

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC, LG ELECTRONICS, INC.,
LG ELECTRONICS, U.S.A., INC., LG ELECTRONICS MOBILECOMM
U.S.A., INC., SAMSUNG ELECTRONICS CO., LTD, SAMSUNG
ELECTRONICS AMERICA, INC., and HUAWEI DEVICE USA, INC.
Petitioner,

v.

RYUJIN FUJINOMAKI,
Patent Owner.

Case IPR2016-01522¹
Patent 6,151,493

Before DAVID C. McKONE, BARBARA A. PARVIS, and
DANIEL N. FISHMAN, *Administrative Patent Judges*.

McKONE, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

¹ Case IPR2017-01017 has been joined with this proceeding.

I. INTRODUCTION

A. Background

Google LLC.², LG Electronics U.S.A., Inc., LG Electronics Mobilecomm U.S.A., Inc., and LG Electronics, Inc. (collectively, “Petitioner”) filed a Petition (Paper 1, “Pet.”) to institute an *inter partes* review of claims 1–6 and 8–10 of U.S. Patent No. 6,151,493 (Ex. 1001, “the ’493 patent”). Ryujin Fujinomaki (“Patent Owner”) filed a Preliminary Response (Paper 7, “Prelim. Resp.”).

Pursuant to 35 U.S.C. § 314, in our Institution Decision (Paper 8, “Dec.”), we instituted this proceeding as to claims 1–6 and 8–10.

On March 6, 2017, Samsung Electronics Co., Ltd., Samsung Electronics America, Inc., and Huawei Device USA Inc. filed a petition challenging claims 1–6 and 8–10 of the ’493 patent, along with a Motion for Joinder with this proceeding. IPR2017-01017, Papers 3–4. On May 26, 2017, we instituted a trial in IPR2017-01017 and joined it to this proceeding. Paper 19.

Patent Owner filed a Patent Owner’s Response (Paper 20, “PO Resp.”), and Petitioner filed a Reply to the Patent Owner’s Response (Paper 21, “Reply”).

An oral argument was held on November 28, 2017 (Paper 30, “Tr.”).

² Google Inc. originally was named as Petitioner. Petitioner subsequently filed updated Mandatory Notices informing the Board that Google Inc. converted from a corporation to a limited liability company and changed its name to Google LLC. Paper 26.

Petitioner relies on the Declarations of Schuyler Quackenbush, Ph.D. (Ex. 1003, “Quackenbush Decl.”; Ex. 1027, “Quackenbush Reply Decl.”³). Patent Owner relies on the Declaration of Christopher Jones, Ph.D. (Ex. 2003, “Jones Decl.”).

We have jurisdiction under 35 U.S.C. § 6. This Decision is a final written decision under 35 U.S.C. § 318(a) as to the patentability of claims 1–6 and 8–10. Based on the record before us, Petitioner has proved, by a preponderance of the evidence, that claims 1–6 and 8–10 are unpatentable.

B. Related Matters

The parties indicate that the ’493 patent has been asserted in *Fujinomaki v. Google Inc.*, 3:16-cv- 03137-JSC (N.D. Cal.) (transferred from 2:15-cv-1381-RJG-RSP (E.D. Tex.)). Pet. 4; Paper 5, 2.

C. Asserted Prior Art References

Petitioner relies on the following prior art:

Ex. 1004 (“Yamamoto”)	US 5,327,482	July 5, 1994
Ex. 1005 (“Mardirossian”)	US 5,796,338	Aug. 18, 1998

³ At the oral argument, Patent Owner argued that the Reply and the Quackenbush Reply Declaration improperly included new argument and evidence that should have been presented in the Petition, although Patent Owner acknowledged that it did not attempt to depose Dr. Quackenbush on his Reply Declaration or otherwise object to his testimony prior to the hearing. Tr. 40:24–42:2, 42:23–44:2. For each of our citations to the Reply and the Quackenbush Reply Declaration, below, we determine that the argument and evidence is properly responsive to the Patent Owner’s Response. See 37 C.F.R. § 42.23(b) (“A reply may only respond to arguments raised in the corresponding opposition, patent owner preliminary response, or patent owner response.”).

Ex. 1006 (“Takeuchi”)	US 5,055,701	Oct. 8, 1991
Ex. 1007 (“Olah”)	US 5,396,218	Mar. 7, 1995

D. The Instituted Grounds

We instituted a trial on the following grounds of unpatentability
(Dec. 36):

Reference(s)	Basis	Claim(s) Challenged
Yamamoto and Mardirossian	§ 103(a)	1–3, and 8
Yamamoto, Mardirossian, and the knowledge of a person of ordinary skill in the art	§ 103(a)	10
Yamamoto, Mardirossian, and Takeuchi	§ 103(a)	4–6
Yamamoto, Mardirossian, and Olah	§ 103(a)	9

E. The ’493 Patent

The ’493 patent describes a use prohibition system that disables a device, such as a cellular phone, if the phone is separated from a user by more than a predetermined distance, and at the same time gives a warning to the user. Ex. 1001, Abstract. Figure 1 of the ’493 patent, reproduced below, illustrates an example:

