We agree that the Petition liberally uses the term “necessarily,” which often relates to inherency, although Petitioner’s Reply entirely omits “necessarily” when discussing Harvey. *See* Pet. 20–23; Pet. Reply 1–9. In contrast, the Petition uses the term “inherent” when arguing other limitations disclosed in Harvey, *see, e.g.*, Pet. 17 (oral administration is inherent), 20 (“signal variation is inherent”). Accordingly, it appears that Petitioner did not expressly rely on inherency. Taking together Petitioner’s express discussion in the Petition and its clarifications in the Reply, we find that Petitioner does

not rely on inherency to show that Harvey describes limitations 5[C] and 5[D].

We find that Petitioner’s Reply further explains how the Petition argued that Harvey’s disclosures would have been understood by one skilled in the art as encoding signals from analog to digital. *See* Pet. Reply 4–6; Tr. 9–10, 18 (“I think the petition says and disclose, when you see EEPROM, that discloses digital.”). These arguments are responsive to those raised in Patent Owner’s response and expand on the arguments raised in the Petition. *See Corephotonics*, 84 F.4th at 1009. In replying to Patent Owner, Petitioner relies on the same legal grounds, anticipation by Harvey, applies the same portions of the reference, and makes the same argument that one skilled in the art would understand Harvey discloses encoding analog signals into digital data. *Compare* Pet. 20–23 (citing Ex. 1004, 29:21–28, 39:4–5; 10:3–11:3, 11:20–24, 24:20–23, 42:36–43:20); Pet. Reply 4–5 (citing Ex. 1004, 39:4–5; 10:3–11:3, 24:20–23, 42:36–43:20, 11:20–24, 29:16–24, 30:6–9). Because this is a proper reply, we consider the scope of these cited disclosures.

We find that a preponderance of the evidence supports Petitioner’s argument that one skilled in the art would have understood Harvey as disclosing encoding a sensor signal as encoded data corresponding to one or more physiological parameters, and storing the encoding data, despite not using the term “encoding.” Specifically, Harvey discloses sensors that provide sensed data to microcontroller 5110 and memory 5160. Ex. 1004, 29:16–24, 39:4–5. Memory 5160 can include non-volatile memory, e.g., EEPROM. *Id.* at 29:16–24. As discussed above as to Risky, we find that a preponderance of the evidence supports Petitioner’s argument that EEPROM was a memory type for storing digital data. *See* Ex. 1024, 93:5–95:22;

Ex. 2007, 186:21–187:8; Ex. 1025 ¶¶ 12–13. Accordingly, one skilled in the art would have understood Harvey to disclose encoding and storing signal information as digital information. Additionally, Harvey discloses communicating sensor data by various digital protocols, e.g., Bluetooth, Zigbee, IEEE Std. 802, and WIFI. *See* Ex. 1004, 10:3–11:3, 24:20–23, 42:36–43:20. Taken together with Harvey’s disclosure of digital storage, we also agree with Petitioner that one of ordinary skill in the art would have understood that transmission by digital protocol discloses encoding the sensor signal as digital information prior to its transmission, including when stored in digital storage before transmission. *See* Ex. 1002 ¶ 62.

Considering the entire record, we are persuaded by Petitioner argument and evidence that Harvey discloses limitations 5[C] and 5[D].

e) Limitations 5[E] and 5[F]

Petitioner asserts Harvey discloses the steps of “enabling a radio signal generator located within said bolus” (limitation 5[E]) and “activating said radio signal generator at predetermined intervals to generate a radio signal to carry said encoded physiological data” (limitation 5[F]). Pet. 23–26 (citing Ex. 1004, Fig. 5, 29:17–18, 42:3–11, 43:4–44:2, 14:1–3, 11:20–22, 26:6–11, 27:14–21; Ex. 1002 ¶¶ 67–74).

Patent Owner disputes together Petitioner’s arguments as to limitations 5[E] and 5[F]. *See* PO Resp. 23–31. We address the parties’ arguments as to limitations 5[E] and 5[F].

(1) Petitioner’s arguments

As to limitation 5[E], Petitioner asserts that Harvey describes XPDR 5000 including RF module 5400 that is a radio signal generator. Pet. 23–24 (citing Ex. 1004, Fig. 5, 29:17–18, 45:8–15). As discussed above for limitation 5[A], Petitioner asserts XPDR 5000 is a constituent of IAT 1110,

that may be a bolus. Accordingly, Petitioner contends “Harvey teaches enabling a radio signal generator located within the bolus.” *Id.* at 25 (citing Ex. 1002 ¶¶ 67–70).

As to limitation 5[F], Petitioner asserts that Harvey describes “wirelessly transmitted IAT messages carry the stored and encoded ‘subject data,’ including sensed animal physiological data.” *Id.* (citing Ex. 1004, 14:1–3, 14:7–9). Petitioner further asserts that the “IAT transponder can transmit outbound messages in a ‘periodic’ manner using a ‘preselected tag transmission interval’ such as every two seconds.” *Id.* at 26 (citing Ex. 1004, 26:6–11). The interval may be assigned during manufacture of self-assignment. *Id.* (citing Ex. 1004, 27:14–21, 28:22–27, 32:12–19, 66:19–22, Fig. 9).

In its Reply, Petitioner asserts that “Harvey indicates that ‘an outbound IAT message’ is transmitted at the preselected tag transmission interval.” Pet. Reply 8 (citing Ex. 1004, 26:6–11).⁹ Specifically, Petitioner asserts that Harvey’s “IAT message may selectively include an SID, a TID, subject data, subject dynamic information, a predetermined monitored subject state, or a predetermined subject state alert.” *Id.* (quoting Ex. 1004, 14:7–9). Accordingly, Petitioner contends that Harvey’s “IAT message sent at a predetermined (‘preselected’) transmission interval containing encoded

⁹ Petitioner presents an alternative argument that “Claim element 5[F], however, requires only that the radio signal generator is activated at pre-determined intervals to send encoded physiological data” and “does not require a single signal that is generated at pre-determined intervals and carries encoded physiological data.” Pet. Reply 7–8. We do not address this alternative claim construction as unnecessary in view of our finding that Harvey discloses a signal generated at pre-determined intervals that carries encoded physiological data.

subject data or subject dynamic information (*i.e.*, physiological data) meets element 5[F].” *Id.* (citing Ex. 1025 ¶¶ 16, 18).

