Trials@uspto.gov
Tel: 571-272-7822

Paper No. 60
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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

KAPSCH TRAFFICCOM IVHS INC.,
Petitioner,

v.

NEOLOGY, INC.,
Patent Owner.

Case IPR2016-01763
Patent 8,944,337 B2

Before JUSTIN T. ARBES, TREVOR M. JEFFERSON, and CHRISTA P. ZADO, *Administrative Patent Judges*.

ZADO, *Administrative Patent Judge*.

FINAL WRITTEN DECISION

35 U.S.C. § 318(a)
37 C.F.R. § 42.73

I. INTRODUCTION

We have authority to hear this *inter partes* review under 35 U.S.C. § 6. This Final Written Decision ("Final Written Decision") is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons discussed herein, we determine that Kapsch TrafficCom IVHS Inc. ("Petitioner")[1] has shown, by a preponderance of the evidence, that claims 1–9 of U.S. Patent No. 8,944,337 B2 (Ex. 1004, "the '337 patent") are unpatentable. *See* 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d).

A. Procedural History

Petitioner filed a Petition for *inter partes* review of claims 1–9 of the '337 patent (Paper 1, "Petition" or "Pet.") and Neology, Inc. ("Patent Owner")[2] subsequently filed a Preliminary Response (Paper 7, "Prelim. Resp."). On March 21, 2017, we instituted an *inter partes* review to determine whether claims 1–6 of the '337 patent are unpatentable under 35 U.S.C. § 102(b) as anticipated by Atherton,[3] whether claim 7 of the '337 patent is unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Atherton and Kubo,[4] and whether claims 7–9 of the '337 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over the

[1] Petitioner identifies as real parties in interest, pursuant to 37 C.F.R. § 42.8, Kapsch TrafficCom Holding Corp., Kapsch TrafficCom Holding II US Corp., Kapsch TrafficCom B.V., and Kapsch TrafficCom AG. Paper 1, 1.

[2] Patent Owner identifies as real parties in interest, pursuant to 37 C.F.R. § 42.8, Neology, Inc. and SMARTRAC N.V. Paper 5, 1.

[3] PCT Int'l Application Publication No. WO 2008/074050 A1 (Ex. 1006) ("Atherton").

[4] U.S. Patent No. 7,460,018 B2 (Ex. 1007) ("Kubo").

combination of Atherton and Roesner.[5] Paper 8, 34 ("Institution Decision" or "Inst. Dec.").

After institution, Patent Owner filed a Response. Paper 12 ("Response" or "PO Resp."). Petitioner thereafter filed a Reply to Patent Owner's Response. Paper 16 ("Reply").

Patent Owner also filed a Contingent Motion to Amend [Claims] Pursuant to 37 C.F.R. § 42.121(a), which proposes substitute claims 10–18 as substitutes for claims 1–9, respectively, should we determine claims 1–9 are unpatentable. Paper 13 ("Motion to Amend" or "Mot."). Petitioner thereafter filed an Opposition to Patent Owner's Motion to Amend. Paper 58 ("Opposition" or "Opp.").[6] Patent Owner subsequently filed a Reply to Petitioner's Opposition. Paper 20 ("Reply to Petitioner's Opposition" or "Reply to Opp."). In view of *Aqua Products, Inc. v. Matal*, 872 F.3d 1290 (Fed. Cir. 2017), we authorized Petitioner to file a sur-reply to Patent Owner's Reply to Petitioner's Opposition. Paper 31 ("Sur-Reply"); *see also* Paper 23 (authorizing Sur-Reply). Thereafter, Patent Owner filed an authorized sur-sur-reply to Petitioner's Sur-Reply. Paper 50 ("Sur-Sur-Reply"); *see also* Paper 49 (authorizing Sur-Sur-Reply).

An oral hearing was held on January 12, 2018. A transcript of the hearing is included in the record. Paper 59 ("Tr.").

[5] U.S. Pat. Publication No. 2010/0302012 A1 (Ex. 1009) ("Roesner").

[6] Petitioner filed an errata (Paper 25) to its original Opposition (Paper 17). We later directed Petitioner to instead file a corrected version of the Opposition. *See* Paper 58; Paper 59, 61:8–21.

B. Additional Proceedings

The parties indicate they are not aware of any related matters, under 37 C.F.R § 42.8(b)(2), to this proceeding. Pet. 1; Paper 5.

C. The '337 Patent

The patent application leading to the '337 patent, U.S. Patent Application No. 14/060,407 ("the '407 application"),[7] was filed on October 22, 2013. Ex. 1004, [21], [22]. The '337 patent is a continuation of U.S. Patent Application No. 13/465,834 ("the '834 application"),[8] filed on May 7, 2012, now U.S. Patent No. 8,561,911 ("the '911 patent"). *Id.* at [63]. The '337 patent also identifies the following related provisional patent applications: U.S. Provisional Patent Application No. 61/487,372 (Ex. 2024, "the '372 provisional application"), filed on May 18, 2011; and U.S. Provisional Patent Application No. 61/483,586 (Ex. 2023, "the '586 provisional application"), filed on May 6, 2011. *Id.* at [60]. Accordingly, the earliest possible priority date of the '337 patent is May 6, 2011.

The '337 patent generally relates to a radio frequency identification (RFID) tag that may be manually activated and deactivated using a switch device. Ex. 1004, Abstract. The '337 patent specification discloses that RFID tags may often contain sensitive information, such as a person's name,

[7] Patent Owner filed U.S. Patent Application Publication No. 2014/0175177 A1, the publication of the '407 application, as Exhibit 2026. The parties do not appear to have filed a copy of the '407 application as filed (on October 22, 2013). As such, we include a copy in the record as Exhibit 3001, and observe that it appears to have the same written description as Exhibit 2026. We also cite to Exhibit 2026 herein, as the parties do in their papers.

[8] Patent Owner filed U.S. Patent Application Publication No. 2012/0280045 A1, the publication of the '834 application, as Exhibit 2025.

birthdate, and place of birth, for example in the context of an e-Passport or visa. *Id.* at 1:13–19. In this example, the sensitive information contained on the RFID tag is intended to be read by only authorized personnel, such as customs officials. *Id.* at 1:19–21. Because RFID tags transmit signals up to 30 feet away, however, and need not be in the line of sight of an RFID tag reader in order for the signal it transmits to be read, unauthorized individuals may be able to access the sensitive information stored on an RFID tag. *Id.* at 1:21–26. According to the '337 patent specification, a need therefore existed for an RFID tag that could be easily activated when a user desired that it be read, and easily deactivated otherwise. *Id.* at 1:44–45. The '337 patent specification further discloses that a clear sensory indication of the operational status of the RFID tag (i.e., activated or deactivated) ideally should be provided. *Id.* at 1:45–47. Figures 2A–2C of the '337 patent, reproduced below, depict block diagrams of exemplary embodiments of a system including an RFID tag that may be activated and deactivated:

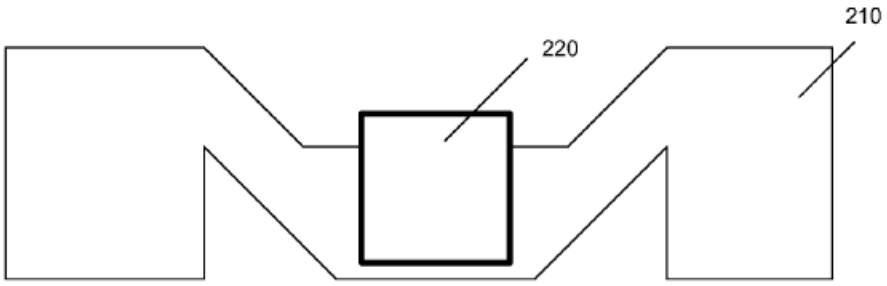


FIG. 2A

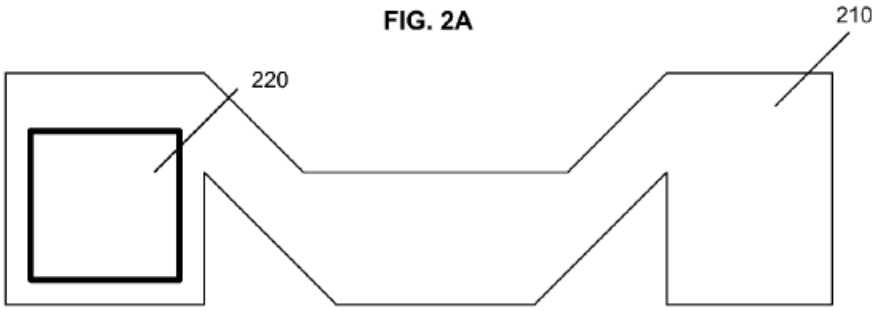


FIG. 2B

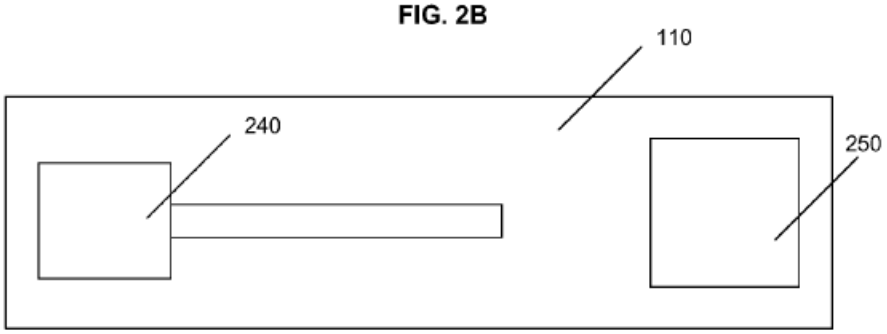


FIG. 2C

Ex. 1004, Figs. 2A–2C. Figure 2A depicts RF module 220, which may include an RFID integrated circuit connected to a conductive trace pattern in the same plane as the integrated circuit. *Id.* at 6:39–42. RF module 220 is fully functional, but its operational range is limited due to the small surface area of the conductive trace pattern. *Id.* at 6:42–45. Figure 2A also depicts booster antenna 210, which when coupled with RF module 220, may increase the module's operational range. *Id.* 6:46–50. RF module 220 and booster antenna 210 are housed in RFID tag 110, as depicted in Figure 2C.

The placement of RF module 220 with respect to booster antenna 210 affects the operational range and performance of RFID tag 110. *Id.* at 7:3–5. This is illustrated in Figures 2A and 2B. When arranged as depicted in Figure 2A, the energy collected by booster antenna 210 is transferred into RF module 220. *Id.* at 6:55–61. When arranged as depicted in Figure 2B, a smaller portion or none of the energy collected by booster antenna 210 is transferred to RF module 220, thus diminishing the operational range of RFID tag 110. *Id.* at 7:8–13. In addition, because in the arrangement shown in Figure 2B RF module 220 is shielded partly or completely by booster antenna 210, RFID communications between RFID tag 110 and the RFID reader may be completely halted, rendering the tag non-operational. *Id.* at 7:13–18.

Slider mechanism 240, depicted in Figure 2C, may be mechanically coupled to RF module 240 so that the placement of the module with respect to booster antenna 210 can be manipulated between an operational state and non-operational state by sliding the position of the slider. *Id.* at 7:37–42. In addition, RFID tag 110 may also include indicator area 250 to provide a visual indication of the status (i.e., operational/activated or non-operational/deactivated) of RFID tag 110. *Id.* at 7:42–43. For example, the visual indication could be a color, such as green when the status is active and red when the status is inactive. *Id.* at 7:44–51.

D. Challenged Claims

Of the challenged claims noted above, claim 1 is independent, and claims 2–9 depend therefrom.

Claim 1 is reproduced below:

1. An RFID device comprising:

> a booster antenna adapted to extend the operational range of the RFID device;
>
> an RFID module comprising an integrated circuit and a set of one or more conductive traces, wherein at least one conductive trace of said set of one or more conductive traces is adapted to electrically couple to a coupling region of the booster antenna when the coupling region of the booster antenna is located in a first position relative to said set of one or more conductive traces; and
>
> a switching mechanism adapted to change the position of the coupling region of the booster antenna relative to the position of said at least one conductive trace.

Ex. 1004, 10:65–11:10.

II. DISCUSSION

A. Level of Ordinary Skill in the Art

In determining whether an invention would have been obvious under 35 U.S.C. § 103 at the time it was made, we must first resolve the level of ordinary skill in the pertinent art at the time of invention. *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966). Factors that may be considered in determining the level or ordinary skill in the art include, but are not limited to, the types of problems encountered in the art, the sophistication of the technology, and educational level of active workers in the field. *In re GPAC, Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995).