FIG. 1

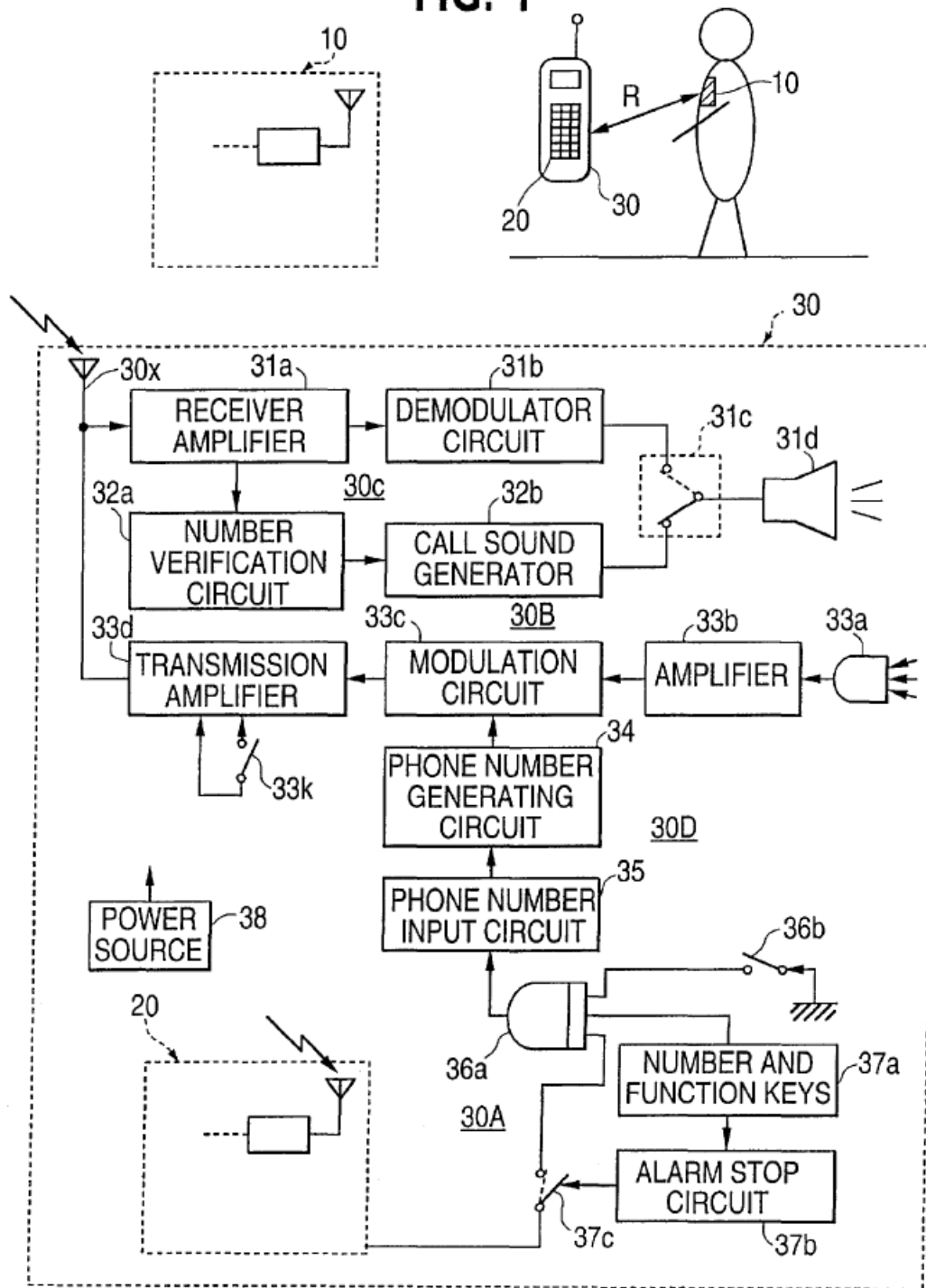


Figure 1 is a schematic view of a use prohibition system for a cellular phone.
Id. at 3:20–21, 3:44–45.

The system includes card-shaped identification signal transmission unit 10 and call prohibition mode canceling unit 20 mounted in or attached to cellphone 30. Ex. 1001, 3:45–50. A user keeps identification signal transmission unit 10 on his or her person, for example in a pocket, such that it is within the predetermined distance from cellphone 30. *Id.* at 3:53–56.

Identification signal transmission unit 10 transmits an identification (ID) signal with a predetermined code signal to canceling unit 20 and receives a confirmation signal returned from canceling unit 20. *Id.* at 4:36–42. ID signal transmission unit 10 determines whether the confirmation signal coincides with the ID signal and determines whether the confirmation signal's strength exceeds a predetermined threshold. *Id.* at 4:52–5:13. If the confirmation signal's strength is below the threshold, ID signal transmission unit 10 generates an alarm, warning the user that cellphone 30 is outside the predetermined distance from ID signal transmission unit 10. *Id.* at 5:13–15.

Similarly, canceling unit 20 receives the ID signal from ID signal transmission unit 10 and returns the confirmation signal upon confirmation of reception of the ID signal. *Id.* at 5:19–21, 5:36–42, 6:58–62. If the strength of the ID signal received by canceling unit 20 is above a predetermined threshold, canceling unit 20 produces a use prohibition canceling signal to cellphone 30, keeping cellphone 30 in a usable mode. *Id.* at 8:50–65. If the strength of ID signal is less than the threshold (i.e., cellphone 30 and canceling unit 20 are more than a predetermined distance from ID signal transmission unit 10), canceling unit 20 stops producing the use prohibition canceling signal to cellphone 30 and cellphone 30 is disabled. *Id.* at 9:8–16.

Claim 1, reproduced below, is illustrative of the claimed subject matter:

1. A device for prohibiting unauthorized use of an electronic device, the device comprising:
 - an identification code transmission unit comprising:
 - a first transmitter for transmitting an identification code signal at a constant level;
 - a first receiver for receiving a confirmation signal;
 - an alarm mechanism being activated when the confirmation signal received by said first receiver is below a predetermined value;
 - a use prohibition canceling unit comprising:
 - a second transmitter for transmitting the confirmation signal at a constant level;
 - a second receiver for receiving the identification code signal; and
 - said use prohibition canceling unit maintaining the electronic device in an operational state while the identification code signal received by said second receiver is at or above the predetermined value, and when the identification code signal is below the predetermined value, said use prohibition canceling unit at least partially disabling the electronic device

II. ANALYSIS

A. *Claim Construction*

We interpret claims of an unexpired patent using the broadest reasonable construction in light of the specification of the patent in which they appear. *See* 37 C.F.R. § 42.100(b); *Cuozzo Speed Techs., LLC v. Lee*,

136 S. Ct. 2131, 2144–45 (2016). Nevertheless, the '493 patent is expired. “[T]he Board’s review of the claims of an expired patent is similar to that of a district court’s review.” *In re Rambus Inc.*, 694 F.3d 42, 46 (Fed. Cir. 2012) (citations omitted). District courts construe claims in accordance with their ordinary and customary meanings, as would be understood by a person of ordinary skill in the art, in the context of the specification. *See Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc).