(2) Patent Owner’s arguments

Patent Owner first addresses the plain and ordinary meaning of limitation 5[F]. *See* PO Resp. 23–24. Specifically, Patent Owner argues that “pre-determined intervals” “is a set and known period of time . . . distinct from transmitting at an undetermined period of time, such as activating the radio at random times or in response to a triggering event, such as a change in environmental conditions.” *Id.* (citing Ex. 1001, 10:31–43, 11:16–20). Patent Owner further argues that the radio signal “also ‘carries’ the ‘encoded physiological data’ of the animal, as opposed to providing mere identification information or pings.” *Id.* at 24 (citing Ex. 100[1], 4:39–41, 10:31–43, 11:16–27, claim 5; Ex. 2006 ¶ 129).

Applying this meaning, Patent Owner argues that “Harvey never contemplates an embodiment where a radio signal is both generated at ‘predetermined intervals’ and also carries ‘encoded physiological data.’” *Id.* Patent Owner contends that Petitioner instead relies on combining separate disclosures in Harvey to meet the limitation: (1) Harvey’s “collision avoidance protocol” to meet “pre-determined interval” and (2) separate descriptions of “IAT messages” that carry subject data. *Id.* at 24–25 (citing Pet. 25–26).

Having identified the separate disclosures, Patent Owner further argues that one skilled in the art would not understand Harvey to teach combining the two. More specifically, Patent Owner contends that “a POSA would understand the ‘periodic tag transmission’ in Harvey’s collision avoidance protocol to be a ‘ping’ that determines if the channel is clear *before* sending any physiological data.” *Id.* at 25 (citing Ex. 2006 ¶¶ 131–

134). Dr. Kan explains that a purpose of a ping, which includes animal identification information but not physiological information, would be to confirm that the channel is clear and thereby avoid losing physiological information. *See* Ex. 2006 ¶¶ 135–138 (citing Ex. 1004, 25:2–6, 25:30–26:11, 27:6–8). Patent Owner also cites to Dr. Kan’s testimony to argue that Harvey’s exemplified periodic interval of “about 2 seconds” would not be useful for extending the life of the bolus and instead consume significant energy. PO Resp. 26–27 (citing Ex. 1004, 26:6–11; Ex. 2006 ¶¶ 139–140). In contrast, Patent Owner contends that Dr. Young provides no explanation as to combining Harvey’s teachings. *See id.* at 28–29.

In the Sur-Reply, Patent Owner further reiterates that “[t]he entire purpose of a collision avoidance protocol is to send an outbound IAT ping *without* animal data to confirm there will be no collision at the receiver that would result in data loss.” PO Sur-Reply 10 (citing Ex. 2008, 31:5–36:30, Ex. 2006 ¶¶ 136–137). Further, Patent Owner argues that Harvey’s “two-second interval example only makes sense if the outbound ping does not include animal data. . . . Otherwise, the transmission of animal data every two seconds would defeat the purpose of a collision avoidance protocol by transmitting data at risk of loss.” *Id.* at 10–11 (citing Ex. 2006 ¶¶ 131, 140).

(3) Our analysis

We find that a preponderance of the evidence supports Petitioner’s argument that Harvey discloses limitations 5[E] and 5[F]. As to limitation 5[E], we agree with Petitioner that Harvey discloses enabling a radio signal generator located within a bolus. As discussed above, XPDR 5000 includes a radio signal generator and is a constituent of IAT 1110, that may be a bolus. *See supra* 35–36. Accordingly, Harvey discloses limitation 5[E].

As to limitation 5[F], first, we find that Harvey discloses activating a radio signal generator at a predetermined interval to generate a radio signal. Specifically, Harvey discloses that XPDR 5000 can be activated according to a periodic operational mode, that may reduce power consumption and prolong operational life time. Ex. 1004, 28:22–27, 32:12–19. Further Harvey discloses that “XPDR 5000 may initiate communication by transmitting an outbound IAT message . . . on a preselected tag transmission interval, which may be periodic or aperiodic.” *Id.* at 26:6–8; *see also id.* at 27:14–21. Of the two options, Harvey describes a specific “periodic collision avoidance protocol embodiment . . . exemplified by XPDR 5000 periodically transmitting an outbound IAT message . . . over a selected periodic tag transmission interval of about 2 seconds.” *Id.* at 26:8–11. Accordingly, Harvey disclose generating a radio signal at a pre-determined interval.

Second, we agree with Petitioner that Harvey discloses a radio signal carrying encoded physiological data, specifically an IAT message that may include an identifier and “subject dynamic information.” Ex. 1004, 14:1–9, 17:18–22, 11:20–22 (“subject dynamic information includes a monitored subject vital sign, a sensed physiological parameter”).

We next consider whether Harvey teaches that the disclosed components or functionalities may be combined and one of skill in the art would be able to implement the combination. *See Blue Calypso*, 815 F.3d at 1344. We find that Harvey describes an IAT message having different components, e.g., content (Ex. 1004, 14:1–9) and timing (*id.* at 26:6–11), that may be combined in a single IAT message, similar to the combined functionalities in *Blue Calypso*. *See id.* at 1343–44. We distinguish the combined components of Harvey’s IAT message from the multiple distinct embodiments in *Net MoneyIn*. *See* 545 F.3d at 1371. Accordingly, we are

persuaded by Petitioner's argument and evidence that Harvey discloses generating an IAT message including physiological information at a pre-determined interval.

We have considered but are not persuaded by Patent Owner's argument that one skilled in the art would have viewed Harvey's periodic collision avoidance excluding an IAT message including physiological information. *See* PO Resp. 25–26; Ex. 2006 ¶¶ 132–134. Specifically, we are not persuaded that Harvey's collision avoidance protocol is limited to a “ping” that excludes physiological data. *See* Ex. 2006 ¶¶ 135–138. Rather, we find that Harvey's collision avoidance protocol may apply to either a ping or an IAT message including physiological data. For example, Dr. Kan identifies that Harvey paragraph 67 (Ex. 1004, 24:33–25:11) describes “a transponder ping operation, in which XPDR 5000 initiates communication by transmitting an outbound IAT message to INT 5900.” *Id.* ¶ 136 (citing Ex. 1004, 25:4–6). Dr. Kan testifies that “[t]wo paragraphs later, on the next page of Harvey, Harvey expressly states that the specific purpose of the periodic tag transmission is also to ‘initiate communication by transmitting an outbound IAT message to INT 5900,’ which a POSA would thus understand is referring to the above ‘ping’ operation.” *Id.* (citing Ex. 1004, 26:6–11). But Harvey's paragraph 67 describes “[y]et another non-limiting example of a selected transmit operation may be XPDR 5000 transmitting to INT 5900 an outbound IAT message including subject dynamic information pertaining to monitored subject 5800.” Ex. 1004, 25:8–11. Accordingly, we do not find it persuasive that Harvey's later description of periodic transmission in paragraph 69 is limited to paragraph 67's first example, a ping, but excludes the second example, physiological information, absent some express exclusion of the latter.