Petitioner's declarant, Bruce Roesner, Ph.D., opines that a person of ordinary skill in the art in the field of the '337 patent would have had the following level of experience:

> either (1) a graduate degree in electrical engineering, physics, computer science, or the equivalent, and at least two years of industry or academic experience in RFID systems or radio frequency data communications, or (2) a bachelor's

> degree in electrical engineering, physics, computer science, or the equivalent, and at least four years of industry or academic experience in RFID systems or radio frequency data communications.

Ex. 1001 ¶ 63.

Patent Owner's declarant, Jeffrey Fischer, opines that a person of ordinary skill in the art in the field of the '337 patent

> would have had a university degree in electrical engineering and at least 2 years of industrial or academic experience in wireless communications technology, RF circuit design, antenna design, and/or RFID systems, or an advanced degree in electrical engineering and at least 1 year[] of industrial or academic experience in RF circuit design.

Ex. 2028 ¶ 28.

We determine that the differences between the declarants' assertions are immaterial to our analysis and that both assessments are consistent with the '337 patent and the referenced prior art. For purposes of our determination below, we determine that a person of ordinary skill in the art with respect to the '337 patent would have had a bachelor's degree or graduate degree in electrical engineering, physics, computer science, or the equivalent, and would have had between one to four years of industrial or academic experience in wireless communications technology, RF circuit design, antenna design, RFID systems, and/or radio frequency data communications. However, we note our factual findings and legal conclusions set forth below would not have differed had we adopted either Dr. Roesner's or Mr. Fischer's assessment.

B. Claim Construction

In an *inter partes* review, claim terms in an unexpired patent are interpreted according to their "broadest reasonable construction in light of the specification of the patent" in which they appear. 37 C.F.R. § 42.100(b); *see also Cuozzo Speed Techs., LLC, v. Lee*, 136 S. Ct. 2131, 2141–46 (2016). We interpret claim terms using "the broadest reasonable meaning of the words in their ordinary usage as they would be understood by one of ordinary skill in the art, taking into account whatever enlightenment by way of definitions or otherwise that may be afforded by the written description contained in the applicant's specification." *In re Morris*, 127 F.3d 1048, 1054 (Fed. Cir. 1997). "Under a broadest reasonable interpretation, words of the claim must be given their plain meaning, unless such meaning is inconsistent with the specification and prosecution history." *Trivascular, Inc. v. Samuels*, 812 F.3d 1056, 1062 (Fed. Cir. 2016). Below we discuss our interpretations of the terms "booster antenna" and "switching mechanism."

For purposes of this Final Written Decision, we determine no other claim terms require express construction. *See Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011) ("[C]laim terms need only be construed 'to the extent necessary to resolve the controversy.'") (quoting *Vivid Techs. v. Am. Sci. Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

1. "*booster antenna*"

In the Petition, Petitioner proposed we construe "booster antenna" as an "antenna used to gather RF energy." Pet. 4. Patent Owner proposed in its Preliminary Response that we construe this term to mean "an antenna that couples with a primary antenna to boost the signal for the primary antenna."

Prelim. Resp. 11. In the Institution Decision, we determined that "[b]ecause claim 1 already recites that the 'booster antenna' is 'adapted to extend the operational range of the RFID device,' no further construction is necessary at this time." Inst. Dec. 8. Subsequent to our Institution Decision, neither party further argued construction of this claim term, and neither party raised any issues that would necessitate further construction. Accordingly, we do not further construe this claim term.

2. "*switching mechanism*"

Claim 1 recites "a *switching mechanism* adapted to change the position of the coupling region of the booster antenna relative to the position of said at least one conductive trace." Ex. 1004, 11:8–10 (emphasis added). In our Institution Decision, we construed the term "switching mechanism" as "any device or construction which serves the purpose of selectively altering or switching the position of the claimed coupling region of the booster antenna relative to the position of the claimed at least one conductive trace." Inst. Dec. 9. Petitioner does not dispute our construction. Reply 2. For reasons that follow, our construction of this term remains unchanged for purposes of this Final Written Decision.

The claim language expressly sets forth the functionality of the claimed "switching mechanism," namely that it is "adapted to change the position" of one thing relative to another. Ex. 1004, 11:8–10. Based on this claim language, one reasonable interpretation is that the word "switching" means "changing." This interpretation is consistent with at least one dictionary definition of the word "switching," indicating the term's plain meaning. *See* Ex. 2027, 1439 (defining the verb form of "switch" as "14. to turn, shift, or divert"). This is also consistent with the '337 patent

specification, which describes a "mechanism" for selectively "altering" the relative positions of the booster antenna and RF module, and refers to a "switching mechanism" adapted to "switch" or "change" relative positions. Ex. 1004, 7:24–26; *id.* at 2:25–27 (disclosing "a switching mechanism adapted to switch the position of the first substrate between a first position and at least a second position"); *id.* at 2:10–13 (disclosing "a switching mechanism adapted to change the position of the coupling region of the booster antenna relative to the position of said at least one conductive trace").

The '337 patent specification also sheds light on what is meant by the term "mechanism," namely that it "may include a switch, lever, knob slider, rotatable member, *or any other device or construction which serves [the] purpose*" of selectively altering the position of one thing relative to another:

> In some embodiments, a mechanism is provided for selectively altering the relative positions of the RF module 220 and the booster antenna 210. . . . In various embodiments, the mechanism may include a switch, lever, knob slider, rotatable member, *or any other device or construction which serves this purpose*.

Ex. 1004, 7:24–36 (emphasis added); *see also id.* at 6:31–36 (describing "activation of a lever, switch, knob, slider, rotating member, or other similar structure"), 7:65–8:1 (describing a "mechanism (e.g., switch, slider, knob, lever, rotatable member, etc.) such as the slider 240 depicted in FIG. 2C"). Therefore, consistent with the plain and ordinary meaning of the word "switching," the claim language, and the '337 patent specification, the claimed "switching mechanism" may be *any device or construction* that serves the purpose of changing the position of the coupling region of the claimed booster antenna relative to the position of the claimed at least one conductive trace.

In the Preliminary Response, Patent Owner urged us to construe the term more narrowly as "a mechanism comprising a lever, switch, knob, slider, rotatable member, or similar mechanical structure with discrete positions" (Prelim. Resp. 11), but we determined Patent Owner's construction was too narrow in light of the claim language and the '337 patent specification (Inst. Dec. 8–9).

Subsequent to our Institution Decision, Patent Owner proposes we construe the term "switching mechanism" as "an assembly of moving parts performing the functional motion of making or breaking a circuit." PO Resp. 13. For reasons we discuss below, this construction is too narrow, and the methodology used to arrive at it is flawed.

In support of its construction, Patent Owner separately construes the terms "switch" and "mechanism," relying on extrinsic evidence for the definitions of each term. *Id.* at 9–10.

With respect to the term "switch," Patent Owner relies on a definition in the context of a circuit, defining "switch" as "[a] device for turning on or off or directing an electric current, or making or breaking a circuit." *Id.* at 9 (citing Ex. 2027, 1439). Patent Owner relies further on dictionary definitions of the word "device" as "[a] thing that is made for a particular working purpose; an invention or contrivance, esp. a mechanical or electrical one," and the word "mechanism" as "an assembly of moving parts performing a complete functional motion." *Id.* at 10 (citing Ex. 1027, 395; Ex. 2027, 889). According to Patent Owner's declarant, Mr. Fischer, the term "switching" is the gerund form of the term "switch," and thus it would be "logical that the term 'switching' be construed as 'turning a device on or off or directing an electric current, or making or breaking a circuit.'" *Id.*

(citing Ex. 2028 ¶ 49). In treating the term "switch" as a noun, Patent Owner essentially limits the term "switching mechanism" to a specific device called a "switch," that is further limited by constraints imposed by Patent Owner's proffered definition of the word "mechanism." *Id.*

We disagree with Mr. Fischer that the term "switching" is the gerund form of the term "switch" in the context of claim 1. The term "mechanism" in claim 1 is a noun, and the term "switching" is a participle, i.e., a verb ("to switch") that acts as an adjective to modify the word "mechanism." Claim 7 of the '337 patent also necessitates our determination that the term "switching mechanism" is not limited to a "switch." Claim 7 recites the RFID device of claim 1, "wherein the switching mechanism comprises a *slider*." Ex. 1004, 12:11–12 (emphasis added). Accordingly, "switching mechanism" is not limited to a switch, and because it can comprise a slider, it is reasonably interpreted to also encompass a knob, lever, rotatable member, and any other device or construction that serves the purpose of selectively altering relative position of the coupling region and the at least one conductive trace. *Id.* at 7:24–36, 7:65–8:1.

Also, Patent Owner's reliance on the definition of the term "switch" in the context of a circuit is too narrow. The claims do not mention using a "switching mechanism" to break a circuit. The claims instead describe a "switching mechanism" that is adapted "to change the position of the coupling region of the booster antenna relative to the position of [a] conductive trace." *Id.* at 11:8–10. Nor does the portion of the specification discussing the mechanism for selectively altering the relative position of the RF module and booster antenna describe making or breaking a circuit. *See, e.g.*, *id.* at 7:24–36. Thus, for reasons we discussed above, the definition of

the verb "to switch" that describes shifting is more consistent with the claim language and '337 patent specification than the definition offered by Patent Owner.

With regard to the term "mechanism," Patent Owner does not explain sufficiently why its submitted extrinsic evidence indicates how the term would be understood by a person of ordinary skill in the art. Patent Owner agrees the '337 patent specification's disclosure (*id*. at 7:24–36) provides express guidance concerning the meaning of this term. PO Resp. 10 (explaining that this disclosure in the '337 patent describes the term "mechanism" in the generic sense of "altering a position of another element"). Patent Owner relies on the following extrinsic dictionary definition: "an assembly of moving parts performing a complete functional motion." *Id.* (citing Ex. 2027, 889). Patent Owner argues this definition is consistent with the '337 patent specification's use of the term "mechanism," but Patent Owner does not explain why. *Id.* The dictionary definition is too narrow because it reads out embodiments described in the '337 specification. For example, Patent Owner's definition requires "an assembly of moving parts," which suggests a requirement of more than one moving part. This is inconsistent with the '337 patent specification's disclosure that a mechanism may include a "rotatable member," which is in singular form, and therefore may comprise only one moving part. Ex. 1004, 7:35. Also, Patent Owner's construction could potentially read out other mechanisms that fall within the category of "any other device or construction which serves" the purpose of altering relative position. *See* Ex. 1004, 7:33–36. Indeed, the same dictionary provided by Patent Owner also provides a broader definition of "mechanism" that is more consistent with the specification of the '337

patent: "the agency or means by which an effect is produced or a *purpose* is accomplished." *See* Ex. 2027, 889 (emphasis added).

Patent Owner argues the description of "mechanism" in the '337 patent (Ex. 1004, 7:24–36) describes the word "mechanism" generally, but does not describe a "switching mechanism." PO Resp. 12. The disclosure describes a "mechanism," but our claim interpretation does not rely solely on the meaning of the word "mechanism." As we discussed above, the term "mechanism" is modified by the word "switching," and we interpret the terms "switching" and "mechanism" together.

For the foregoing reasons, Patent Owner's overly narrow definitions of "switching" (limited to breaking a circuit) and "mechanism" (limited to an assembly of moving parts) fail to capture the full scope of the claim language, given its broadest reasonable interpretation in light of the '337 patent specification.

Petitioner further provides a dictionary definition of the term "switching mechanism" from the Wiley Electrical and Electronics Engineering Dictionary, which defines the term as "[t]he mechanism utilized to perform a given switching function." Reply 3 (citing Ex. 1028, 763) (emphasis omitted). This definition is consistent with the claim language and the '337 patent specification because it does not unduly narrow the term "switching mechanism" by reading out embodiments contemplated by the '337 patent disclosure.

For the foregoing reasons, we construe the term "switching mechanism" as "any device or construction which serves the purpose of selectively altering or switching the position of the claimed coupling region of the booster antenna relative to the position of the claimed at least one

conductive trace."

C. Principles of Law

To prevail in its challenges to the patentability of the claims, Petitioner must prove its propositions of unpatentability by a preponderance of the evidence. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d).

Under 35 U.S.C. § 102, "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros., Inc. v. Union Oil Co. of Cal.*, 814 F.2d 628, 631 (Fed. Cir. 1987). Also,

> Section 103 forbids issuance of a patent when "the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains."