In the Institution Decision, we determined that “[a] device,” and “the device,” as recited in claim 1, refers to a system that includes (1) an identification code transmission unit and (2) a use prohibition unit coupled to “an electronic device” (and “the electronic device”) and remote from the identification code transmission unit. Dec. 8–9. The parties agree with this determination. PO Resp. 13; Reply 5.⁴

The parties dispute the meaning of “identification code signal” and “confirmation signal.” PO Resp. 11–13; Reply 2–5. We address the constructions of those terms below.

1. “*identification code signal*”

Claim 1 recites “a first transmitter for transmitting *an identification code signal* at a constant level” and “a second receiver for receiving *the identification code signal*.” Patent Owner contends that:

⁴ In the Institution Decision, we noted “[t]he '493 patent likely will expire during the pendency of this proceeding,” but “neither party yet has requested a district court-type claim construction approach.” Dec. 8. Our determination in the Institution Decision regarding “[a] device,” and “the device,” recited in claim 1 (*id.* at 8–9) is the same using a district court-type approach.

the term *identification code signal* should be construed as “a signal that contains information representing [] 1) the phone number of the electronic device, 2) an ID number or signal indicative of other information about the owner of the electronic device, or 3) any number or code peculiar to the electronic device, and that is transmitted regularly and periodically.”

PO Resp. 12. Patent Owner’s proposed construction has two aspects. First, the signal contains information representing a phone number, ID number, or code peculiar to the device. Second, the signal is transmitted “regularly and periodically.”

As to the first aspect, Patent Owner does not dispute that the signal in Yamamoto identified by Petitioner as the identification code signal satisfies at least one of the three types of numbers or codes in Patent Owner’s proposed construction. Tr. 27:5–9 (“Is it your position that Yamamoto does or does not disclose at least one of those three? Mr. Cecil: Some of their signals do contain those elements. The ones mentioned in columns 6 and 7 do”), 35:15–16 (“There is an ID that is included on those particular control signals.”). Rather, Patent Owner’s patentability arguments turn on the second aspect, whether the identification code signal must be transmitted regularly and periodically.

At the oral argument, Patent Owner clarified that “regular” and “periodically” mean different things, with “regular” meaning, essentially, transmitted all the time, as distinguished from the identified signal in Yamamoto, which is transmitted at call setup and during a call, but not when the phone is idle. Tr. 29:21–22 (“Regular means that it’s sent consistently, so it’s more than just being periodic. It has to be consistently sent.”). “Periodically,” then, means transmitted at predetermined intervals. PO

Resp. 12; Tr. 29:16–17 (“Periodic means sent at specific time intervals. It could also be the term intermittent.”).

In support of its contention that the signal must be transmitted regularly, Patent Owner points to the description in the specification of an identification code signal that Patent Owner contends is always transmitted. PO Resp. 12 (citing Ex. 1001, 5:30–42). Here, the ’493 patent states that power is always supplied to parts of canceling unit 20 because:

in order for the canceling unit 20 to be able to always receive the ID signal from the transmission unit 10 and return, upon confirmation of reception of the ID signal, the confirmation signal at predetermined intervals in response to the command from the transmit-receive control timer 23a, the canceling unit 20 has to be kept turned on.

Ex. 1001, 5:30–42. As to its contention that the signal must be transmitted periodically, Patent Owner cites description in the specification of an identification code signal transmitted intermittently, rather than continuously. PO Resp. 12 (citing Ex. 1001, 2:58–59, 5:58–62). Here, the ’493 patent states that “[t]he ID signal, made up of the M-sequence signal and the phone number signal, is transmitted, not continuously, but intermittently at intervals S (e.g. 2000 ms) to save electric power and, thus, to prolong the interval between recharges of the battery.” Ex. 1001, 5:58–62. The testimony of Dr. Jones essentially repeats these arguments. Ex. 2003 ¶ 59. Patent Owner argues that “the identification code signal and the confirmation signal cannot be naked signals of themselves—to read the terms as mere signals would read out the words ‘identification code’ and ‘confirmation’ from the claims.” PO Resp. 12–13.

Petitioner argues that “identification code signal” need not be construed; rather, it should take its plain and ordinary meaning. Reply 2. In

the alternative, Petitioner contends that the term means “a signal that includes a predetermined code.” *Id.* Petitioner contends that Patent Owner’s construction improperly reads extraneous limitations into the claims from permissive examples in the specification. *Id.* at 2–3. Rather, Petitioner would have us read “identification code signal” in light of the specification’s description that “a signal containing **a predetermined code signal** is used as **the ID signal.**” *Id.* at 2 (quoting Ex. 1001, 5:50–51 (emphasis Petitioner’s)). Petitioner contends that the patent’s description of particular types of predetermined codes (phone number, ID number, etc.) are non-limiting examples. *Id.* at 2–3. As to a requirement that the signal be transmitted regularly and periodically, Petitioner argues that such a requirement is introduced in dependent claims 3, 6, and 8, giving rise to a presumption, under the doctrine of claim differentiation, that these limitations are not required in independent claim 1. *Id.* at 3–4.

The Federal Circuit states:

The claims themselves provide substantial guidance as to the meaning of particular claim terms. In addition, the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification. But while we read claims in view of the specification, of which they are a part, we do not read limitations from the embodiments in the specification into the claims.