Likewise, we are not persuaded by Patent Owner’s argument that one skilled in the art would understand Harvey’s example of a two-second periodic interval as excluding physiological data from the message. *See* PO Resp. 26–27; Ex. 2006 ¶¶ 139–140. There is no indication in the reference itself that the two-second periodic interval would exclude physiological information. *See* Ex. 1004, 26:6–11. Rather, we find more persuasive Dr. Young’s testimony that one skilled in the art would have recognized the two-second interval as an example of a periodic interval rather than the only periodic interval. *See* Ex. 1025 ¶ 20.

In sum, we find that a preponderance of the evidence supports Petitioner’s argument that Harvey discloses limitations 5[E] and 5[F].

f) Limitation 5[G]

Petitioner asserts that Harvey discloses a transponder with transceivers that can generate a radio signal having a frequency “between about 850 MHz to about 950 MHz,” that falls within the claimed range of 700 MHz to 1 GHz. Pet. 26–27 (citing Ex. 1004, 43:4–6, 55:14–18; Ex. 1002 ¶ 76).

Patent Owner does not dispute that Harvey discloses limitation 5[G]. *See* PO Resp. 12–31.

On the full record, we are persuaded by Petitioner’s argument and evidence that Harvey discloses the claimed frequency of limitation 5[G]. Ex. 1004, 43:4–6; Ex. 1002 ¶ 76.

g) Conclusion as to Claim 5

Based on our review of the complete trial record, we determine that Petitioner establishes by a preponderance of the evidence that Harvey anticipates claim 5.

3. *Dependent Claim 6*

Claim 6 depends from claim and recites specific radio signal frequency ranges. *See* Ex. 1001, 21:48–52.

Petitioner asserts that Harvey discloses the “frequency . . . selected from the group consisting of: between about 700 MHz to about 800 MHz, 750 MHz to about 850 MHz, about 800 MHz to about 900 MHz, 850 MHz to about 950 MHz, 900 MHz to about 1 GHz.” Pet. 27. Specifically, Petitioner asserts that Harvey discloses transceivers that “can operate in the 850–950 MHz frequency range.” *Id.* (citing Pet. 26–27; Ex. 1004, 43:4–6, 55:14–18).

Patent Owner does not dispute Petitioner’s showing that Harvey discloses one of the frequency ranges recited by claim 6. *See* PO Resp. 12–31.

We find that Harvey discloses the frequency range recited by claim 6. Accordingly, we find that Harvey anticipates claim 6.

F. Asserted Obviousness of Claims 5 and 6 over Harvey and Risky

Petitioner contends that claims 5 and 6 would have been obvious over the combination of Harvey and Risky. Pet. 38–43.

Petitioner states

[t]o the extent Patent Owner alleges that either Harvey or Risky fails to teach any claim element, that element is provided by the other reference. Further, to the extent the teachings of Harvey are substantively different than Risky for any given claim element, it would have been at least obvious to try Risky’s implementation of that element in Harvey, or vice versa, given the overall similarity in their purpose, design and operation.

Id. at 42. Petitioner concludes “[s]ince a POSA would have been motivated to combine Harvey and Risky [(citing Pet. 38–42)], and since the

combination meets all elements of Claims 5 and 6, those claims are obvious over the combination.” *Id.* at 43 (citing Ex. 1002 ¶ 103).

In our Institution Decision, our preliminary analysis indicated that Petitioner failed to engage in a proper obviousness analysis. *See* Inst. Dec. 30–31. Specifically, we identified that Petitioner’s obviousness ground combining Harvey and Risky did not explain with particularity how the prior art would have rendered the challenged claims unpatentable. *See Sisvel Int’l S.A. v. Sierra Wireless, Inc.*, 82 F.4th 1355, 1364 (Fed. Cir. 2023) (“[T]he Petition does not explain what reference is the primary versus secondary reference, what elements are missing from the primary reference, what elements should be added from the secondary reference to reach the claimed invention, or why those particular elements would be obvious to add.”).

Patent Owner’s Response supports our Institution Decision. *See* PO Resp. 47–48. Patent Owner further argues that to the extent Harvey is treated as the primary reference under *Sisvel*, “the Petition still fails to identify (1) any specific element missing in Harvey, (2) the teachings in Risky that should be combined with Harvey for such element, or (3) how and why a POSA would have modified Harvey in view of Risky to achieve claim 5 or 6.” *Id.* at 49. Patent Owner further argues that the Petition fails to identify a reason to combine Risky and Harvey, in part, because the combination would be redundant. *See id.* at 50–52. Finally, Patent Owner argues that the combined teachings of Harvey and Risky fails to teach “a radio signal generator at ‘pre-determined intervals’ to carry ‘physiological data’ or the ‘encoding’ or ‘storing’ steps.” *Id.* at 53.

Petitioner replies that “Ground 3 asserts that Claims 5 and 6 are rendered obvious by Harvey in light of Risky.” Pet. Reply 15. In its Reply,

Petitioner proposes combining Harvey’s transponder XPDR 5000 with Risky’s bolus, being described in more detail than Harvey’s bolus. *See id.* at 15–16 (citing Ex. 1004, Fig. 5; Ex. 1005, Fig. 1; Ex. 1025 ¶ 31). Petitioner also argues that one skilled in the art would have been motivated to include Risky’s teachings about compressing animal measurement data to reduce the amount of data and to save power. *Id.* at 17 (citing Ex. 1025 ¶ 30).

Patent Owner replies that Petitioner presents a new argument “identifying two general teachings from Risky that would be incorporated into Harvey’s XPDR 5000 embodiment.” PO Sur-Reply 18–19 (citing Pet. Reply 15–17). Patent Owner argues Petitioner effectively abandons its petition in favor of a new argument. *Id.* at 19 (citing *Wasica*, 853 F.3d at 1286). Patent Owner further argues that Petitioner fails “to articulate which ‘additional details’ from Risky’s bolus are combined with which ‘components’ of Harvey’s XPDR 5000 to be arranged as required by the claims.” *Id.*

Considering the entire record, we determine that Petitioner “did not make out its obviousness case in its petition” and its arguments on reply “effectively abandoned its petition in favor of a new argument.” *Wasica* at 1286. To the extent Petitioner asserts the claims would have been obvious over Harvey and Risky in the Petition, it does so using a merely conclusory statement that “[t]o the extent Patent Owner alleges that either Harvey or Risky fails to teach any claim element, that element is provided by the other reference.” *See* Pet. 42; *Wasica* at 1286. And, as discussed in our Institution Decision, the Petition at a minimum does not explain what reference is the primary versus second reference, and what elements should be combined to reach the claimed invention. *See Sisvel*, 82 F.4th at 1364.