KSR Int'l Co. v. Teleflex Inc., 550 U.S. 398, 406 (2007) (quoting 35 U.S.C. § 103).

D. Asserted Anticipation of Claims 1–6 by Atherton

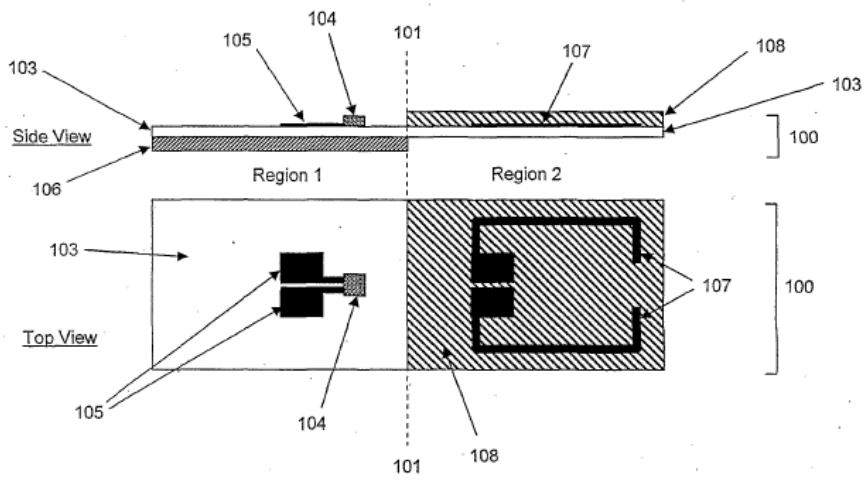
Petitioner asserts that claims 1–6 of the '337 patent are unpatentable as anticipated by Atherton. Pet. 19–29. Petitioner proffers a declaration of Dr. Roesner to support its contentions. Ex. 1001. Patent Owner disputes Petitioner's contentions, arguing that Atherton does not disclose a "switching mechanism." PO Resp. 2–3, 21–46. Patent Owner proffers a declaration of Mr. Fischer to support its contentions. Ex. 2028. We have reviewed the full record from trial, and we determine that Petitioner has shown by a preponderance of the evidence that claims 1–6 of the '337 patent are unpatentable as anticipated by Atherton.

1. *Overview of Atherton (Ex. 1006)*

Petitioner asserts Atherton is prior art under 35 U.S.C. § 102(b). Pet. 3. Patent Owner does not dispute Petitioner's assertion that Atherton is prior art. Atherton was published on June 26, 2008. Ex. 1006, [43]. Based on the earliest possible priority date of the '337 patent (*see supra* Section I.C), for purposes of this Final Written Decision, we conclude that Atherton is prior art to the '337 patent under 35 U.S.C. § 102(b).

Atherton relates to an RFID tag having privacy and security capabilities. In particular, Atherton describes an RFID tag whose operational state can be selectively alternated by a user between providing RFID function in a first configuration and having degraded or disabled RFID function in a second configuration. Ex. 1006, 2:11–25. Figure 1A of Atherton, reproduced below, depicts RFID tag 100:

Figure 1A



Ex. 1006, Fig. 1A. Figure 1A depicts RFID tag 100 formed of flat rectangular substrate 103 comprising two regions, Regions 1 and 2, separated by fold line 101 about which tag 100 may be folded. *Id.* at 4:1–6, 4:24–25. Region 1 comprises a portion of substrate 103 having conducting

areas 105 thereon and RFID integrated circuit 104. *Id.* at 4:17–25. Region 2 comprises a portion of substrate 103 having conducting areas 107 made of conducting material. *Id.* at 4:29–31. The tag substrate "may be perforated or modified in some way along fold line 101 so as to promote folding along the fold line 101." *Id.* at 4:32–36.

Atherton discloses that when RFID tag 100 is in a folded configuration, depicted in Figure 1B, conducting areas 107 is brought into close proximity to conducting areas 105, which results in conducting areas 105 and 107 being electrically coupled in a manner that provides an efficient RF antenna. *Id.* at 5:1–8. Accordingly, in this folded configuration, RFID tag 100 becomes functional. *Id.* Atherton discloses further that a user may deliberately degrade the function of the tag or disable it entirely by unfolding the tag along fold line 101, as depicted in Figures 1A and 2. *Id.* at 5:21–23. The degraded function occurs because when the tag is unfolded, conducting areas 107 is moved further away from conducting areas 105, thereby forming a less efficient RF antenna. *Id.* at 5:23–31. Accordingly, via the operation of folding and unfolding RFID tag 100, a user may selectively alternate between a functional state and a state in which RFID function is degraded or disabled.

2. *Discussion*

Petitioner identifies where it contends Atherton discloses the recitations of claim 1. Pet. 19–24. With respect to the preamble of claim 1, which recites "[a]n RFID device," Petitioner argues that Atherton's disclosure of an RFID tag amounts to disclosure of an "RFID device." *Id.* at 19. Patent Owner does not argue otherwise in its Response. We are persuaded that Atherton's RFID tag is an RFID device.

For the claim limitation "a booster antenna adapted to extend the operational range of the RFID device," Petitioner argues Atherton's conducting areas 107 act as a booster antenna that extends the operational range of RFID tag 100. Pet. 19–20. Patent Owner does not dispute that Atherton discloses this claim limitation. We are persuaded by Petitioner's arguments because Atherton discloses that "conducting areas 105 are designed such that on their own they provide a poor antenna for the RFID integrated circuit 104" (Ex. 1006, 4:23–25), and RFID tag 100's performance is degraded or disabled unless conducting areas 107 are coupled with conducting areas 105 (*id.* at 5:1–11). Accordingly, coupling with conducting areas 107 extends the operational range of the RFID device.

Petitioner also argues Atherton discloses "an RF module comprising an integrated circuit and a set of one or more conductive traces," and identifies RFID tag 100, which includes integrated circuit 104 and conductive areas 105. Pet. 20–21 (citing Ex. 1006, Figs. 1–6, Abstract, 4:17–23, 5:7, 5:18, 5:26, 6:4, 6:36, 7:3, 7:13–14, 8:3, 8:10–12, 9:13–18, 9:30–34, 11:4–6, 11:16). Patent Owner does not dispute that Atherton discloses this claim limitation. We are persuaded by Petitioner's arguments because Atherton's integrated circuit 104 satisfies the limitation "integrated circuit" and Atherton's conductive areas 105 are "a set of one or more conductive traces."

Claim 1 further recites that at least one of the conductive traces in the set of traces is "adapted to electrically couple to a coupling region of the booster antenna" when the booster antenna's coupling region is in a first position relative to the set of conductive traces. Petitioner argues Atherton discloses this limitation by virtue of conducting areas 107. *Id.* at 21 (citing

Ex. 1006, 5:12–18, 11:5–11, Figs. 1–5; Ex. 1001 ¶ 82). Petitioner argues conducting areas 107 comprise a coupling region of a booster antenna, and when RFID tag 100 is in a folded configuration as depicted in Figure 1B of Atherton, is electrically coupled to conducting areas 105 (which Petitioner identifies as the claimed set of conductive traces). *Id.* at 22–23 (citing Ex. 1006, 5:1–5). According to Petitioner, the folded configuration is the claimed "first position." *Id.* (citing Ex. 1006, 2:17–20, 5:5–11, Figs. 1–5). Patent Owner does not dispute that Atherton discloses this claim limitation. We are persuaded by Petitioner's arguments because RFID tag 100 is adapted to fold along a fold line, and when the tag is folded, conducting areas 105 (the alleged at least one set of conductive traces) are electrically coupled to conducting areas 107 (the alleged coupling region of Atherton's booster antenna).

The parties dispute whether Atherton discloses the "switching mechanism" of claim 1 that is adapted to change the position of the coupling region of the booster antenna relative to the position of at least one conductive trace. Petitioner contends fold line 101 in Atherton's RFID tag 100 is a "switching mechanism." Pet. 23–24. Patent Owner argues our construction of "switching mechanism" is incorrect, and premises its arguments that Petitioner fails to demonstrate unpatentability on Patent Owner's proposed construction of the term. PO Resp. 21–46.

RFID tag 100 includes fold line 101 along which the RFID tag may be folded, as depicted in Figure 1B, or unfolded as depicted in Figure 1A. Ex. 1006, 4:32–36, 5:1–5, Figs. 1A–1B. In the folded configuration, "at least a portion of the conducting areas 107 is brought into close proximity with at least a portion of the electrically conducting areas 105." *Id.* at 5:1–3.

Petitioner argues, therefore, that in going from an unfolded to a folded configuration, the position of conducting areas 107 (i.e., the coupling region of the booster antenna) is changed relative to the position of conducting areas 105 (i.e., at least one conductive trace). Pet. 23. Atherton discloses that fold line 101 may be a perforation or other modification to tag substrate 103 "so as to promote folding along the fold line 101." Ex. 1006, 4:33–36. "The substrate is flexible along the fold line 101 to provide for folding." *Id.* at 4:24–25. We are persuaded by Petitioner's arguments that fold line 101 of RFID tag 100 facilitates changing the position of a coupling region of a booster antenna (i.e., conducting areas 107) relative to the position of a conductive trace (i.e., conducting areas 105) because folding along the line results in the areas being brought closer together. Accordingly, Atherton's fold line 101 is adapted to function in the manner recited in claim 1.

We are persuaded that a perforation of the RFID tag's substrate at the fold line to promote folding is a construction that serves the purpose of changing the relative position of two conducting areas by virtue of folding and unfolding the substrate because it is a physical formation on the substrate.

Patent Owner's declarant, Mr. Fischer, enumerates a list of types of "switches," and alleges there is no "description of forming an arbitrary fold in a malleable plastic sheet to form a switch." PO Resp. 31 (citing Ex. 2028 ¶ 77); *see also id.* at 31–39 (describing types of switches). Patent Owner's argument is inapposite. *See* Reply 12–15. The issue here is not whether Atherton discloses a "switch," as Mr. Fischer alleges that term would have been understood by a person of ordinary skill in the art, but rather is whether

Atherton discloses a "switching mechanism" as we have construed this term. As we discussed above, the term "switching mechanism" means "any device or construction which serves the purpose of selectively altering or switching the position of the claimed coupling region of the booster antenna relative to the position of the claimed at least one conductive trace." *See supra* Section II.B.2. Furthermore, claim 7 of the '337 patent makes explicitly clear that a "switching mechanism" is not limited to a "switch." Ex. 1004, 12:11–12 ("wherein the switching mechanism comprises a slider").

Patent Owner also argues Atherton's folding mechanism cannot be a switch because it operates on a continuum of folded positions, whereas a switch, "by the common, ordinary and customary meaning," has "specific positions." PO Resp. 27–28. According to Patent Owner, there are only two possible states of operation for the RFID device recited in claim 1 (i.e., optimized and detuned). *Id.* at 27. According to Mr. Fischer, a "switching device" "involves a distinct difference, or some threshold, between being open and closed." *Id.* at 30 (citing Ex. 2028 ¶ 77). Furthermore, a device such as the folding tag in Atherton, that has a continuum of positions, would not have been considered a switch, according to Mr. Fischer. *Id.* (citing Ex. 2028 ¶ 76); *see also* Ex. 2028 ¶¶ 85–86. As we noted above, the issue here is not whether Atherton discloses a "switch," but rather whether it discloses a "switching mechanism" as we have construed this term. Even if the relevant inquiry were whether Atherton discloses a "switch," we are not persuaded by the arguments relating to a continuum of positions because the RFID device claimed in the '337 patent can move along a continuum of positions. Claim 7 recites the RFID device of claim 1, "wherein the switching mechanism comprises a *slider*." Ex. 1004, 12:11–12 (emphasis

added). Figure 2C of the '337 patent, reproduced below, depicts a block diagram of an RFID tag including a slider.