MasterMine Software, Inc. v. Microsoft Corp., 874 F.3d 1307, 1310 (Fed. Cir. 2017) (internal citations and quotation marks omitted). In this case, “identification code signal” has an ordinary meaning that does not require a code to take a particular numerical form or to be broadcast all the time or at predetermined intervals. Ex. 1027 ¶ 13. Rather, the claim language itself includes no recitation of particular types of codes, intermittent transmission,

or transmission all the time. For example, “regular and periodic” does not appear in the claims.

In the related District Court litigation, Patent Owner agreed that “identification code signal” should be given its plain and ordinary meaning. Specifically, Patent Owner proposed construing “transmitting an identification code signal at a constant level” to mean “[o]rdinary meaning; this term, as a whole, does not require construction,” and proposed a construction only for the portion of the term reciting “constant level.” Ex. 1020 (Joint Claim Construction and Prehearing Statement), Ex. A (Disputed Claim Constructions for the ’493 Patent) at 2. Thus, in District Court, Patent Owner proposed a construction substantially the same as Petitioner proposes in this proceeding. In the Preliminary Response, Patent Owner stated that “Patent Owner believes that its litigation constructions are correct.” Prelim. Resp. 5. Patent Owner does not explain sufficiently why it now disagrees with the construction it proposed to the District Court. Rather, Patent Owner argues that “we ended up with additional elements because we looked harder at the patents, thanks to this proceeding so, you know, we refined our definition.” Tr. 33:25–27.

Claims that depend from claim 1 reinforce the view that identification code signal does not carry with it the requirements Patent Owner now would add. For example, claim 3 recites that:

said identification code transmission unit further comprises a first transmit-receive control timer for transmitting the identification code signal and receiving the confirmation code signal as intermittent signals and said use prohibition canceling unit further comprises a second transmit-receive control timer for transmitting the confirmation code signal and receiving the identification code signal as intermittent signals.

Here, claim 3 adds structure for the express purpose of transmitting and receiving intermittent signals. This implies that an identification code signal, in claim 1, is not necessarily intermittent.

We recognize that the specification describes examples of intermittent identification code signals that include certain types of codes and are transmitted whenever canceling unit 20 is on. We agree with Petitioner, however, that the examples cited by Patent Owner are just that—examples. Specifically, in the described example, power is always supplied to portions of canceling unit 20 because, in that embodiment, canceling unit 20 always receives an ID signal and returns a confirmation signal. Ex. 1001, 5:30–42. Patent Owner, however, does not point to description requiring that canceling unit 20 always receive and transmit signals. The patent’s description of intermittent signals, likewise, is presented as an example, rather than a requirement. *Id.* at 5:58–62. We agree with Petitioner that an identification code signal includes a predetermined code. However, as to the three specific types of predetermined numbers or codes in Patent Owner’s proposal, we agree with Petitioner that they are described as examples rather than requirements. *Id.* at 5:63–68 (“The M-sequence signal may be a C/A code, P code or linear FM signal. The phone number as the code signal may be any other ID number or signal indicative of other information about the owner or person in charge in the case of devices other than cellphones.”), 6:11–13 (“In the embodiment, the code signal represents the phone number but may represent any other number or code peculiar to the particular phone.”). Adding these examples to identification code signal, as recited in claim 1, would be importing limitations from the specification into the claims improperly.

In sum, the plain and ordinary meaning of “identification code signal,” in light of the specification, is “a signal that includes a predetermined code.” We decline to add the remaining language proposed by Patent Owner because to do so would be to import limitations from the specification into the claims.

2. “*confirmation signal*”

Claim 1 recites “a first receiver for receiving *a confirmation signal*” and “a second transmitter for transmitting *the confirmation signal* at a constant level.” Patent Owner contends that

[t]he term *confirmation signal* should be construed to mean “a signal that contains information representing [] 1) the phone number of the electronic device, 2) an ID number or signal indicative of other information about the owner of the electronic device, or 3) any number or code peculiar to the electronic device, and that is transmitted regularly and periodically.”

PO Resp. 12. Patent Owner argues “identification code signal” and “confirmation signal” together, proposing essentially the same construction for each and citing to the same evidence. *Id.* at 12–13. Patent Owner points to description in the specification that the identification codes and confirmation signals can include the same information. *Id.* at 12 (citing Ex. 1001, 6:16–20); *see also* Ex. 1001, 6:60–62 (“[T]he canceling unit 20 recognizes its identity and returns the ID signal to the unit 10 as a confirmation signal.”). In the related district court litigation, Patent Owner proposed construing “confirmation signal” to include the three types of numbers or codes it proposes now, but, contrary to its construction here, did not advocate for a construction that includes “transmitted regularly and periodically.” Ex. 1020, Ex. A, at 2.

Petitioner argues that “confirmation signal” needs no construction but that if construed, it should mean “a signal returned in response to the identification signal.” Reply 4 (quoting Ex. 1001, Abstract (“[T]he canceling unit **receives an ID code signal** from the transmission unit. . . . The canceling unit **returns a confirmation signal**.”), 4:36–42 (“**a confirmation signal returned** from the transmitter of the canceling unit 20”) (emphases Petitioner’s)). Otherwise, Petitioner reiterates its arguments that reading a confirmation signal to require particular types of numbers or codes, or regular and periodic transmission, would be to import limitations from the specification improperly. *Id.* at 4–5.

For the reasons given above for “identification code signal,” we agree with Petitioner that we should not import from the specification requirements that a confirmation signal include particular numbers or codes, or that the signal must be regular and periodic.