Petitioner’s Reply presents a new position that Harvey is the primary reference to be modified with Risky’s bolus and data compression. *See* Pet. Reply 15–17. Rather than explaining how its original petition was correct, Petitioner’s subsequent arguments amount to an entirely new theory of *prima facie* obviousness absent from the Petition. *See Wasica*, 853 F.3d at 1286; *see also Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1369 (Fed. Cir. 2016) (“the expedited nature of IPRs bring with it an obligation for petitioners to make their case in their petition to institute”). We decline to engage in this new argument.

Accordingly, we determine that Petitioner has not met its burden to show that claims 5 and 6 would have been obvious over Harvey and Risky.

G. Asserted Obviousness of Claim 7 over Harvey and Rettedal

Petitioner contends that claim 7 would have been obvious over the combination of Harvey and Rettedal. Pet. 43–49. Patent Owner disputes Petitioner’s contentions. PO Resp. 54–61.

1. Rettedal (Ex. 1006)

Rettedal relates to “an animal monitoring device configured as a bolus for oral administration to reside in an animal’s stomach.” Ex. 1006 ¶ 2. The bolus may contain “microprocessors for processing animal identification information and the signal from a temperature sensor to provide encoded data representations which can be transmitted by radio-frequency to a radio-frequency receiver.” *Id.* ¶ 3; *see also id.* ¶ 23 (describing a bolus including “[a] microcontroller(7) having one or more processors(8) which operate to continuously or intermittently transform the analog or digital sensor signal (10) from the one or more sensors (9) to generate encoded sensed animal characteristic information (11)”).

Rettedal identifies a problem with a conventional bolus whereby “the mass of the animal in which the bolus has a location can demodulate the frequency of the radio signal such that the radio signal has a different frequency at the point of transmission than the frequency of the radio signal after passing through the mass of the animal.” *Id.* ¶ 6. Rettedal addresses this problem by providing “a network frequency match element . . . to compensate for the mass of the animal such that the radiofrequency signal generated by the animal monitoring device antenna located inside the animal can be received by the radio frequency reader antenna located outside of the animal.” *Id.* ¶ 11; *see also id.* ¶ 64.

2. *Reason to Combine Harvey and Rettedal*

a) *Petitioner’s arguments*

Petitioner asserts “Harvey and Rettedal provide substantial motivation to combine these references and to add the matching elements disclosed in Rettedal to Harvey’s bolus.” Pet. 43. For example, Petitioner argues that Rettedal describes improving “prior-art animal-monitoring boluses (which would include Harvey’s bolus)” by providing a “network frequency match element.” *Id.* at 45 (citing Ex. 1006 ¶¶ 11, 64). Rettedal’s “network frequency match element (118) can include capacitors and resistors in combination to deliver a particular first radio frequency signal . . . to the antenna(90) [and to] compensate for demodulation of the radio frequency signal (13) due to interaction with the mass of animal.” *Id.* (citing Ex. 1006 ¶ 64, Fig. 6) (alterations in the original).

Petitioner asserts that a “POSA would have understood, at least from Rettedal, that Harvey’s implanted bolus would experience this same problem since it is surrounded by the animal’s mass.” *Id.* at 46 (citing Ex. 1002 ¶¶ 105–108). Because Rettedal provides a solution to the same problem,

Petitioner asserts “a POSA would have been motivated to apply that solution to Harvey’s bolus.” *Id.* (citing Ex. 1002 ¶ 108). Petitioner adds that both Harvey and Rettedal teach similar components (*id.* at 43–45) and “the technology and operation of such components was well-understood in the relevant time period such that the combination of Harvey and Rettedal would have had a high likelihood of success” (*id.* at 47, citing Ex. 1002 ¶ 109).

b) Patent Owner’s arguments

Patent Owner responds that one skilled in the art would not have a reason to combine Harvey and Rettedal, or a reasonable expectation of success in doing so. PO Resp. 58–61. First, Patent Owner argues that “Petitioners’ purported reason to combine Harvey and Rettedal fails at the outset because the alleged ‘problem’ solved by Rettedal does not apply to the ear tag device in Harvey that Petitioners rely on.” *Id.* at 58. Patent Owner reiterates their previous argument that Harvey describes XPDR 5000 as part of an external ear tag and not an internal bolus. *See id.* at 58–59. According to Patent Owner, “[b]ecause XPDR 5000 is external to the animal, there is no reason to use Rettedal’s ‘match element’ to adjust for the animal’s mass and thus no reason to make the proposed combination.” *Id.* at 59 (citing Ex. 2006 ¶ 195).

Second, Patent Owner argues that Petitioner fails to “establish a reasonable expectation of success in incorporating Rettedal’s ‘match element’ into a bolus and arrive at the claimed invention.” *Id.* at 59–60. Specifically, Patent Owner argues that “Petitioners’ testimonial evidence [for combining the references] is limited to a conclusory statement from its expert that merely parrots the Petition, without any explanation or support.” *Id.* at 60 (citing Ex. 1002 ¶ 109). Patent Owner further argues that “Rettedal

also cannot establish a reasonable expectation of success because it does not provide details on how its ‘match element’ could operate in the claimed manner,” specifically using “‘resonant circuit’ to ‘increase the inductance and capacitance values to purposefully shift the center frequency upward.’” *Id.* at 60–61 (citing Ex. 1001, 6:33–40; Ex. 2006 ¶ 198); *see also* PO Sur-Reply 23 (“Even assuming Harvey taught the use of XPDR 5000 in a bolus, Rettedal’s ‘match element’ does not adjust the resonant frequency of the antenna, as required by claim 7 under the proper construction.”).

c) Our analysis

Considering the entire record, we are persuaded that a preponderance of the evidence supports Petitioner’s argument that one skilled in the art would have been motivated to combine Harvey and Rettedal. First, as discussed above as to anticipation by Harvey, we find that Harvey discloses IAT 1110, that may be a bolus, including transponder XPDR 5000. *See supra* 35–36. Because we find Harvey describes a bolus including XPDR 5000, we further find persuasive Dr. Young’s testimony that one skilled in the art “would have understood, at least from Rettedal, that the implanted bolus of Harvey would have experienced [shifting of a center frequency to a lower frequency] given that the bolus is surrounded by the mass of the animal.” Ex. 1002 ¶ 108. Because Petitioner identifies a known problem in the art, we are persuaded by Petitioner’s argument that one of ordinary skill in the art would have been motivated by Rettedal’s express teaching of improving an implanted bolus device for reporting sensor information by using matching elements to adjust the frequency. Ex. 1006 ¶¶ 11, 64. *See KSR*, 550 U.S. at 417 (“[W]hen the question is whether a patent claiming the combination of elements of prior art is obvious,” the answer depends on

“whether the improvement is more than the predictable use of prior art elements according to their established functions.”).