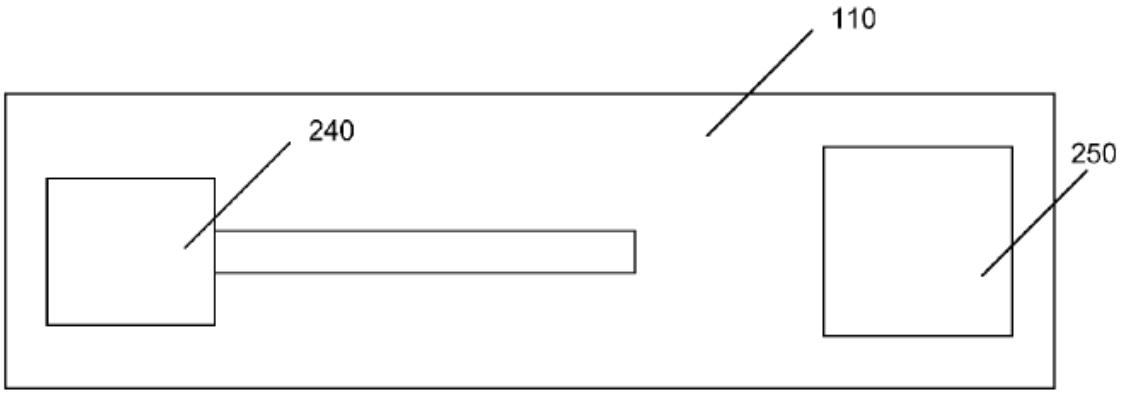


FIG. 2C

Id., Fig. 2C. Figure 2C depicts RFID tag 110 and slider mechanism 240. *Id.* Not shown in Figure 2C, RF module 220 is mechanically coupled to slider mechanism 240. *Id.* at 7:38–42. "By manipulating the slider, a user modifies the relative positions of the RF module 220 and the booster antenna 210." *Id.* at 7:40–42. Because RF module 220 is mechanically coupled to slider 240, moving the slider to modify the position of RF module 220 relative to booster antenna 210 involves positioning RF module 220 along a continuum. *See also* Tr. 35:6–13 (Patent Owner's counsel agreeing that the switching mechanism associated with the embodiment depicted in Figures 2A and 2B must allow the RF module to move along a continuum); *see also* Reply 10–12.

Petitioner's arguments regarding claim 1 are supported by the testimony of Dr. Roesner, which we credit, and are persuasive. Upon review of the record in this proceeding, we determine that Petitioner has demonstrated by a preponderance of the evidence that claim 1 of the '337 patent is unpatentable under § 102(b) as anticipated by Atherton.

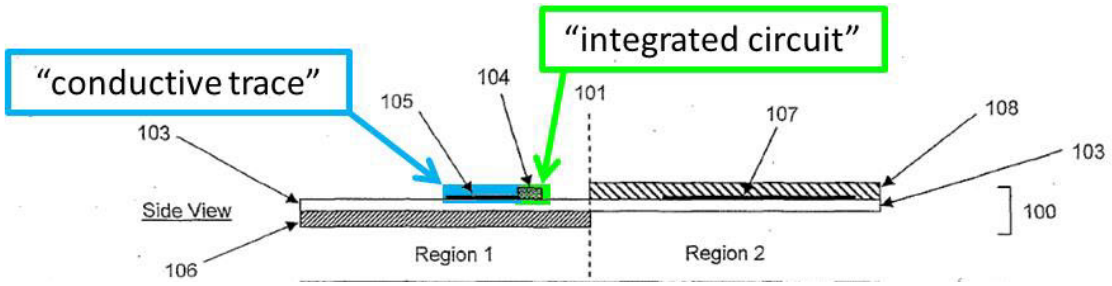
With regard to claims 2–6, which depend from claim 1, Petitioner presents evidence and argument that Atherton discloses each element recited in these claims. Pet. 24–29. Patent Owner in its Response does not dispute Petitioner's contentions (other than its contention that Atherton does not disclose a "switching mechanism").

Claim 2 recites "[t]he RFID device of claim 1, wherein the booster antenna comprises a conductive trace pattern disposed upon a substrate." Ex. 1004, 11:11–13. As we noted above, Petitioner relies on conductive areas 107 for disclosure of a booster antenna. Pet. 19–20. Petitioner argues that Atherton's booster antenna is disposed on a substrate because Atherton discloses conductive trace areas 107 are "secured to" substrate 103. *Id.* at 24–25 (citing Ex. 1006. 2:17, 4:29–30). We are persuaded by Petitioner's evidence and arguments because Atherton describes conductive area 107 as electrically conducting material that is applied to the upper surface of substrate 103. Ex. 1006, 4:29–30; *see also* Ex. 1006, Fig. 1A (depicting conductive area 107 as a conductive trace disposed on substrate 103).

Claim 3 recites "[t]he RFID device of claim 1, wherein the integrated circuit is adapted to ohmically connect to said set of one or more conductive traces." Ex. 1004, 11:14–16. As we noted above, Petitioner relies on Atherton's integrated circuit 104 for disclosure of the claimed "integrated circuit," and conductive areas 105 for disclosure of "a set of one or more conductive traces." Pet. 20–21. Petitioner argues Atherton expressly discloses that integrated circuit 104 is ohmically connected to conducting areas 105 based on Atherton's disclosure that "areas 105 of conducting material connect electrically to connection points on the RFID circuit (IC) 104." *Id.* at 26 (citing Ex. 1006, 4:19–23). According to Petitioner, an

ohmic connection exists when two conductors, like conductive areas 105 and connection points on integrated circuit 104, are in direct contact with each other. *Id.* at 12, 26. We are persuaded by Petitioner's arguments because Atherton discloses that conductive areas 105 and connection points on integrated circuit 104 electrically connect with each other. Ex. 1006, 4:17–23.

Claim 4 recites "[t]he RFID device of claim 1, wherein the integrated circuit is substantially coplanar with said set of one or more conductive traces." Ex. 1004, 11:17–19. In support of its argument that Atherton's integrated circuit 104 is coplanar with conductive areas 105, Petitioner relies on Figure 1A of Atherton, and provides an annotated version of Figure 1A reproduced below:



Pet. 27; *see also* Ex. 1006, Fig. 1. Annotated Figure 1A depicts conductive areas 105 and integrated circuit 104 as being coplanar. Atherton's disclosure confirms the depiction in Figure 1A, namely that conductive areas 105 and integrated circuit 104 are both located on "upper surface of region 1 of the substrate 103." Pet. 27 (citing Ex. 1006, 4:19–23, Fig. 1A). We are persuaded by Petitioner's evidence and arguments that conductive areas 105 and integrated circuit 104 are coplanar based on Figure 1A, which depicts these items as residing on the same plane and Atherton's disclosure that they reside on the same substrate surface.

Claim 5 recites "[t]he RFID device of claim 1, wherein said at least one conductive trace is adapted to capacitively couple to the coupling region of the booster antenna when the coupling region of the booster antenna is located in the first position relative to said set of one or more conductive traces comprising said RF module." Ex. 1004, 11:20–12:4. Claim 6 recites "[t]he RFID device of claim 1, wherein said at least one conductive trace is adapted to inductively couple to the coupling region of the booster antenna when the coupling region of the booster antenna is located in the first position relative to said set of one or more conductive traces comprising said RF module." Ex. 1004, 12:5–10. With regard to claims 5 and 6, Petitioner asserts that, in several instances, Atherton discloses capacitive and inductive coupling between the coupling region of conductive areas 105 (i.e., at least one conductive trace) and conductive areas 107 (i.e., booster antenna). Pet. 27–29. Petitioner relies on Atherton's disclosure of "conducting areas 105 and 107 being electrically coupled to each other by means of a non-contact coupling method such as capacitive coupling or inductive coupling." *Id.* at 28 (citing Ex. 1006, 5:1–11, 2:28–29, 5:13–18, 11:17–18). Petitioner also relies on Atherton's disclosure that "induction coil 107 thereby couples the RFID integrated circuit 104 via the induction coil 105." *Id.* (citing Ex. 1006, 6:26–7:5, 2:28–29, 4:12–16, 5:1–11, 5:13–18, 6:26–7:5, 7:10–18, 11:17–18). We are persuaded by Petitioner's evidence and arguments based on Atherton's express disclosure that Atherton's booster antenna and at least one conductive trace are coupled capacitively or inductively.

Petitioner's arguments regarding claims 2 through 6 are supported by the testimony of Dr. Roesner, which we credit, and are persuasive. Upon

review of the record in this proceeding, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 2–6 of the '337 patent are unpatentable under § 102(b) as anticipated by Atherton.

E. Asserted Obviousness of Claim 7 over the Combination of Atherton and Kubo, and Obviousness of Claims 7–9 over the Combination of Atherton and Roesner

Petitioner contends that claim 7 of the '337 patent is unpatentable as obvious over the combination of Atherton and Kubo. Pet. 4, 67–68. Patent Owner disputes Petitioner's contention. PO Resp. 46–51. We have reviewed the full record from trial, and we determine that Petitioner has shown by a preponderance of the evidence that claim 7 of the '337 patent is unpatentable as obvious over the combination of Atherton and Kubo.

Petitioner contends that claims 7–9 of the '337 patent are unpatentable as obvious over the combination of Atherton and Roesner. Pet. 4, 68–72. Patent Owner disputes Petitioner's contention. PO Resp. 51–55. We have reviewed the full record from trial, and we determine that Petitioner has shown by a preponderance of the evidence that claims 7–9 of the '337 patent are unpatentable as obvious over the combination of Atherton and Roesner.

1. *Overview of Kubo (Ex. 1007)*

Petitioner asserts Kubo is prior art under 35 U.S.C. § 102(b). Pet. 3. Patent Owner does not dispute Petitioner's assertion that Kubo is prior art. Kubo issued as a patent on December 2, 2008. Ex. 1007, [45]. Based on the earliest possible priority date of the '337 patent (*see supra* Section I.C), for purposes of this Final Written Decision, we conclude that Kubo is prior art to the '337 patent under 35 U.S.C. § 102(b).

Kubo relates to an RFID tag that is disabled when not coupled with a detachable or movable inductive antenna device, thereby preventing

unauthorized access. Ex. 1007, Abstract. Figure 1 of Kubo is reproduced below:

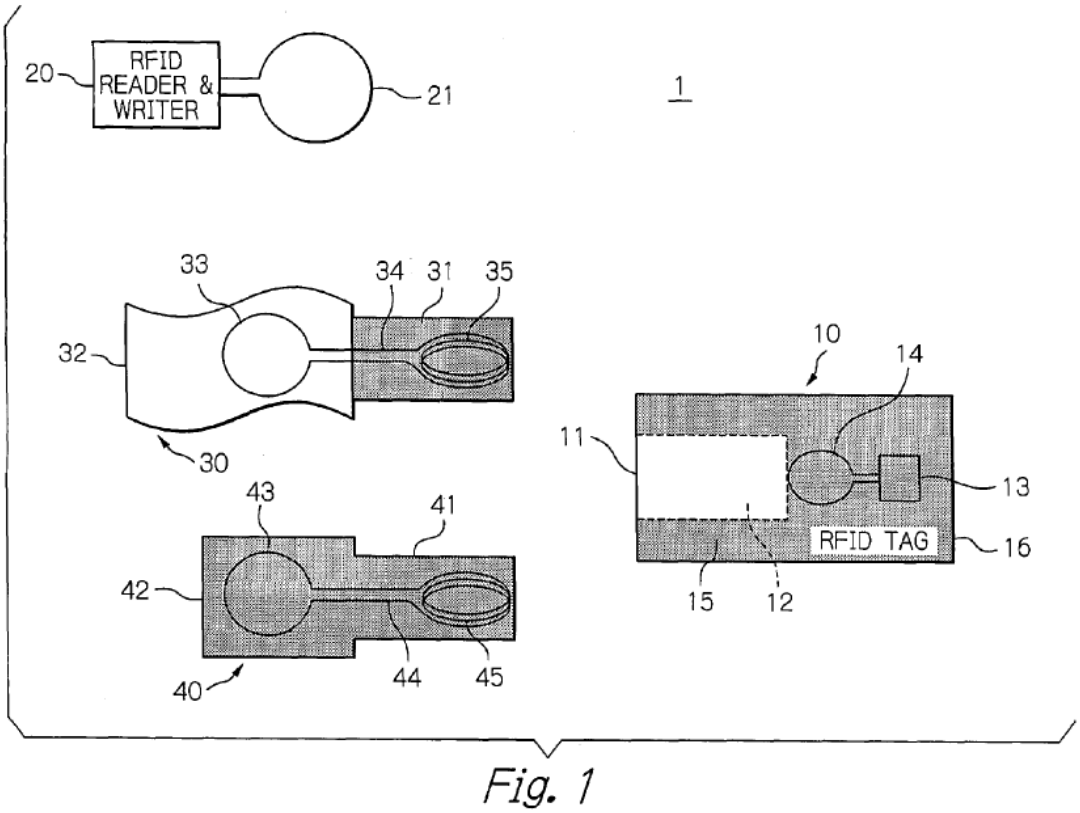


Fig. 1

Ex. 1007, Figure 1. Depicted in Figure 1 of Kubo, RFID tag 10 includes RFID chip 13 and tag antenna 14, sealed in sealant 15, such as resin. *Id.* at 4:14–18. RFID tag 10 further comprises insertion slot 11 into which a detachable device may be inserted. *Id.* at 3:65–4:1. The entire surface member 16 of RFID tag 10 functions to electromagnetically shield antenna tag 14 from communicating with devices outside RFID tag 10. *Id.* at 4:19–21. In order for RFID tag 10 to communicate with other devices, an inductive antenna device, such as label inductive antenna device 30 and management inductive antenna device 40, must be inserted into insertion slot 11. *Id.* at 4:28–34. For example, management inductive antenna device

40 comprises tag side inductive antenna 45 that, when the antenna device is inserted in slot 11, inductively couples with tag antenna 14. *Id.* Management inductive antenna device 40 further comprises reader-writer side inductive antenna 43, for communicating with an RFID reader/writer, that is electrically coupled to tag side inductive antenna 45. *Id.* at 5:8–16, 40–42. The coupling provided by the inductive antenna devices enables communication between RFID tag 10 and RFID reader/writer 20. *Id.* at 6:46–50.