As to Petitioner’s argument that the ordinary meaning of confirmation signal, in light of the specification, is a signal that is returned in response to receipt of an identification signal, Patent Owner argues that this is not supported by the specification. Tr. 34:26–35:5. The specification describes the confirmation signal as confirming the receipt of the identification code signal. Ex. 1001, 6:17–21, 6:58–62. Patent Owner admits that “the confirmation signal does confirm the presence of the use prohibition canceling unit to the identification code transmission unit.” Tr. 34:21–23. However, Patent Owner argues that it does not describe sending the confirmation signal in response to the identification signal. *Id.* at 35:3–5. We need not reach that issue, however, to resolve the parties’ dispute. On

the complete record, we construe “confirmation signal” to mean “a signal confirming receipt of the identification signal.”

B. Asserted Grounds of Unpatentability

A claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter 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.” We resolve the question of obviousness on the basis of underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) objective evidence of nonobviousness, i.e., secondary considerations.⁵ *See Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

In an obviousness analysis, some reason must be shown as to why a person of ordinary skill would have combined or modified the prior art to achieve the patented invention. *See Innogenetics, N.V. v. Abbott Labs.*, 512 F.3d 1363, 1374 (Fed. Cir. 2008). A reason to combine or modify the prior art may be found explicitly or implicitly in market forces; design incentives; the “interrelated teachings of multiple patents”; “any need or problem known in the field of endeavor at the time of invention and addressed by the patent”; and the background knowledge, creativity, and common sense of the person of ordinary skill. *Perfect Web Techs., Inc. v. InfoUSA, Inc.*, 587

⁵ The record does not include arguments or evidence regarding objective indicia of nonobviousness.

F.3d 1324, 1328–29 (Fed. Cir. 2009) (quoting *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418–21 (2007)).

1. Level of Ordinary Skill

Petitioner contends that a person of ordinary skill in the art would have had a bachelor’s degree in electrical engineering, computer engineering, computer science, or a related field, and approximately two years of professional experience with signal processing or wireless communications, or, in the alternative, additional graduate education. Pet. 12; Ex. 1003 ¶¶ 21–23. Patent Owner does not dispute Petitioner’s contention. PO Resp. 13–14. We adopt Petitioner’s statement of the level of skill in the art and find that this level of skill is reflected in the prior art of record. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001).

2. Scope and Content of the Prior Art

a. Overview of Yamamoto

Yamamoto describes a public cordless telephone system. Ex. 1004, Abstract. Figure 1 of Yamamoto, reproduced below, illustrates an example:

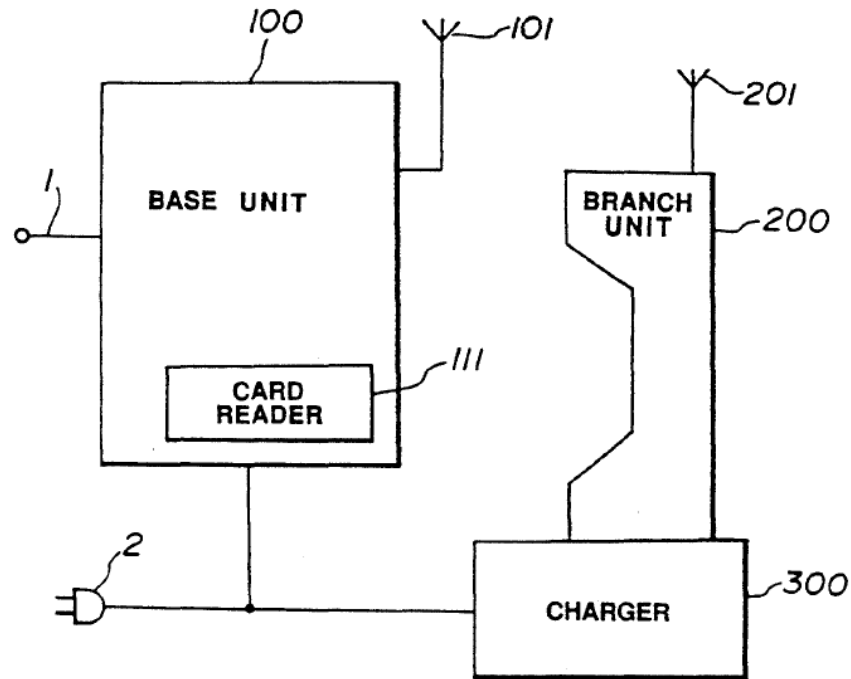


FIG.1

Figure 1 is a schematic diagram of a public cordless telephone system. *Id.* at 2:63–64.

Public telephone line 1 is connected to base unit 100, which includes card reader 111 and antenna 101. *Id.* at 4:18–21. Branch unit 200, with antenna 201, sits in charger 300, which is plugged into a commercial power supply. *Id.* at 4:22–25. A user inserts a payment card into card reader 111, picks up branch unit 200 from charger 300, and pushes a calling switch to establish a radio link between base unit 100 and branch unit 200, after which the user can place a telephone call. *Id.* at 4:26–37.

Base unit 100 receives a signal from branch unit 200, demodulates the received signal, and collates an identification signal (“ID code”) determined by a combination of base unit 100 and branch unit 200. *Id.* at 5:7–13.

Similarly, branch unit 200 receives a signal from base unit 100, demodulates that received signal, and collates the ID code. *Id.* at 5:37–39. According to Yamamoto,

Control signals to be so far transmitted and received between the base unit 100 and branch unit 200 are transmitted through the control channel. Each of the control signals is attached with an ID so that collation of this ID enables positive control of interconnection between the base unit 100 and branch unit 200.