Second, we find that a preponderance of the evidence supports Petitioner’s argument that one skilled in the art would have had a reasonable expectation of success of modifying Harvey’s bolus with Rettedal’s matching elements. Contrary to Patent Owner’s argument, we find persuasive Dr. Young’s testimony that Harvey and Rettedal describe similar devices, for similar purposes, including similar components. *See* Ex. 1002 ¶ 107. Thus, we agree with Petitioner that the underlying “technology and operation of such components was well-understood in the relevant time period,” whereby incorporating Rettedal’s improvement would have been a predictable use of the network matching element according to its established functions taught by Rettedal. *See* Pet. 43–47; Ex. 1002 ¶¶ 108–110. We consider Patent Owner’s argument that Rettedal does not teach using a “resonant circuit” and therefore does not explain how the matching elements could operate in the claimed manner. *See* PO Resp. 60–61 (citing Ex. 1001, 6:33–40; Ex. 2006 ¶ 198). We do not find this argument persuasive as to a reasonable expectation of success in view of Rettedal’s express teaching that the described networking matching element addresses the problem caused by an animal monitoring device located inside an animal. *See* Ex. 1006 ¶ 11. “Obviousness does not require absolute predictability of success.” *In re O’Farrell*, 853 F.2d 894, 903 (Fed. Cir. 1988). Instead, we address whether Rettedal’s networking matching element meets the claim limitations below.

3. *Dependent claim 7*

Claim 7 depends from claim 6 and recites “wherein said bolus further comprises matching elements which adjusts said frequency of said radio

signal to compensate for a change in said frequency of said radio signal due to passing through a mass of said ruminant animal.” Ex. 1001, 21:53–57.

a) The Parties’ arguments

Petitioner asserts that Harvey teaches or renders obvious every element in claims 5 and 6 from which claim 7 depends. Pet. 47–48 (citing Pet. 16–27). Petitioner asserts that “Rettedal teaches matching elements for adjusting the frequency of a radio signal to compensate for a change in the signal’s frequency due to its passing through the mass of the ruminant animal in which the bolus resides.” *Id.* at 48. Specifically, Petitioner cites Rettedal’s “matching network 118” that “adjusts the frequency of the radio signal to compensate for the effect that the mass of the animal has on the radio signal.” *Id.* (citing Ex. 1006 ¶¶ 11, 64, Fig. 6).

In response, Patent Owner argues that Rettedal does not teach the claimed matching elements as would be construed by one skilled in the art based on the Specification. PO Resp. 56–58. Patent Owner argues that “[a] POSA would understand that the ‘change’ in frequency is a shift in the resonant frequency (or ‘center frequency’) of the antenna caused by the animal mass, which creates a mismatch between the center frequency and the frequency of the signal delivered by the radio signal generator.” *Id.* at 56 (citing Ex. 2006 ¶ 188). According to Patent Owner, the “claimed ‘matching elements’ therefore adjust the antenna’s center frequency to match the radio signal generator’s output frequency.” *Id.* (citing Ex. 2006 ¶¶ 188–191).

Patent Owner supports this argument by citing to the Specification. *Id.* at 56–57 (citing Ex. 1001, 5:4–16; Ex. 200[6] ¶¶ 189–190). According to Patent Owner, the Specification explains how the matching elements compensate for a downward shift in antenna center frequency “by using a ‘resonant circuit’ comprising ‘an array of inductors (27) and capacitors (26)

used in series or in parallel to balance the circuit impedance.” *Id.* at 57 (citing Ex. 1001, 5:39–45, 5:16–20). Patent Owner concludes that the passive capacitors and inductors are “configured to ‘purposefully shift the center frequency’ of the antenna ‘upward and allow[] the radio signal frequency (23) to be re-tuned to a desired radio signal frequency.’” *Id.* (citing Ex. 1001, 6:33–40; Ex. 2006 ¶ 190) (alteration in original).

Patent Owner relies on this construction to argue that “Rettedal’s alleged ‘network frequency match element’ . . . does not meet the ‘matching elements’ limitation because it does not adjust the center frequency of the antenna as claimed.” *Id.*; *see also id.* at 57–58 (citing Ex. 1006 ¶ 64; Ex. 2006 ¶ 192). Referring to Dr. Kan’s testimony, Patent Owner argues that

a POSA would understand Rettedal’s design to reflect a different approach to addressing the effects of the animal mass on the system. Rather than raising the antenna’s center frequency, Rettedal’s match element attempts to lower the oscillator’s generated frequency, presumably to more closely match the expected center frequency of the antenna—but the center frequency itself is not adjusted.

Id. at 58 (citing Ex. 2006 ¶ 192; Ex. 1006 ¶ 64, Fig. 6).

Petitioner replies that claim 7 addresses a mismatch between the frequency of the generated radio signal and the center frequency of the antenna. Pet. Reply 18 (citing Pet. 45–46; Ex. 1001, 6:25–32; PO Resp. 56). According to Petitioner “this mismatch can be addressed in one of two ways, by adjusting the frequency of the generated radio signal, or by changing the center frequency of the antenna.” *Id.* (citing Ex. 1024, 192:17–193:3). Petitioner contends that “Claim 7 unequivocally prescribes the first approach, yet Patent Owner seeks to rewrite the claim such that it only encompasses the second approach.” *Id.* (citing PO Resp. 56).

Petitioner further argues that the plain meaning of claim 7 supports Petitioner’s argument. *See id.* at 19–20. Specifically, “said frequency of said radio signal” refers to the radio signal generated by the radio signal generator recited by claim 5. *Id.* at 19 (citing Ex. 1001, 21:43–57). According to Petitioner, claim 7’s matching elements adjust the output frequency of the same generated radio signal. *Id.* Applying the literal recitations of claim 7, Petitioner argues that “Rettedal likewise discloses using matching elements to adjust the radio signal generator’s output frequency.” *Id.* at 21 (citing Ex. 1006 ¶ 64).