Figures 6A–B of Kubo depict an embodiment in which the tag side inductive antenna is part of RFID tag 100. *Id.* at Figs. 6A and 6B. In particular, RFID tag 10 comprises opening 17 which has enough space such that tag side inductive antenna 65 can slide back and forth between a position in which inductive antenna 65 couples with tag antenna 14 and a position in which there is no such coupling. *Id.* at 11:14–29. Figures 6A and 6B further depict shifting device 66, which may slide from one end position to another in order to shift the position of inductive antenna 65, thereby alternating RFID tag 10 between an enabled state and a disabled state. *Id.*

2. *Overview of Roesner (Ex. 1009)*

Petitioner asserts Roesner is prior art under 35 U.S.C. § 102(e). Pet. 4. Patent Owner does not dispute Petitioner's assertion that Roesner is prior art. Roesner was published on December 2, 2010. Ex. 1009, [43]. Based on the earliest possible priority date of the '337 patent (*see supra* Section I.C), for purposes of this Final Written Decision, we conclude that Roesner is prior art to the '337 patent under 35 U.S.C. § 102(e).

Roesner relates to switching RFID tags between different states, and

providing visual indication of tag state status. Ex. 1009 ¶¶ 2, 15, 18. With reference to Figure 1, Roesner discloses RFID tag 120 that includes a moveable element, panel 122, and conductive pads 124 mounted on panel 122 such that the pads align with one or more elements of RFID tag 120 in one of a plurality of selected positions associated with panel 122. *Id.* ¶ 16. Roesner discloses that "[i]n response to a selectable position of the panel 122, the conductive pads 124 for each RFID tag 120 may form a direct or indirect electrical connection to the RFID tag 120 that updates the tag state, such as deactivation or an update to the logic state." *Id.* Roesner further discloses that panel 122 "may move between the first and second position by way of a variety of methods such as, for example, rotating about a hinge, sliding between positions, folding the panel 122, and/or other methods." *Id.* Roesner also provides that it may be beneficial to provide visual indication of the RFID tag status. *Id.* ¶ 15. Roesner discloses, for example, that "visually identifiable states may be beneficial in transportation systems" so that the "state of the RFID tag may be visually recognized by both passengers within a vehicle and onlookers outside the vehicle." *Id.* Roesner discloses one implementation of providing visual indication in which panel 122 may present a green color when configured in an active RFID state, and a red color when configured in a deactivated state. *Id.* ¶ 18.

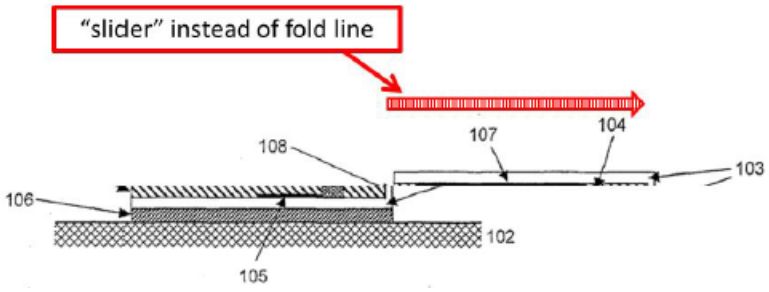
3. *Discussion—Claim 7*

Claim 7 of the '337 patent recites "[t]he RFID device of claim 1, wherein the switching mechanism comprises a slider." Petitioner argues Atherton in view of Roesner or Kubo renders this claim obvious. Pet. 67–68. As we discussed above, with regard to a "switching mechanism," Petitioner relies on Atherton's fold line 101 of RFID tag 100. *Id.* at 67; *see*

also supra Section II.D.2. With regard to claim 7's requirement that the "switching mechanism" comprise a "slider," Petitioner argues each of Kubo and Roesner teaches this limitation. Pet. 67. With respect to Roesner, Petitioner relies on the teaching of "'slide 720' that a user can move within 'case 710' in order to change the state of the RFID tag." *Id.* With respect to Kubo, Petitioner relies on switching device 66, which a user may actuate to selectively alternate between two different arrangements of tag side antenna 65 relative to tag antenna 14—an arrangement in which the antennas are electromagnetically coupled and an arrangement in which the antennas are not coupled due to shielding. *Id.* at 67 (citing Ex. 1007, 10:59–64, 10:39–40; Ex. 1001 ¶ 118); *see also id.* at 43 (citing Ex. 1007, 4:6–9, 6:16–20, 6:46–50, 7:6–11, 7:15–20; Ex. 1001 ¶ 119).

Petitioner argues it would have been obvious to a person of ordinary skill in the art to modify Atherton in accordance with the teachings of Roesner or Kubo to use a "slider" instead of a fold line of the RFID tag in order to selectively alternate between configurations in which Atherton's conductive traces 105 and conductive traces 107 are coupled and not coupled. Pet. 68. Petitioner argues the modification would have been, for example, as depicted in the following modified version of Figure 1B of Atherton:

Disabled State (Atherton Fig. 1B - Modified)



Id. (citing Ex. 1001 ¶ 166). The modified version of Figure 1B of Atherton depicts an embodiment in which Region 2 of substrate 103 slides relative to Region 1 of substrate 103, instead of folding along fold line 101 (depicted in the unmodified version of Figure 1B), to alternate the relative position of Region 1 with respect to Region 2. *Id.* Petitioner argues that an ordinarily skilled artisan at the time of alleged invention would have had several reasons to combine Atherton with Kubo or Roesner. *Id.* at 59–65. We have reviewed Petitioner's evidence and arguments, which are supported by the testimony of Dr. Roesner, which we credit, and highlight the following.

Petitioner argues all three references are directed to protecting an RFID device from unauthorized access, and as such, a person of ordinary skill in the art would have looked to their related teachings. *Id.* at 59. Combining the references, therefore, would have been a simple application of known prior art elements and techniques to improve devices in a similar way according to Petitioner. *Id.* (citing Ex. 1001 ¶ 148). We agree, and find that each reference teaches protecting an RFID device from unauthorized access and find that the three references each teach preventing access by switching an RFID device from an active or enabled state to an inactive or disabled state. Ex. 1006, 1:20–25, 2:10–25; Ex. 1007, 1:18–22, 1:59–2:3; Ex. 1009, Abstract [57], ¶ 2. Moreover, we find each reference relies on the same principle in order to alternate between an active/enabled and inactive/disabled state, namely by electrically coupling and uncoupling two regions by altering the position of one region relative to the other. Ex. 1006, 5:1–33; Ex. 1007, 2:8–25, 10:17–23; Ex. 1009 ¶¶ 16, 18.

Petitioner also argues Roesner teaches that one of ordinary skill in the art would have considered multiple mechanisms to alternate, or switch,

between active and inactive states, and an ordinarily skilled artisan would have known a "slider" could have be substituted for "folding" in Atherton, and would have had reasons to do so. Pet. 60–61 (citing Ex. 1009 ¶¶ 16, 24). We are persuaded by Petitioner's arguments. Both Atherton and Roesner describe switching between different states (i.e., active and inactive) in response to alternating the position of a moveable element. Atherton describes folding and unfolding a substrate along a fold line to switch an RFID device between the two states. Ex. 1006, 2:17–25, 4:32–5:33, Figs. 1A–1B, 2. Roesner teaches switching an RFID tag between states in response to positioning a moveable element between different locations. Ex. 1009 ¶¶ 15, 18. Roesner also teaches that panel 122 may slide between different positions associated with different tag states, but *alternatively panel 122 may be folded* between two positions associated with different states. *Id.* ¶ 18. Roesner further teaches that alternating panel 122 between first and second positions may be achieved using a variety of methods:

> Panel 122 may move between the first and second position by way of a variety of methods such as, for example, rotating about a hinge, sliding between positions, folding the panel 122, and/or other methods.

Id. ¶ 16. This evidence supports Petitioner's argument that a person of ordinary skill in the art would have understood altering the position of Atherton's conducting areas 105 relative to conducting areas 107 could have been achieved using a sliding mechanism instead of a folding line in light of Roesner's disclosure that sliding is an alternative method to folding, Ex. 1009 ¶ 18, and that a person of ordinary skill in the art would have had reasons to do so, as explained above.

Patent Owner disputes that it would have been obvious to modify Atherton to include a sliding mechanism because doing so allegedly would have rendered Atherton's RFID tag inoperable for its intended purpose and would have fundamentally altered its principle of operation. PO Resp. 46–54. Patent Owner's arguments assume the intended purpose of Atherton's RFID tag includes ensuring the tag would not be "awkward and impractical" to attach to a consumer item, and that Atherton's teachings are limited to a *folding* RFID tag. *Id.*

We disagree with Patent Owner's limited view of Atherton's teachings. Instead, we find Atherton's teachings are directed more broadly to providing privacy by reversibly degrading or disabling an RFID tag, wherein folding is a non-limiting mechanism for accomplishing this goal. Atherton's Background of the Invention describes an "issue" with RFID tags attached to consumer goods, namely "privacy of the consumer." Ex. 1006, 1:20–21. "One concern is that it may be possible for an RFID tag on a tagged item to be read after the item has been purchased and without the consumer being aware that reading of the tag has occurred." *Id.* at 1:21–23. Atherton explains that previous solutions included *permanently* degrading or disabling the RFID tag after purchase to prevent reading of the tag. *Id.* at 1:26–33. Atherton alleges that permanently degrading or disabling the tag was problematic if a consumer returned the consumer item to a store because the tag no longer functioned. *Id.* at 1:27–29, 1:33–2:3. Atherton states "[t]he object of the present invention is to overcome or substantially ameliorate the above disadvantages." *Id.* at 2:10–12. Atherton's stated solution to the problem was to provide an RFID tag that allowed a user to reversibly degrade or disable RFID function. *See, e.g.*, *id.* at 2:13–25

(Atherton's "Summary of Invention"); *see also id.* at 5:12–31, 11:1–11. These stated problems and solution do not pertain to the particular method of attachment of the RFID tag to the consumer item.

Atherton further discloses that reversibly degrading or disabling the RIFD tag can be accomplished by coupling and un-coupling an integrated circuit and antenna by altering their positions relative to each other. *Id.* at 2:14–25, 5:12–31. A disclosed embodiment in Atherton involves a folding mechanism for altering relative position, but Atherton expressly states that the disclosed embodiment is non-limiting. *Id.* at 3:30–31 ("The present invention will now be described by way of a non-limiting example with reference to the embodiments illustrated schematically in figures 1 to 5."). Patent Owner cites no express disclosure in Atherton that prohibits other mechanisms for altering the position of the integrated circuit relative to the antenna.

Atherton's disclosure in the Summary of the Invention states that "[p]referably," the tag's "substrate is folded back upon itself . . . so as to change from an open configuration to a closed folded configuration." Ex. 1006, 3:1–3, 3:30–31. However, this disclosure is directed merely toward a non-limiting embodiment of Atherton. Ex. 1006, 3:1–3, 3:30–31. We note that the word "Preferably" in Atherton's Summary of the Invention is used to describe features that appear in Atherton's narrower, dependent claims, and, therefore, is not reasonably read as limiting Atherton's disclosure. Ex. 1006, 2:13–3:13, 11:1–12:11. Claims 1 and 2 of Atherton, reproduced below, support our findings.