Id. at 7:5–10. Yamamoto further describes that “signal transfer between the base unit 100 and branch unit 200 is carried out based on the frame format shown in FIG. 18.” *Id.* at 12:33–35. Figure 18 is reproduced below:

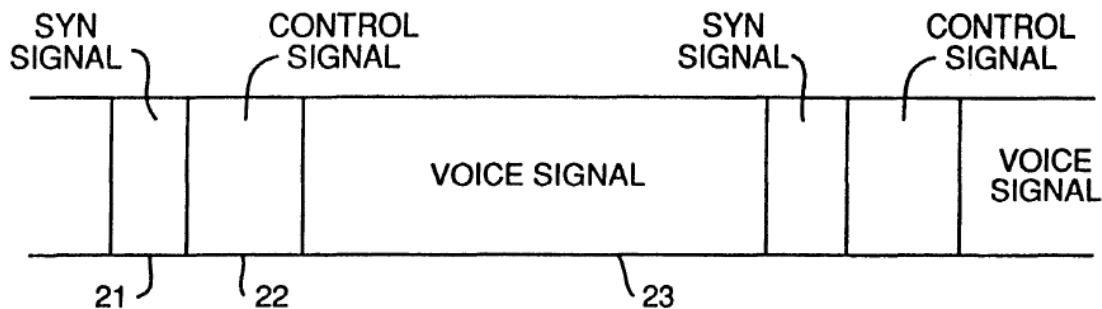


FIG. 18

Figure 18 is an example frame structure of a digital transmission frame format. *Id.* at 3:61–63. The frame structure shows synchronizing signal 21, control signal 22, and digitized voice signal 23 transmitted at periodic intervals. *Id.* at 12:35–37. “The control signal 22 contains various types of control signals for setting of a radio link, charging data, battery charging data, theft-proof data, etc.” *Id.* at 12:37–40.

Yamamoto also describes theft detection, or steal detection, circuitry. Figure 19 of Yamamoto is reproduced below:

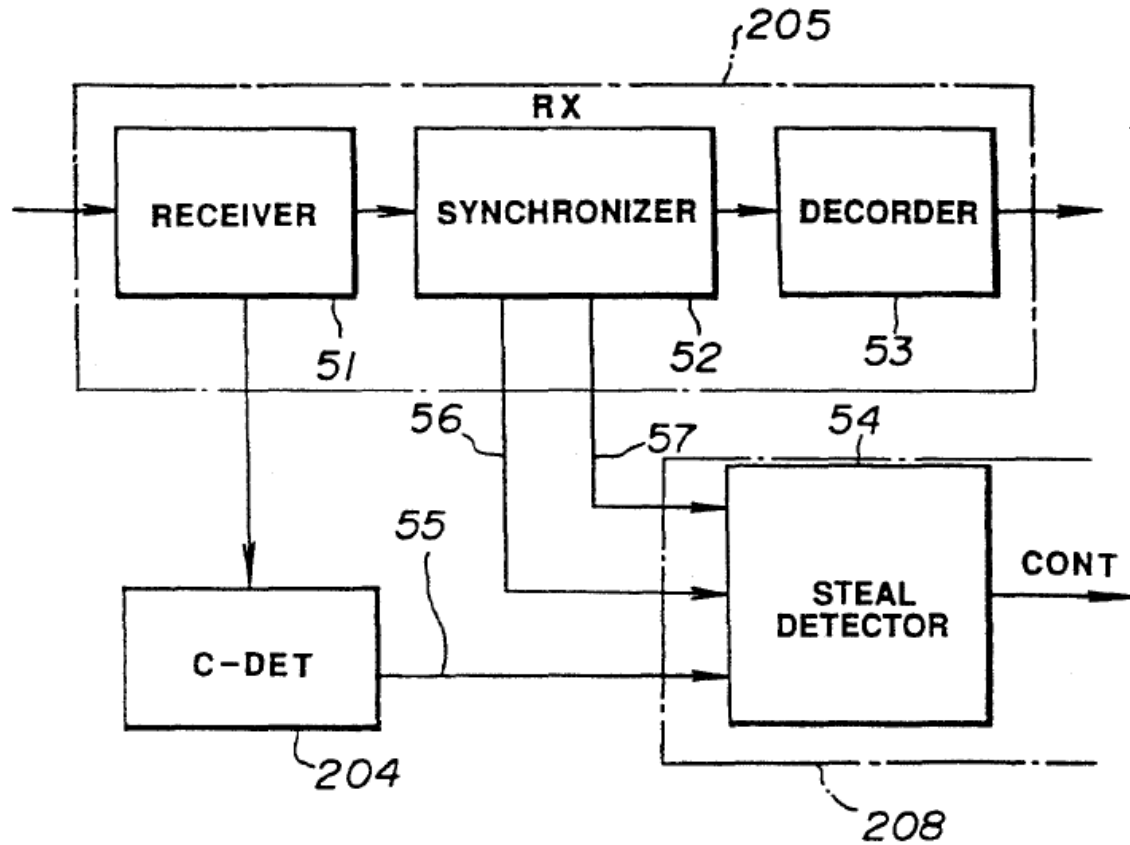


FIG.19

Figure 19 is a block diagram of a theft detecting structure of branch unit 200. *Id.* at 3:64–66. Theft detector 54 (labeled “steal detector” in Figure 19) receives signal 55, which is proportional to the intensity of the signal received from base unit 100, and receives signals 56 and 57, which are indicative of errors detected in the signal received from base unit 100. *Id.* at 12:50–62. Theft detector 54 generates a theft signal under certain circumstances. *Id.* at 12:63–64. Specifically, when branch unit 200 is moved far enough away from base unit 100, the received signal intensity becomes weak, the error rate becomes high, and theft detector 54 generates

the theft signal based on one or more of signals 55, 56, and 57. *Id.* at 12:50–64, 13:1–10. A controller of branch unit 200 receives the theft signal and drives a loudspeaker or lights to issue an alarm. *Id.* at 13:11–20. If this condition lasts long enough, the controller inhibits all transmission operations of branch unit 200, and continues to inhibit transmission even if the user returns to the predetermined service area. *Id.* at 13:24–30.

b. Overview of Mardirossian

Mardirossian describes a system for reducing the risk of cellular phone loss, misplacement, or theft. Ex. 1005, Abstract. Figure 2 of Mardirossian, reproduced below, illustrates an example:

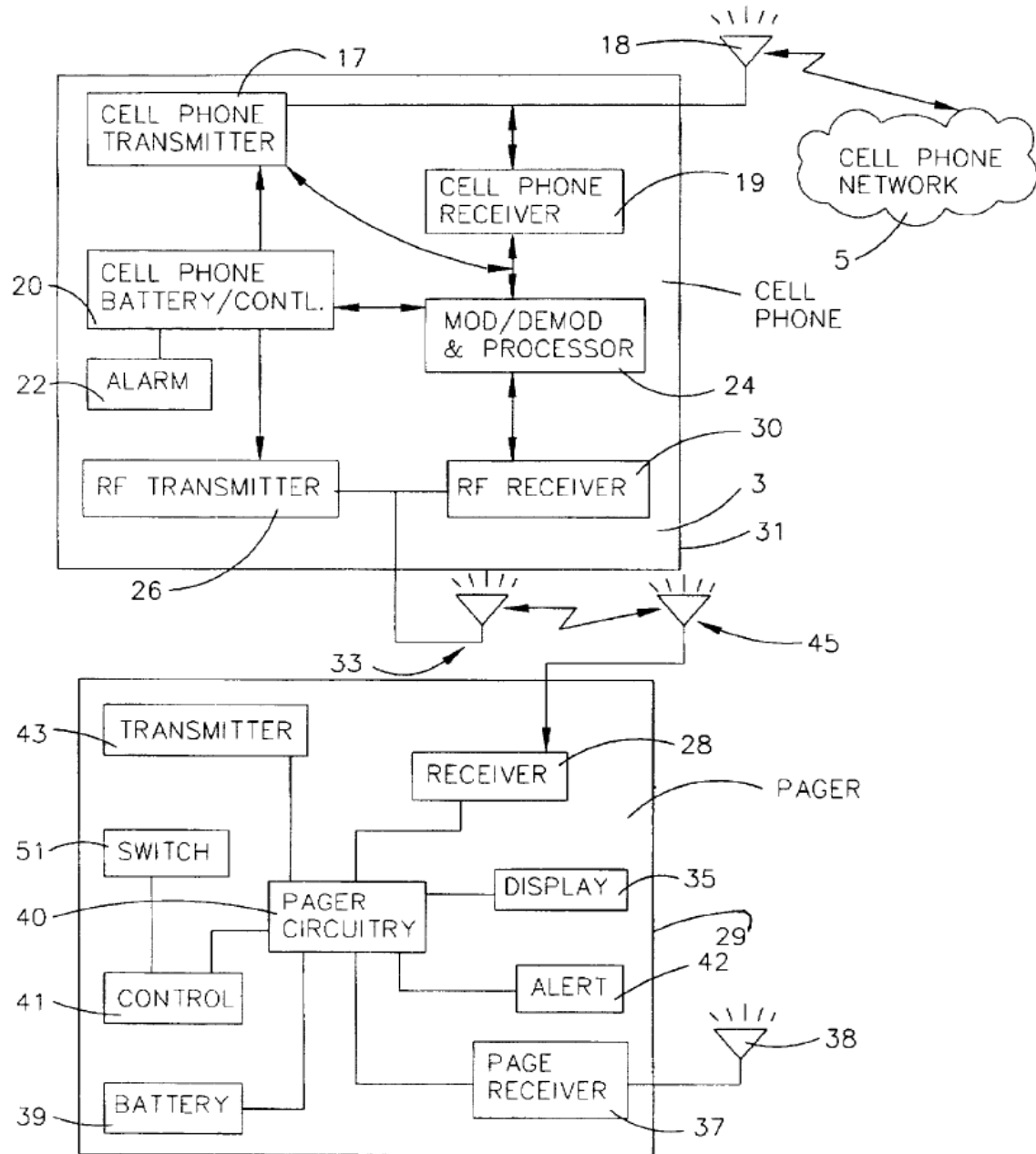


FIG. 2

Figure 2 is a schematic/block diagram of a security system for preventing the loss, misplacement, or theft of a cell phone. *Id.* at 2:60–62, 3:25–27. The security system includes cell phone 3 and pager 29, both of which

include additional security transmitter/receiver circuitry for communicating with each other without the need for cellular network 5. *Id.* at 3:20–24.

Pager 29 includes receiver 28 for receiving low power security signals from cell phone transmitter 26. Ex. 1005, 3:67–4:2. The pager’s controller 41 and pager circuitry 40 determine the strength of the low power signal and the point in time when the last such signal was received. *Id.* at 4:50–56.

When the pager’s controller 41 or pager circuitry 40 determines that the pager has not received a low power signal from cell phone 3, or that a received low power signal is so weak such that cell phone 3 must be beyond a predetermined threshold distance away from pager 29, the pager’s alert/alarm 42 is commanded to sound. *Id.* at 4:15–24, 4:56–63.

Additionally, the pager’s transmitter 43 sends a signal to cell phone 3 that causes the cell phone’s controller 20 to actuate phone alarm 22 (e.g., causing cell phone 3 to beep, vibrate, or make other audible or visual signals). *Id.* at 4:26–35.

c. Overview of Takeuchi

Takeuchi describes a keyless entry system for unlocking a door (e.g., a car door or house door). Ex. 1006, Abstract, 3:15–20. The system includes a transmitting circuit for transmitting a request signal that includes an identification code and a sequence of random numbers, such as M series signals, to a door lock controller. *Id.* at 3:19–36, 3:55–62.

d. Overview of Olah

Olah describes a portable security system based on maintaining wireless communication between two or more plastic cards (e.g., credit card sized) within a defined range. Ex. 1007, Abstract, 1:5–8. According to

Olah, it would be desirable to sound an alarm when a valuable object, such as a wallet, is taken from or inadvertently misplaced by its owner. *Id.* at 1:24–29. Olah describes intermittent communication of identification codes between the two cards and the activation of an alarm if such a code is not detected. *Id.* at 3:51–4:16. According to Olah, the identification code programmed into one card can be the same as the identification code programmed into the other. *Id.* at 4:56–59.