Patent Owner responds that, “a POSA would understand the ’644 Patent’s invention as using matching elements to adjust the *antenna’s* resonant (or “center”) frequency, not to adjust the radio signal generator’s *output* frequency. PO Sur-Reply 22 (citing Ex. 2006 ¶ 188; Ex. 1024, 188:23–192:11, 192:22–195:4, 196:6–197:10, 201:5–203:24, 208:10–209:20). Further, “[a]ccording to Dr. Kan, Petitioners’ understanding of the claim—which requires the matching elements to adjust the frequency of the signal output—is not possible in view of the specification’s teachings.” *Id.* at 22 (citing Ex. 1024, 208:10–211:3). Patent Owner argues that it does not seek to redraft the claim, but instead demonstrates that a skilled artisan would have applied that interpretation in view of the Specification. *Id.* at 22–23 (citing *Rembrandt Data Technologies, LP v. AOL, LLC*, 641 F.3d 1331, 1339 (Fed. Cir. 2011)).

b) Our analysis

We are not persuaded by Patent Owner’s argument because it requires importing limitations from the Specification into the plain and ordinary meaning of the claim. The plain and ordinary meaning of claim 7 recites “matching elements which adjusts said frequency of said radio signal,”

which, as argued by Petitioner, refers to the generated radio signal in claim 5. Ex. 1001, 21:43–45, 21:53–57. Patent Owner seeks to import additional limitations, based on the teachings of the Specification, to require matching elements for adjusting the antenna’s resonant frequency. Even if claims are to be interpreted in view of the Specification, “extraneous limitations cannot be read into the claims from the specification or prosecution history.” *Bayer AG. v. Biovail Corp.*, 279 F.3d 1340, 1348 (Fed. Cir. 2002).

We further consider Patent Owner’s argument that a skilled artisan would have read Patent Owner’s proposed language into the claim, in view of Dr. Kan’s testimony that the alternative “is not possible in view of the specification’s teachings.” See PO Sur-Reply 21–22 (citing Ex. 1024, 208:10–211:13; *Rembrandt Data Tech.*, 641 F.3d at 1339). Our reviewing court “repeatedly and consistently has recognized that courts may not redraft claims, whether to make them operable or to sustain their validity.” *Rembrandt Data Tech.* at 1339 (quoting *Chef Am., Inc. v. Lamb-Weston, Inc.*, 358 F.3d 1371, 1374 (Fed. Cir. 2004)). The *Rembrandt* court identified exceptions to this principle “only if (1) the correction is not subject to reasonable debate based on consideration of the claim language and the specification and (2) the prosecution history does not suggest a different interpretation of the claims.” *Id.* This determination must be made from the point of view of one skilled in the art. *Id.*

Neither party identifies any relevant discussion from the prosecution history. As to a reasonable debate among those skilled in the art, Dr. Young testifies that claim 7 is possible because “[a] radio frequency signal generator can be implemented by using a local oscillator. The local oscillator frequency can be adjusted by varying the value of passive components, for

example capacitors, inductors, or resistors, as a part of a matching network electrically coupled to the local oscillator.” Ex. 1025 ¶ 35. Patent Owner has not shown that Dr. Young’s understanding is unreasonable. And, as discussed above, Patent Owner’s proposed construction refers to the antenna’s resonant frequency and not the claimed radio signal frequency. Accordingly, Patent Owner’s proposed redrafting of the claims is “not minor, obvious, free from reasonable debate or evident from the prosecution history.” *Rembrandt Data Tech.*, 641 F.3d at 1339–40. Thus, we will not redraft the claim to meet Patent Owner’s proposed construction.

Applying the plain and ordinary meaning of the claim, we find that a preponderance of the evidence supports Petitioner’s argument that Rettedal teaches the limitations of claim 7, specifically “matching elements which adjusts said frequency of said radio signal to compensate for a change in said frequency of said radio signal due to passing through a mass of said ruminant animal.” See Ex. 1006 ¶¶ 11, 64. Because one skilled in the art would have been motivated to modify Harvey’s bolus with Rettedal’s matching elements, we determine that claim 7 would have been obvious over the combination of Harvey and Rettedal.

H. Asserted Obviousness of Claims 9 and 10 over Harvey and Kunda

Petitioner contends that claims 9 and 10 would have been obvious over the combination of Harvey and Kunda. Pet. 49–66. Patent Owner disputes Petitioner’s contentions. PO Resp. 61–66.

1. Kunda (Ex. 1007)

Kunda relates to a small antenna for use in portable wireless communication devices. Ex. 1007 ¶¶ 2, 6. Kunda describes an antenna “configured so that the direction of current flow in the second loop conductor part is the reverse of the direction in the first loop conductor part,

making it possible to reduce the interference between the first and second loop conductor parts.” *Id.* ¶ 8. According to Kunda, “interference between the first and second loop conductor parts can be reduced even if the first and second loop conductor parts are placed close together. And this makes it possible to reduce the antenna size while maintaining satisfactory characteristics.” *Id.* ¶ 20.

Kunda illustrates an embodiment of the antenna in Figure 3b, reproduced below.

(b)

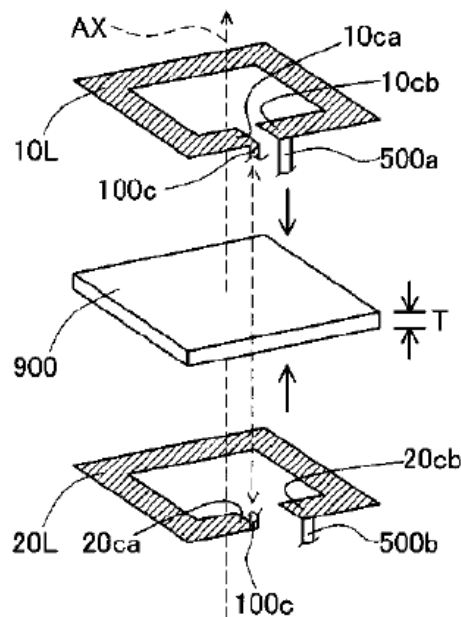


Figure 3b shows an exploded view of antenna 100. *Id.* ¶ 33. Antenna 100 includes planar plate-like dielectric substrate 900, having a thickness T. *Id.* First loop conductor part 10L and second loop conductor part 20L are both formed in the loop shapes that go around axis AX (shown perpendicular to the first and second loop conductor parts). *Id.* First loop conductor part 10L is formed on one side of dielectric substrate 900, and second loop conductor part 20L is formed on the reverse side. *Id.*

2. *Reason to Combine Harvey and Kunda*

Petitioner asserts “motivation to add Kunda’s antenna to Harvey’s bolus is expressly provided in both references.” Pet. 50. Petitioner asserts that Harvey describes the need for a miniature transponder with a compact form factor to create a bolus that would fit within the digestive tract of a monitored animal. *Id.* (citing Ex. 1004, 11:10–13, 18:15–17). Petitioner asserts that “because Kunda’s double-loop antenna saves space—a benefit touted by Kunda—a POSA would consider it well-suited for use in Harvey’s cattle bolus.” *Id.* (citing Ex. 1007, Abstr., ¶¶ 6, 8, 20, 57, 77–78; Ex. 1002 ¶¶ 114–115).