1. An RFID tag including:

a substrate;

> am RFID integrated circuit secured to said substrate;
>
> an RFID antenna also secured to said substrate;
>
> and wherein said tag is arrangeable in a first configuration in which said integrated circuit and said antenna are operatively coupled to provide an RFID function, and a second configuration in which electric coupling of said antenna and circuit is altered to change said function, with said tag being alterable from said first configuration to said second configuration, and from said second configuration to said first configuration to at least partly change to said function.
>
> 2. The tag of claim 1, where said function is degraded or disabled when said tag is in said second configuration, relative to said function when said tag is in said first configuration.

Id. at 11:1–14. Atherton's claim 1 broadly recites an RFID tag that allows for altering the position of an integrated circuit relative to an antenna, but nowhere mentions folding. *Id.* at 11:1–11. Atherton's claim 2 recites the feature of degrading or disabling RFID function. *Id.* at 11:12–14. Atherton's claim 8, which depends from claim 1, is further evidence that Atherton contemplates mechanisms other than folding. Claim 8 recites the RFID tag of claim 1 wherein the tag may be folded in order to achieve privacy. *Id.* at 11:24–27. Atherton's claim 1 is broader than claim 8, and therefore is not limited to a folding mechanism. Accordingly, we find that a person of ordinary skill in the art would not have read Atherton's disclosure as limited to a folding RFID tag.

Also, Roesner's disclosure that "a variety of methods" (including "folding the panel" and "sliding between positions") may be used to electrically couple and uncouple components of an RFID tag to activate and deactivate the tag further supports the finding that an ordinarily skilled artisan reading the references together would have considered mechanisms

in addition to folding to accomplish reversibly degrading or disabling an RFID tag. *See* Ex. 1009 ¶ 16.

a. Intended Purpose

With regard to intended purpose, we disagree with Patent Owner's assertion that the intended purpose of Atherton is to provide an RFID tag "that will remain attached to the purchased item to permit returns and avoid fraud." PO Resp. 47 (citing Ex. 2028 ¶¶ 109–115), 52–53. Based on this assertion, Patent Owner concludes the slider on the modified Atherton RFID tag would have been rigid, and therefore too "awkward" to attach to consumer items. *Id.* at 47–50. Patent Owner, therefore, suggests that Atherton is limited to a "pliable folding tag." *Id.* at 48–49. As we discussed above, Atherton's disclosure confirms that the reference is not limited to a folding tag, but instead allows for mechanisms other than folding. Also discussed above, Atherton describes problems associated with, and a corresponding solution for, providing an RFID tag that can be reversibly degraded or disabled, without expressly limiting the tag to one that folds. Ex. 1006, 1:4–2:23. Further, Atherton's claim 1 does not mention purchased items, and nowhere recites the RFID tag must remain attached to a purchased item. *Id.* at 11:1–11. Dependent claims 11 and 12 recite "when said tag is removed from an object to which it is attached," but Atherton's claim 1 does not require the claimed RFID tag to be attached to an object. *Id.* at 1:1–11, 12:1–6. These facts support our finding that Atherton's intended purpose is broader than what Patent Owner contends, and is not limited to RFID tags that remain attached to purchased items.

In addition, Patent Owner cites to nothing in Atherton that expressly states the problem to be solved involves providing an RFID tag that is not

awkward to attach to a consumer item. *See also id.* at 1:4–2:12 (describing the disadvantages of permanently degrading or disabling an RFID tag). We do not discern any disclosure in Atherton expressly stating that the advantage of using a folding RFID tag is to make the RFID tag suitable, or less awkward, for attaching to consumer items. To the extent use of a folding mechanism is described in Atherton, it is in the context of allowing for electrical coupling and uncoupling in order to reversibly degrade or disable RFID function. *See*, e.g., *Id.* at 4:32–5:36. These facts also support our findings.

Even if we were to accept Patent Owner's argument that Atherton's RFID tag must remain attached to a purchased item, we are not persuaded Atherton's modified tag would have required a *rigid* housing or slider. With respect to Kubo, Mr. Fischer improperly imports shielding casing into Atherton's modified RFID device. Ex. 2028 ¶¶ 117–120. Atherton's modified RFID tag, as proposed by Petitioner, does not require shielding because in Atherton electric coupling is prevented by increasing the distance between conducting areas 105 and 107, and shielding is not used. Ex. 1006, 5:23–31. Atherton's modified RFID tag, as proposed in Petitioner's asserted combination, does not rely on shielding to couple and un-couple conducting areas 105 and 107, but instead uses a sliding mechanism rather than folding to increase and decrease the distance between conducting areas 105 and 107. Pet. 67–68 (citing Ex. 1006, Fig. 1B); *see also* Pet. 68 (modified Fig. 1B depicting sliding Region 2 (containing conducting areas 107) over Region 1 (containing conducting areas 105) to achieve electrical coupling).

With respect to Roesner, Mr. Fischer argues Roesner describes inserting the slider into a cover, and concludes from this that Atherton's

modified RFID tag would have required a rigid housing. Ex. 2028 ¶ 119 (citing Ex. 1009 ¶ 23). We do not discern, however, why a sliding mechanism in Atherton would have to be affixed to a rigid housing in order to operate. Roesner's embodiment states the RFID tag "may" be affixed to a case, but this non-limiting embodiment does not require Roesner's RFID tag to be affixed to a case in all applications, nor does Roesner teach that its slider would fail to operate if not affixed to a case. Accordingly, Mr. Fischer's conclusion is not supported persuasively by the evidence he cites. Therefore, we are not persuaded that the modified version of Atherton's RFID tag in Petitioner's proposed combination would have required a rigid housing.

Accordingly, we disagree with Patent Owner's arguments that combining Atherton with either Kubo or Roesner in the manner proposed by Petitioner would render Atherton inoperable for its intended purpose.

b. Principle of Operation

Patent Owner contends that combining Atherton with Kubo or Roesner would fundamentally alter the principle of operation of Atherton's RFID tag. PO Resp. 47, 49–51, 53–54. Specifically, Patent Owner argues that Atherton's principle of operation is "folding the tag and holding the tag in a folded configuration with releasable adhesive so the tag can subsequently be unfolded and reused with full operating range." *Id.* at 50.

In support of its contention, Patent Owner argues that under *Plas-Pak Indus., Inc. v. Sulzer Mixpac AG*, the "principle of operation" of a primary prior art reference depends on the reference's "contribution to the art." PO Resp. 49 (citing *Plas-Pak Indus., Inc. v. Sulzer Mixpac AG*, 600 F. App'x 755, 759 (Fed. Cir. 2015) (unpublished)). We disagree with Patent Owner's

characterization of *Plas-Pak*. *Plas-Pak* is non-precedential, and does not support the legal principle argued by Patent Owner. In *Plas-Pak*, the Court's decision was limited to reviewing the specific factual findings of the Board to determine whether they were supported by substantial evidence. *Plas-Pak*, 600 F. App'x at 758–759. In particular, the Court determined the Board's findings as to a reference's "principle of operation" were supported by substantial evidence. *Id.* Whether the Board's definition coincided with the reference's "contribution to the art" was immaterial, and the court made no finding on this point. *Id.*

Second, even if Atherton's "contribution to the art" were the appropriate inquiry, Patent Owner improperly cabins Atherton's contribution. For reasons we discussed above, we disagree that Atherton's teachings are limited to a folding RFID tag, or holding the tag in such a configuration with adhesive. We instead find Atherton's teachings are directed more broadly to providing privacy by reversibly degrading or disabling an RFID tag (via coupling and uncoupling an integrated circuit and antenna by changing their positions relative to each other).

Accordingly, we disagree with Patent Owner's arguments that combining Atherton with either Kubo or Roesner in the manner proposed by Petitioner would fundamentally alter the principle of operation of Atherton.

c. Conclusion

Petitioner has provided sufficient articulated reasoning with rational underpinning to support the legal conclusion of obviousness as to claim 7. *See KSR*, 550 U.S. at 418. Upon review of the record in this proceeding, we determine that Petitioner has demonstrated by a preponderance of the evidence that claim 7 of the '337 patent is unpatentable under § 103 as

obvious over the combination of Atherton and Kubo and also over the combination of Atherton and Roesner.

4. *Discussion—Claims 8 and 9*

Claim 8 of the '337 patent further recites "[t]he RFID device of claim 1 further comprising an indicator adapted to visually indicate the status of the RFID device." Claim 9 of the '337 patent narrows claim 8, and recites "the indicator is adapted to display a first color if the RFID device is active, and is further adapted to display a second color if the RFID device is inactive." Petitioner relies on Roesner for teaching the claimed indicator. Pet. 68–72. In particular, Roesner teaches "one or more visual indicators that identify the state of the RFID tag." Ex. 1009 ¶ 15. Roesner teaches "the RFID tag may present, in a first configuration, a first color (e.g., green) indicating an activated state and, in a second configuration, a second color (e.g., red) indicating deactivated." Pet. 70 (citing Ex. 1009 ¶ 15); *see also* Ex. 1009 ¶ 18 ("In a first configuration, the panel 122 may present a green color indicating an active state to observers, and in a second configuration, the panel may present a red color indicating a deactivated state to observers."); *id.* ¶ 24;[9] *id.* ¶ 26.[10] Accordingly, Roesner teaches the limitations of claims 8 and 9.

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[9] "[C]over 610 may visually identify whether tag 120 is activated or deactivated. . . . [T]he inner surface of the cover 610 may be marked one color and the outer surface of the cover 610 may be marked a different color. . . . [W]hen the cover 610 is in a closed position, only one color is visually apparent, indicating that the RFID tag 120 is deactivated. . . . [W]hen the cover 610 is opened, a separate color is visible, indicating that the RFID tag 120 is activated." Ex. 1009 ¶ 24.

[10] "[S]lide 720 may also include colored markings to visually indicate the state of the tag 120 as the slide 720 is switched between a plurality of

Petitioner argues it would have been obvious in view of Roesner to modify Atherton to include a visual indicator as recited in claims 8 and 9. Pet. 68–72. Petitioner argues Roesner "provides a specific reason to implement its 'indicator' teaching on an RFID device—that visual indication of the state of the tag is 'beneficial in certain implementations, such as when the RFID tag is fixed on the windshield of a vehicle.'" *Id.* at 69 (citing Ex. 1009 ¶ 26; Ex. 1001 ¶ 168). Furthermore, both Atherton and Roesner are directed to providing a mechanism to alter an RFID tag between an enabled/active state and disabled/inactive state in order to protect privacy. *Id.* (citing Ex. 1006, 1:20–21, Ex. 1009 ¶ 3). Petitioner argues any mechanism in which a user manually alters between states requires a user to understand which state the device is in. *Id.* (citing Ex. 1001 ¶ 172). Roesner's teachings address this need by providing a visual indicator of RFID tag status, wherein one color indicates active status and another color indicates inactive status. *Id.*; *see also* Ex. 1009 ¶¶ 15, 18, 24, 26. We credit Petitioner's arguments, and Dr. Roesner's testimony in support thereof, because Roesner expressly discloses that visual indication of an RFID tag is beneficial (Ex. 1009 ¶ 26), and visual indication by its nature is intended to provide a user with a mechanism to determine visually the state of a device. We also find persuasive the argument that visually indicating the RFID tag's state would have been obvious because Atherton's RFID tag is intended to

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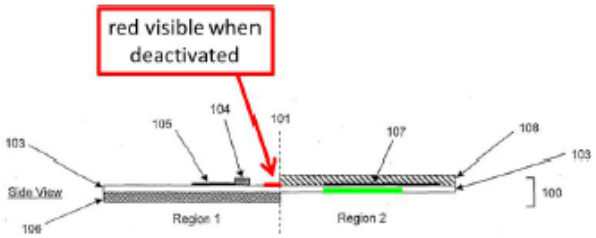
positions. . . . [T]he exposed portion 750a of the slide 720 may be green indicating an activated state. . . . [T]he newly exposed portion 750c of the slide 720 may be red indicating a deactivated state. . . . [U]sing the colored slide implementation of the multi-level switched tag state, the state of the tag may be visually identified." Ex. 1009 ¶ 26.

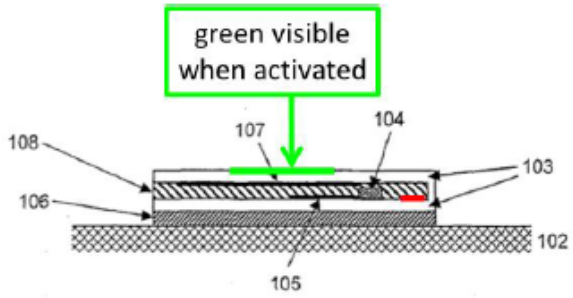
alternate between an active and inactive state and the user of Atherton's RFID tag would benefit from knowing the state of the RFID tag.

Petitioner argues that how to implement a visual indicator in Atherton's RFID tag would have been obvious. Petitioner provides an annotated version of Atherton's Figures 1A and 1B to illustrate how Atherton would have been modified to include a visual indicator, reproduced below:

Disabled State (Fig. 1A)



Enabled State (Fig. 1B)



Pet. 71; *see also* Ex. 1006, Figs. 1A–1B. Modified Figures 1A and 1B depict a red portion in Region 1 of Atherton's RFID tag that is visible when the tag is unfolded or open, and a green portion in Region 2 that is visible when the tag is folded or closed. *Id.* at 70–71. We are persuaded by Petitioner's arguments because Roesner describes a similar way to implement a visual indicator based on color in the context of a folding RFID tag. Pet. 70–71 (citing Ex. 1003 ¶ 173). Roesner discloses marking the outer cover of the RFID tag one color that is visible when the tag is in a closed position to indicate one state, and marking the inner cover of the tag a

different color that is visible when the tag is in an open position to indicate another state. Ex. 1009 ¶ 24.

Patent Owner does not provide arguments for claims 8 and 9 other than the arguments it presents for claim 7. PO Resp. 54–55.

Petitioner has provided sufficient articulated reasoning with rational underpinning to support the legal conclusion of obviousness as to claims 8 and 9. *See KSR*, 550 U.S. at 418. Upon review of the record in this proceeding, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 8 and 9 of the '337 patent are unpatentable under § 103 as obvious over the combination of Atherton and Roesner.

F. Patent Owner's Contingent Motion to Amend

Patent Owner requests, should claims 1–9 be determined to be unpatentable, that the '337 patent be amended to include proposed substitute claims 10–18, respectively. Mot. 1. Petitioner opposes Patent Owner's request. Opp. Having determined claims 1–9 are unpatentable, we turn to Patent Owner's Motion to Amend. For reasons that follow, we deny Patent Owner's Motion to Amend.

1. *Principles of Law*

Section 316(d) of Title 35 of the United States Code provides that "the patent owner may filed 1 motion to amend the patent" in which the patent owner may either cancel any challenged claim in the patent or propose a reasonable number of substitute claims for each challenged claim. *See also* 37 C.F.R. § 42.121. "An amendment under [Section 316(d)] may not enlarge the scope of the claims of the patent or introduce new matter." 35 U.S.C. § 316(d)(3); *see* 37 C.F.R. § 42.121(a)(2)(ii). "A motion to amend

claims must . . . set forth: (1) The support in the original disclosure of the patent for each claim that is added or amended; and (2) The support in an earlier-filed disclosure for each claim for which benefit of the filing date of the earlier filed disclosure is sought." 37 C.F.R. § 41.121(b); *see Aqua Products*, 872 F.3d at 1301 ("Under [Section 42.121(a)(2)], the Board may deny a motion to amend if the amendment does not satisfy the requirements of § 316(d)(3)—i.e., if it expands the claim scope, introduces new matter, or if it 'does not respond to a ground of unpatentability involved in the trial.'").

2. *Substitute Claims*

Proposed substitute claim 10, in pertinent part, modifies claim 1 of the '337 patent by replacing "the" with "a" in two places, and by adding the following limitations:

> an indicator adapted to visually indicate an optimized position of the RF module where the at least one conductive trace is located over the coupling region of the booster antenna and a detuned position of the RF module with respect to the coupling region of the booster antenna,
>
> wherein in the detuned position the RF module is displaced from the coupling region of the booster antenna such that *the RF module is entirely disposed behind a continuous conductive portion of the booster antenna*.

Mot., Claims App'x i–ii (emphasis added).

Proposed substitute claims 11–16 are substantively the same as claims 2–7, but have been modified to depend from substitute claim 10 rather than from claim 1. *Id.*, Claims App'x ii–iii.

Proposed substitute claim 17, the substitute for claim 8, deletes the limitation requiring the RFID device to comprise "an indicator adapted to visually indicate a status of the RFID device." *Id.*, Claims App'x iii–iv. This limitation is replaced with the requirement that "in the detuned position

the booster antenna shields the RF module from an RF signal such that RFID communications with the RFID device is halted." *Id.*

Claim 9 depends from claim 8. Claim 18, the substitute for claim 9, is substantively the same as claim 9, but depends from claim 10, not claim 17.[11]

3. *Discussion*

We first address whether the substitute claims introduce new matter and whether the original patent application provides written description support for the substitute claims. 35 U.S.C. § 316(d)(3); 37 C.F.R. § 41.121. In determining whether claims introduce new matter, we look to whether the original application provides adequate written description support for the claims. The test for determining compliance with the written description requirement is "whether the disclosure of the application [as originally filed] reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date." *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc). Because possession of the claimed invention is required, "a description that merely renders the invention obvious does not satisfy the requirement." *Id.* at 1352.

As we noted above, proposed substitute claim 10 adds the limitation "the RF module is entirely disposed behind a continuous conductive portion of the booster antenna," which we refer to herein as "the continuous conductive portion feature." Mot., Claims App'x ii. For reasons that follow,

[11] Given our disposition herein of the Motion to Amend, we need not decide whether proposed substitute claims 17 and 18 are proper substitutes for claims 8 and 9, respectively.

Patent Owner has not shown this limitation is supported by the original disclosure of the ’337 patent. Patent Owner asserts that the ’586 provisional application supports this feature. *Id.* at 6. Besides referring to a single sentence in the ’586 provisional application—“[i]n the arrangement of Fig. 1B, a smaller portion, or none, of the RF energy collected by booster antenna 110 is transferred to the RF module” (*id.* (citing Ex. 2023, 2))—the Motion to Amend provides no further explanation except to state in conclusory fashion that Figure 1B depicts RF module 120 positioned entirely “behind a continuous conductive portion of the booster antenna” (*id.*).

Petitioner argues the ’586 provisional application does not mention or describe a continuous conductive portion of a booster antenna behind which an RF module is entirely disposed. Opp. 7–8. The evidence of record supports Petitioner’s argument.

Figure 1B of the ’586 provisional application is identical to Figure 2B of the ’337 patent, except for the numbered labels. Ex. 2023, Fig. 1B; Ex. 1004, Fig. 2B. Figure 1B of the ’586 provisional application is reproduced below:

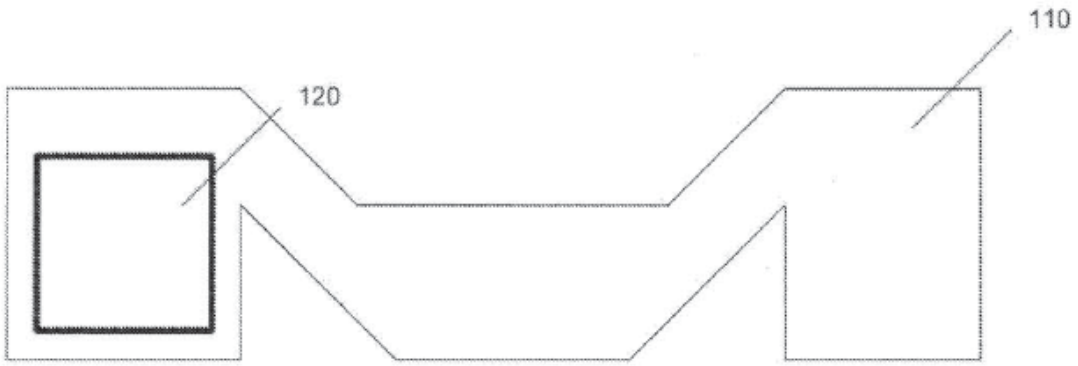


FIG. 1B

Ex. 2023, Fig. 1B. Figure 1B depicts a block diagram of booster antenna 110 roughly in the shape of the letter "M." *Id.* Figure 1B further depicts, on the left side of booster antenna 110, RF module 120 represented by a block in the shape of a square. *Id.* The outline of the block representing RF module 120 is shown as being entirely inside the outline of the block representing booster antenna 110. *Id.* This figure does not expressly show a continuous conductive portion of booster antenna 110 or show RF module 120 is *entirely disposed behind* such a portion. *Id.* Nowhere does the '586 provisional application's roughly two-page disclosure mention a *continuous conductive trace portion* of booster antenna 110, much less describe or depict RF module 120 as being *entirely disposed behind* such a region. Ex. 2023. The disclosure upon which Patent Owner relies (i.e., that a smaller portion, or none, of the RF energy collected by booster antenna 110 is transferred to the RF module) does not describe a *continuous conductive portion* or that RF module 120 is *entirely disposed behind* such a portion. Mot. 6 (citing Ex. 2023 ¶ 2). Patent Owner's argument amounts to an assumption that the reduction in collected energy must be due to disposing RF module 120 entirely behind an unseen and unnamed continuous conductive portion of booster antenna 110. Opp. 7. Patent Owner provides no support for this assumption. Mot. 6. Patent Owner's declarant, Mr. Fischer, also opines that the following disclosure in the '586 provisional application amounts to disclosure of a *continuous conductive portion* of booster antenna 110: "[i]n one embodiment, this booster consists of a conductive trace pattern on a substrate." Ex. 2029 ¶ 43 (citing Ex. 2023, 1). However, he does not state, or explain how, this

discloses a continuous conductive portion *behind* which RF module 120 is *entirely disposed*. *See id.*

In the Reply to Petitioner's Opposition, Patent Owner improperly introduces a new argument that the application leading to the '337 patent, the '407 application, provides support for the continuous conductive portion feature. Reply to Opp. 2–3. A reply is not a supplemental motion. "A reply may only respond to arguments raised in the corresponding opposition . . . ." 37 C.F.R. § 42.23(b). Patent Owner in its Motion to Amend argued *only* that the '586 provisional application supports the continuous conductive portion feature. Mot. 6. Logically, therefore, Petitioner in its Opposition only addressed the '586 provisional application. Opp. 7–8. In its Reply to Petitioner's Opposition, Patent Owner for the first time relies on disclosure that was added to the '407 application (that was not part of the '586 provisional application) to argue an ordinarily skilled artisan would have understood the "'M' shaped booster antenna 110 is a solid conductive trace pattern." Reply to Opp. 2–3 (citing Ex. 2026 ¶ 46 ("[The] booster antenna 210 consists of a conductive trace pattern on a substrate.")). This argument is not part of the Motion to Amend, and is not responsive to any argument made in Petitioner's Opposition, both of which address the adequacy of only the '586 provisional application's disclosure. Accordingly, Patent Owner's new argument is not entitled to consideration. Also, the portion of the '407

application Patent Owner attempts to rely on is not part of the ’586 provisional application.

Even though Patent Owner’s new argument in the Reply to Petitioner’s Opposition is not entitled to consideration, for the following reasons we do not find Patent Owner’s new argument persuasive.

The ’407 application discloses “FIG. 2B is a block diagram of the exemplary RFID switch tag with its RF module located in a second position relative to its booster antenna according to the embodiment depicted in Fig. 2A.” Ex. 2026 ¶ 17. Figure 2B of the ’407 application is reproduced below:

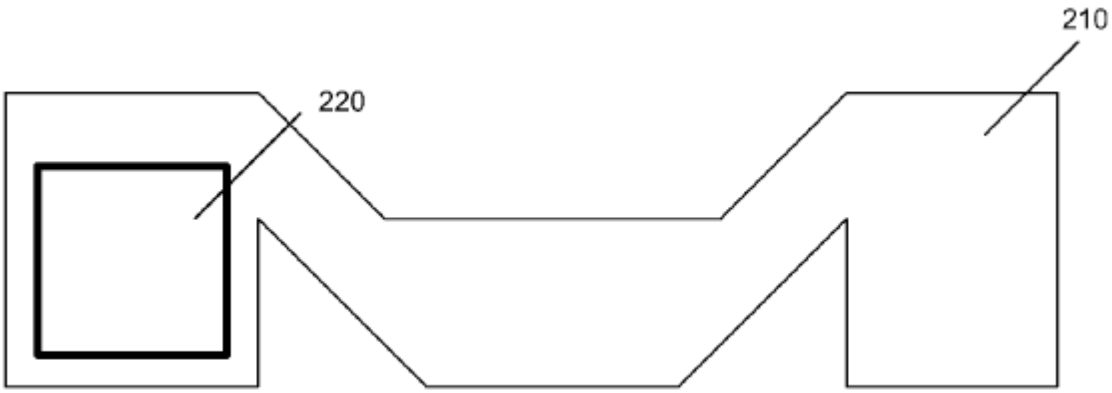


FIG. 2B

Id. at Fig. 2B. Figure 2B depicts a block representing booster antenna 210 roughly in the shape of the letter “M,” and a block representing RF module 210 in the shape of a square. *Id.* The outline of RF module 220 is depicted as being entirely within the outline of booster antenna 210. *Id.* The ’407 application describes the placement of RF module 220 with respect to booster antenna 210 as follows:

> [T]he placement of the RF module 220 with respect to the booster antenna 210 may alter the operational range and performance of the RFID tag 110. This is illustrated in FIG. 2B.