Petitioner further asserts that Kunda touts additional benefits for its double loop antenna, including increased bandwidth (*id.* at 51, citing Ex. 1007 ¶ 66) and improved performance “by configuring the loops such that their magnetic fields interact with each other constructively, not destructively” (*id.* at 51–52, citing Ex. 1007 ¶¶ 30, 45–48, 49, 50–57, 70, 75, Figs. 6(a)–7(c)). Petitioner asserts that one skilled in the art would recognize “the advantage that Kunda’s antenna confers in maintaining antenna emission efficiency while allowing small size, providing additional motivation to combine it with wireless devices such as Harvey’s.” *Id.* at 52 (citing Ex. 1002 ¶ 118). Petitioner adds that both Harvey and Kunda teach similar components (*id.* at 53–54) and “the technology and operation of such components was well-understood in the relevant time period such that the combination of Harvey and Kunda would have had a high likelihood of success” (*id.* at 53, citing Ex. 1002 ¶ 119).

In response, Patent Owner presents two arguments why one skilled in the art would not have been motivated to combine Harvey and Kunda. First, Patent Owner argues that “Petitioners’ alleged reason to combine does not

apply to Harvey’s ‘bolus’” because “Harvey never mentions or suggests a concern related to the size of any bolus or that its ‘bolus’ does not fit within a digestive tract.” PO Resp. 62–63 (citing Ex. 2006 ¶¶ 204–205). Patent Owner argues that Harvey refers to a “more compact form factor” only as to an external ear tag. *Id.* at 63 (citing Ex. 1004, 18:15–17, Fig. 2C; Ex. 2006 ¶ 206).

As discussed above, we find that Harvey describes a transponder XPDR 5000 as a constituent of IAT 1110, which may be a bolus. As to the size of the bolus, we are persuaded by Dr. Young’s testimony that “[a] POSA designing Harvey’s XPDR 5000 transponder into a ‘digestive tract bolus’ for a ruminant animal such as cattle would have understood that the bolus would need to be compact in size to be administered to the animal.” Ex. 1025 ¶ 37. Additionally, Harvey’s preference for “a more compact form factor” (Ex. 1004, 18:14–17) would apply alike to an ear tag and bolus. *See KSR*, 550 U.S. at 417 (“[I]f a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.”). Accordingly, we find that one skilled in the art would have found Kunda’s small antenna relevant to Harvey’s digestive tract bolus.

Second, Patent Owner argues that “Kunda provides an express reason not to use its antenna in Harvey’s devices, including if a POSA were seeking to reduce their size.” PO Resp. 64. Specifically, Patent Owner contends that Harvey teaches embedding its antenna “in a printed circuit board” but Kunda explains that proximity to the circuit board “will diminish the characteristics of the antenna.” *Id.* (citing Ex. 1004, 45:12–15; Ex. 1007 ¶ 5; Ex. 2006 ¶ 206). Patent Owner cites Dr. Kan’s testimony that “a POSA would

understand that Harvey teaches placing antennas within the device close to a printed circuit board, which would apply even if Kunda's alleged 'double loop antenna' were somehow employed in the device to reduce size." *Id.* (citing Ex. 2006 ¶ 206); *see also* PO Sur-Reply 25 ("Kunda provides numerous examples of prior art problems, and Petitioners provide no evidence or citation as to where Kunda's 'present invention' resolves all of the problems, including the proximity of the antenna from the circuit board.")

We are not persuaded by Patent Owner's argument because Kunda describes diminished characteristics for an antenna placed close to a printed circuit board as a problem of prior art monopole-type antennas. *See* Ex. 1007 ¶ 5; *see* Pet. Reply 24. As Petitioner asserts, Kunda teaches that its disclosed loop antenna addresses the prior art problems and provides a small antenna with satisfactory characteristics. *See* Ex. 1007 ¶¶ 6, 57. And even if using Kunda's antenna in Harvey's bolus will not resolve all of the prior art problems, "a given course of action often has simultaneous advantages and disadvantages, and this does not necessarily obviate motivation to combine." *Medichem, S.A. v. Rolabo S.L.*, 437 F.3d 1157, 1165 (Fed. Cir. 2006). Accordingly, we are persuaded by Petitioner's argument and evidence that one skilled in the art would have been motivated to combine Harvey's bolus with Kunda's small antenna. *See* Ex. 1002 ¶ 115.

Apart from the motivation to combine the references, Patent Owner argues that "a POSA would not have had a reasonable expectation of success in combining the two references to arrive at the invention because Kunda's antenna is unfit for use inside of an animal." PO Resp. 64–65 (citing Ex. 2006 ¶ 207; Ex. 1007 ¶¶ 1, 2, 24). Patent Owner argues that "the key design criteria for an antenna within an animal's reticulum are unique, and

different from Kunda's antenna, and Petitioners fail to explain how a POSA would have modified Kunda's antenna to meet those criteria and successfully arrive at the claims." *Id.* at 65. "For example, Kunda's antenna fails to account for impedance mismatching and antenna detuning caused by factors unique to a bolus, such as the properties of body tissue and complex food mixtures." *Id.* (citing Ex. 2006 ¶ 208). Further, "Petitioners also fail to address how to modify Kunda's antenna to have the appropriate size, shape, weight, material, and operating bandwidth to successfully incorporate it into a bolus configuration." *Id.* at 66 (citing Ex. 2006 ¶¶ 209–211; Ex. 2007, 81:19–82:22, 84:11–86:14); *see also* PO Sur-Reply 24–25.

Petitioner replies that "Kunda teaches, at a minimum, that its double loop antenna with an insulting core allows for a smaller antenna with reduced interference, as described also in the '644 patent." Pet. Reply 25 (citing Ex. 1002 ¶¶ 115–118). According to Petitioner, "Kunda's antenna addressed those problems with a reasonable expectation of success, which is not undercut by the Patent Owner's speculations about general design issues for a bolus sensor." *Id.*

We are persuaded by Petitioner's arguments and evidence that a person of ordinary skill would have had a reasonable success of modifying Harvey with Kunda's antenna. As Dr. Young testifies, in addition to the benefits of small size, Kunda describes decreased transmission interference, increased bandwidth, and constructive interaction, which address similar problems relevant to a bolus. *See* Ex. 1002 ¶¶ 116–118 (citing Ex. 1007 ¶¶ 23, 45–57, 64–66, 70, 75). Additionally, Kunda teaches that its antenna generates the same frequency (900 MHz) as Harvey (850–950 MHz) and may be used in the same communication protocols. *Id.* ¶¶ 120–121 (citing Ex. 1004, 42:36–43:7, 55:1–18; Ex. 1007 ¶¶ 1, 23, 64, 65). Accordingly, we

find a preponderance of the shows that the skilled artisan would have had a reasonable expectation of success that Kunda's antenna would have worked for its intended purpose in Harvey's bolus. *See Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1364 (Fed. Cir. 2007) (the "case law is clear that obviousness cannot be avoided simply by a showing of some degree of unpredictability in the art so long as there was a reasonable probability of success").