> In FIG. 2B, the relative positions of the RF module 220 and the booster antenna 210 are different than the arrangement shown in FIG. 2A. In the arrangement of FIG. 2B, a smaller portion, or none, of the RF energy collected by booster antenna 210 is transferred to the RF module 220. In this manner, the effective operational range of the RFID tag 110 may be reduced as compared to the arrangement of FIG. 2A. In fact, because RF module 220 is completely or at least partially shielded by a portion of antenna 210, RFID communications between the RFID tag 110 and the RFID reader interrogator 102 may be completely halted.

Id. ¶ 48. Notably, Figure 2B does not depict any continuous conductive portion on booster antenna 210, nor does it show RF module 220 as being *entirely disposed behind* such a portion. With respect to Figures 2A–C (which depict the same booster antenna 210), there is no depiction or description of a continuous conductive portion behind which the RF module is entirely disposed. Moreover, nowhere does the specification for the '407 application disclose a continuous conductive portion of a booster antenna, and the word "continuous" does not appear anywhere in the specification. None of the figures of the '407 application depict the placement of a conductive trace pattern, much less a continuous conductive trace pattern behind which an RF module is entirely disposed. The single claim originally filed with the '407 application does not claim a continuous conductive portion. Ex. 3001, 20.[12] Although the written description requirement does not demand any particular form of disclosure, *Ariad*, 598 F.3d at 1352, we find the lack of any disclosure of a continuous conductive trace pattern, and in particular one behind which an RF module is entirely disposed, to indicate

[12] We cite to the page number of the exhibit, shown in the lower right hand corner.

Patent Owner was not in possession of the RFID device claimed in proposed substitute claim 10 as of the filing of the ’407 application.

Because neither the ’586 provisional application nor the ’407 application expressly discloses where the conductive trace pattern is located on booster antenna 110/210, Patent Owner’s argument that the ’407 application supports the continuous conductive portion feature is premised on the argument that an ordinarily skilled artisan would have “understood” from Figure 2B that booster antenna 210 is a solid conductive trace pattern. Reply to Opp. 3. According to Patent Owner, because booster antenna 210 is a solid conductive trace pattern, the positioning of RF module 220 in the figure depicts the module as being disposed entirely behind a continuous conductive portion of booster antenna 210. *Id.* For the reasons that follow, the evidence does not support the premise that booster antenna 210 is a solid conductive trace pattern.

First, because there is no disclosure in the ’407 application that booster antenna 210 is a solid conductive trace pattern, Patent Owner relies on the testimony of Petitioner’s declarant, Dr. Roesner, whom Patent Owner alleges “readily discerned from looking at Fig. 2A of the ’337 patent [which depicts the same booster antenna 210 as depicted in Figure 2B of the ’407 application] that the antenna was a solid antenna.” *Id.* at 3 (citing Ex. 2050, 52:20–54:9, Ex. 2044 ¶¶ 15, 64–65). In the cited testimony, Dr. Roesner testifies that the booster antenna depicted in Figure 2A of the ’337 patent “appears to be a solid metal antenna.” Ex. 2050, 49:25–50:1, 50:4–5, 52:20–53:3. However, Dr. Roesner’s testimony is not based on any explicit disclosure in the ’337 patent. Instead, he is responding to the appearance of Figure 2A (*id.* at 52:20–53:15), which is described in the ’337 patent

specification as a "block diagram," and therefore does not accurately depict the physical geometry and features of an actual booster antenna (Ex. 1004, 3:41–48). *See also* Ex. 2026 ¶¶ 16–17 (describing Figures 2A–B as "block diagram[s]"). For example, Figures 2A and 2B depict RF module 220 as an empty square, but this depiction omits all details regarding the features of the RF module. *Id.*, Figs. 2A–B. The '407 application specification describes some of the features of RF module 220 not depicted in the figures, stating "*[w]hile not shown* [in Figures 2A–C], RF module 220 may comprise an RFID integrated circuit and a conductive trace pattern." *Id.* ¶ 47 (emphasis added). Similarly, Figures 2A and 2B represent booster antenna 210 by depicting an outline in the shape of the letter "M," but otherwise provide no details regarding the features of booster antenna 210 other than the feature described below. *Id.*, Figs. 2A–2B. Accordingly, we find the appearance of booster antenna 210 in Figures 2A–2C does not indicate either way whether the antenna is a solid antenna or is a solid conductive trace pattern.

Although not shown in Figures 2A and 2B, the '407 application specification describes the following feature of booster antenna 210, with respect to Figures 2A and 2B: "[the] booster antenna 210 consists of a conductive trace pattern on a substrate." *Id.* ¶ 46. Therefore, we find booster antenna 210 is not a solid metal antenna or solid conductive trace pattern, as alleged by Patent Owner, because it comprises at least two materials, namely a substrate material and the material forming the conductive trace pattern.

Finally, neither party makes any arguments with respect to the '834 application or '372 provisional application. We do not discern any

disclosure in the ’834 application or ’372 provisional application that impacts our findings or decision.

Based on the above and the entirety of the record before us, we determine that the amendments proposed in proposed substitute claim 10, and proposed substitute claims 11–18 depending therefrom, introduce new matter under 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121(a)(2)(ii). Patent Owner has not shown, and we do not find, written description support in the original disclosure of the ’337 patent for proposed substitute claim 1, or proposed substitute claims 11–18 depending therefrom. Because our determination is dispositive, we need not, and do not, address the parties’ contentions regarding whether proposed substitute claims 10–18 are unpatentable over the prior art of record.

G. Motions to Exclude

1. *Petitioner’s Motion*

Petitioner filed a Motion to Exclude (Paper 38), Patent Owner filed an opposition thereto (Paper 41), and Petitioner filed a reply (Paper 47). Petitioner seeks to exclude Exhibits 2045 and 2053, and paragraphs 11, 20–28, and 67 of Exhibit 2044. Paper 38, 1. Exhibits 2045 and 2053 are videos Patent Owner asserts were created by Mr. Fischer that purport to show testing regarding a prior art reference asserted by Petitioner in connection with Patent Owner’s Motion to Amend. *Id.* Exhibit 2044 is Mr. Fischer’s supplemental declaration in support of Patent Owner’s Motion to Amend, and the paragraphs Petitioner seeks to exclude relate to the video testing. *See generally* Paper 38. These exhibits relate to arguments we need not, and do not, address regarding the alleged unpatentability of Patent Owner’s proposed substitute claims in view of the prior art of record. *See supra*

Section II.F. Because we do not rely on or reference Exhibits 2045, 2053, or paragraphs11, 20–28, and 67 of Exhibit 2044 in our Final Written Decision, Petitioner's Motion to Exclude is dismissed as moot.

2. *Patent Owner's Motion*

Patent Owner filed a Motion to Exclude Evidence (Paper 37), Petitioner filed an opposition thereto (Paper 42), and Patent Owner filed a reply (Paper 46). Patent Owner seeks to exclude portions of Exhibit 1049—the declaration of Dr. Roesner in support of Petitioner's Sur-Reply. Paper 37, 2–9. Patent Owner also seeks to exclude Exhibits 1041–1045, 1048, 1050, 1051, 1052, 1056, 2062. Paper 37, 9–15. As the moving party, Patent Owner "has the burden of proof to establish that it is entitled to the requested relief." 37 C.F.R. § 42.20(c).

Exhibits 1041–1045 are alleged by Patent Owner to be hand-drawn RFID tags modified by Petitioner. Paper 37, 9–10. Ex. 1048 is alleged by Patent Owner to be a printout of a product listing from a company that offers RFID tags. *Id.* at 11. Exhibit 1050 includes excerpts from a dictionary. *Id.* at 11–12. Exhibit 1051 and 1052 are patents. *Id.* at 12. Because we do not rely on or reference Exhibits 1041–1045, 1048, or 1050–1052 in our Final Written Decision, Patent Owner's request to exclude these exhibits is dismissed as moot.

As we noted above, Exhibit 1049 is the declaration of Dr. Roesner in support of Petitioner's Sur-Reply. Patent Owner seeks to exclude paragraphs 21–25, 34–44, 48–55, 59–60, 62, 69, 70, 72, 73, 74, 75–78, and 118–145. *Id.* at 2–9. All of these portions of Dr. Roesner's declaration pertain to other bases on which Petitioner argues Patent Owner's Motion to Amend should be denied, which we need not, and do not, decide given our

disposition of the Motion herein based on the continuous conduction portion feature recited in proposed substitute claim 10. Accordingly, Patent Owner's request to exclude these paragraphs of the declaration is dismissed as moot.

Exhibit 1056 is the curriculum vitae of Dr. Roesner marked at this deposition on December 1, 2017. Exhibit 2062 is the transcript of Dr. Roesner's second deposition in this proceeding taken on December 1, 2017. Patent Owner alleges the curriculum vitae was submitted in response to Patent Owner's contention that Dr. Roesner lacks relevant experience in antenna design, testing, and experience. Paper 37, 14–15. Again, the cited evidence pertains to other bases on which Petitioner argues Patent Owner's Motion to Amend should be denied, which we need not, and do not, decide given our disposition of the Motion herein. Accordingly, Patent Owner's request to exclude these exhibits also is dismissed as moot.

H. Observations on Cross-Examination

Patent Owner filed a Motion for Observations on the Cross-Examination of Petitioner's Sur-Reply Declarant, Dr. Bruce Roesner (Paper 39), and Petitioner filed a response thereto (Paper 43).

Petitioner filed a corrected Motion for Observation on the Cross-Examination of Patent Owner's Sur-Sur-Reply Declarant, Mr. Fischer (Paper 55), and Patent Owner filed a response thereto (Paper 56).

The cited portions of the cross-examination of both declarants pertain to other bases on which Petitioner argues Patent Owner's Motion to Amend should be denied, which we need not, and do not, decide given our disposition of the Motion herein. Nevertheless, in rendering this Final Written Decision, we have considered the parties' observations and

respective responses thereto to the extent the observations pertain to the credibility of Mr. Fischer and Dr. Roesner, and have accorded appropriate weight to their respective testimony.

III. SUMMARY

For the foregoing reasons, we determine that Petitioner has demonstrated, by a preponderance of the evidence, that claims 1–6 of the '337 patent are unpatentable under 35 U.S.C. § 102(b) as anticipated by Atherton, claim 7 of the '337 patent is unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Atherton and Kubo, and claims 7–9 of the '337 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Atherton and Roesner.

We also determine that proposed substitute claims 10–18 introduce new matter, as prohibited by 35 U.S.C. § 316(d)(3) and 37 C.F.R. § 42.121(a)(2)(ii). The original disclosure of the '337 patent does not provide written description support for proposed substitute claims 10–18.

IV. ORDER

Accordingly, it is:

ORDERED that claims 1–9 of the '337 patent have been shown to be unpatentable;

FURTHER ORDERED that Patent Owner's Motion to Amend is denied;

FURTHER ORDERED that Petitioner's Motion to Exclude (Paper 38) is dismissed as moot;

FURTHER ORDERED that Patent Owner's Motion to Exclude (Paper 37) is dismissed as moot; and

FURTHER ORDERED that, because this Decision is final, 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.

PETITIONER:

Gregg F. LoCascio
Anders P. Fjellstedt
Nathan S. Mammen
KIRKLAND & ELLIS LLP
gregg.locascio@kirkland.com
anders.fjellstedt@kirkland.com
nathan.mammen@kirkland.com

PATENT OWNER:

Noel C. Gillespie
Victor M. Felix
PROCOPIO, CORY, HARGREAVES & SAVITCH LLP
noel.gillespie@procopio.com
victor.felix@procopio.com