3. *Independent Claim 9*

Independent claim 9 recites similar subject matter to claim 5. *See* Ex. 1001, 22:14–34. Unlike claim 5, claim 9 does not recite "pre-determined intervals" and specific radio signal frequency ranges. *See id.* Petitioner asserts that claim 9 would have been obvious over Harvey and Kunda. Pet. 55–61.

a) *Limitations 9[A]–9[F]*

For the preamble and steps 9[A]–9[F], Petitioner applies Harvey's same teachings as it did with claim 5. *See* Pet. 55–56 ((citing Pet. 16–26); arguing that "Element 9[A] is identical to Element 5[A]" and "Element 9[E] is identical to Element 5[E]. Both are taught by Harvey."). We previously found that Petitioner shows Harvey teaches claim 5's preamble and limitations 5[A]–5[F], corresponding to claim 9's preamble and limitations 9[A]–9[F]¹⁰, respectively. *See supra* §§ III.E.2.a–e. For the same reasons, we are persuaded that Harvey teaches or suggests limitations 9[A]–9[F].

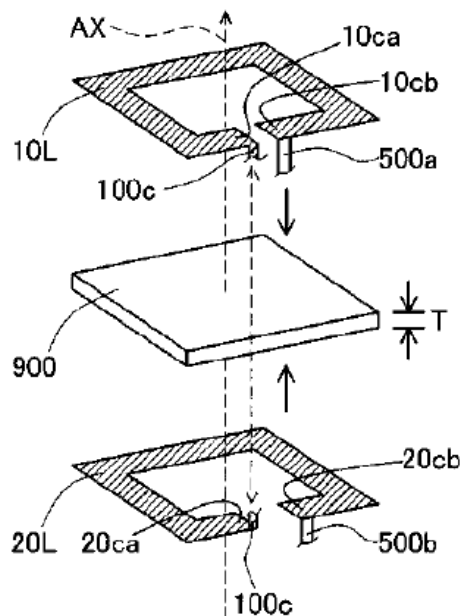
¹⁰ Limitation 9[F] recites "activating said radio signal generator" but does not require limitation 5[F]'s "pre-determined intervals."

b) Limitation 9[G]

Limitation 9[G] recites “transmitting said radio signal with an antenna having a pair of electrically conductive loops disposed a distance apart and further comprising transmitting said radio signal through said antenna.” Ex. 1001, 22:31–34.

Petitioner asserts that Kunda teaches this limitation. Pet. 56–61. Specifically, Petitioner asserts “Kunda’s radio communications module transmits radio signals using an antenna 100 comprising ‘first loop conductor part 10L and . . . second loop conductor part 20L, which circle around the same imaginary axis.’” *Id.* at 56–57 (citing Ex. 1007, Abstr., Claims 1–7, ¶¶ 1, 5, 7–21, 23–26, 28–57, Figs. 1–7) (alteration in original). As an example, Petitioner cites Kunda’s Figure 3b, reproduced below.

(b)



Petitioner asserts that the Figure shows “loops 10L and 20L . . . disposed a distance T apart, where T is the thickness of the dielectric substrate 900 separating the loops.” *Id.* at 57–58 (citing Ex. 1007 ¶ 33, Figs. 3(a), (b)).

Patent Owner argues “as discussed in Grounds 1 and 4, Harvey fails to disclose several elements recited in claim 5, which are also present in claims 9–10, such as a “bolus” that contains a “sensor” and “radio signal generator” or the claimed “encoding” and “storing” steps.” PO Resp. 61 (citing Ex. 2006 ¶¶ 200–203). Apart from arguing that there was no reason to combine Harvey and Kunda, Patent Owner does not argue that Kunda does not teach limitation 5[G]. *See id.* at 61–62.

We addressed Harvey’s teachings as to sensors contained in a bolus, encoding step, and radio signal generator, above in section III.E.2. We further find that a preponderance of the evidence shows that Kunda teaches limitation 5[G]. *See* Ex. 1007 ¶¶ 1, 5, 7–21, 23–26, 28–57, Figs. 1–7.

c) Conclusion as to Claim 9

Considering the entire record, we are persuaded by Petitioner’s argument and evidence that claim 9 is unpatentable as having been obvious over Harvey and Kunda.

4. Dependent Claim 10

Claim 10 depends from claim 9 and recites “wherein said pair of electrically conductive loops each comprise a loop of conductive sheet material having an inner annular edge and an outer annular edge which join opposed loop faces.” Ex. 1001, 22:35–38.

Petitioner asserts that Kunda teaches “wherein said pair of electrically conductive loops each comprise a loop of conductive sheet material having an inner annular edge and an outer annular edge which join opposed loop faces.” Pet. 61–66. Specifically, Petitioner asserts that Kunda teaches “electrically conductive antenna loops are formed from conductive sheet material” (*id.* at 61–62, citing Ex. 1007 ¶¶ 33, 36; Ex. 1002 ¶ 135) with inner

and outer annular edges which join opposed loop faces (*id.* at 62–65, citing Ex. 1007, Fig. 3(b), 8(a), 11(a); Ex. 1002 ¶ 136).

Patent Owner does not separately dispute Petitioner’s showing as to claim 10. PO Resp. 61–66.

On the complete record, we are persuaded that Petitioner’s argument that claim 10 is unpatentable as having been obvious over Harvey and Kuna. Ex. 1007, Fig. 3(b), 8(a), 11(a); Ex. 1002 ¶ 136.

IV. CONCLUSION¹¹

For the reasons discussed above, Petitioner has shown by a preponderance of the evidence that claims 5–7, 9 and 10 of the ’644 patent are unpatentable.

In summary:

Claim(s)	35 U.S.C. §	Reference(s)/Basis	Claim(s) Shown Unpatentable	Claim(s) Not Shown Unpatentable
5, 6	102	Harvey	5, 6	
5, 6	102	Riskey	5, 6	
5, 6	103	Harvey, Risky		5, 6
7	103	Harvey, Rettedal	7	
9, 10	103	Harvey, Kunda	9, 10	
Overall Outcome			5–7, 9, 10	

¹¹ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner’s attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. § 42.8(a)(3), (b)(2).

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, claims 5, 6, 7, 9, and 10 of the '644 patent have been proven to be *unpatentable*;

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

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