3. Differences Between the Claimed Subject Matter and the Prior Art, and Reasons to Modify or Combine

a. Claims 1–3 and 8

Petitioner contends that claims 1–3 and 8 would have been obvious over Yamamoto and Mardirossian. Pet. 5. As explained above, Yamamoto describes an alarm mechanism in its branch unit but not its base station. Yamamoto also does not expressly state that its control signals are transmitted at a constant level. Petitioner contends that a skilled artisan would have (1) incorporated Mardirossian’s teaching of alarm mechanisms in two devices (both in a phone and in a pager) to add an alarm mechanism to Yamamoto’s base station and (2) incorporated Mardirossian’s teaching of transmitting signals at a constant level to modify Yamamoto’s control signals. *Id.* at 19–21.

Regarding claim 1, Petitioner contends that Yamamoto’s base unit 100 is an “identification code transmission unit.” Pet. 25–27. Petitioner points to Yamamoto’s transmitter 104 as corresponding to a “first transmitter for transmitting an identification code signal,” and argues that the control signal with attached ID is “an identification code signal.” *Id.* at 29. Specifically, Yamamoto describes:

Control signals to be so far transmitted and received between the base unit 100 and branch unit 200 are transmitted through the control channel. Each of the control signals is attached with an ID so that collation of this ID enables positive control of interconnection between the base unit 100 and branch unit 200.

Ex. 1004, 7:5–10. On this evidence, we find that Yamamoto teaches an “identification code transmission unit” and a “first transmitter for transmitting an identification code signal.” Patent Owner contests whether Yamamoto’s control signals constitute identification code signals. We address this dispute below.

Petitioner cites to Mardirossian for a teaching of transmitting a signal from a phone to a pager at a constant level. Pet. 29–30. In particular, Mardirossian describes that “transmitter 26 may be caused by controller 20 to send an RF signal having a predetermined low strength to pager 29 every ten seconds.” Ex. 1005, 4:40–43.

Petitioner contends that a skilled artisan would have incorporated Mardirossian’s teaching of a predetermined low strength signal (from pager 29 to cell phone 3) with Yamamoto’s teaching of transmitting an identification code signal. Pet. 28–30 and n.3. According to Petitioner and Dr. Quackenbush, transmitting the identification code at a constant level would have simplified Yamamoto’s circuitry and resulted in lower design and manufacturing costs, while transmitting it at a varying level would have required additional and more complex circuitry. *Id.* at 28 n.3; Ex. 1003

¶¶ 62, 64. For example, Dr. Quackenbush testifies:

A [person of ordinary skill in the art] would have understood that transmitting a signal at a constant level would make it easier to determine the distance between the base unit and the branch unit by making it possible to simply compare the power level of the received signal with a predetermined threshold and hence

determine that the distance is less than (or greater than) a predetermined distance.

Ex. 1003 ¶ 64. We credit Dr. Quackenbush's testimony on this point and find that a skilled artisan would have had reason to implement Yamamoto's control signal as a constant signal, similar to that of Mardirossian's, in order to simplify the design and lower design and manufacturing costs.

Patent Owner, relying on its proposed construction of "identification code signal," argues that Yamamoto's control signals are not identification code signals because they are not sent regularly and periodically. PO Resp. 41. As explained above, Figure 18 represents the form in which signals, including control signals with ID codes, are transmitted between base unit 100 and branch unit 200. Figure 18 depicts these signals as periodic, with control signals, synchronization signals, and voice signals transmitted at recurring intervals in time slots of a frame. Thus, even were we to apply Patent Owner's construction, Yamamoto's control signals are transmitted periodically.

At the oral argument, Patent Owner disagreed that the control signals depicted in Figure 18 and the control signals described as exchanged during call setup (Ex. 1004, 7:5–10) are the same control signals. Tr. 27:8–19. This argument is unpersuasive. According to Yamamoto, the control signals of Figure 18 include signals "for setting of a radio link." Ex. 1004, 12:37–39. Yamamoto does not describe any other control signals. The straightforward reading of Yamamoto is that all described control signals are transmitted in frames that take the form of Figure 18.

Patent Owner argues that the identified signals are "call setup signals that are only transmitted sporadically (if at all) when a call is being initialized." PO Resp. 41–42. As Patent Owner argues (*id.* at 42),

Dr. Quackenbush admits that Yamamoto's control signals are transmitted, at most, during call setup, during a call, and possibly during call teardown.

Ex. 2004, 44:7–46:3. Thus, Yamamoto's control signals are not transmitted “regularly,” as Patent Owner understands the term. Nevertheless, as explained in Section II.A.1 above, a signal need not be transmitted all the time to constitute an identification code signal. Therefore, Patent Owner's argument is not persuasive.

As explained above, an “identification code signal” is “a signal that includes a predetermined code.” Yamamoto's control signals each include an “an identification signal determined by a combination of the base unit 100 and branch unit 200” that is “generally called ID code.” Ex. 1004, 5:10–13. We find that this is an identification code signal.

Claim 1 further recites “a first receiver for receiving a confirmation signal,” as part of the identification code transmission unit. Petitioner points to receiver 106 in Yamamoto's base unit 100. Pet. 30–31 (citing Ex. 1004, 7:5–8). As Petitioner notes (*id.* at 31), Yamamoto describes that:

One of the outputs of the receiver 106 is sent to the received-field detecting circuit 109 to judge the intensity of a received electric field. . . . Another output of the receiver 106 is sent, as a data signal containing a received demodulation signal, to the identification signal detecting circuit 110 for collating an identification signal determined by a combination of the base unit 100 and branch unit 200.

Ex. 1004, 5:3–12. On this evidence, we find that Yamamoto teaches a first receiver. According to Petitioner, the signals transmitted from Yamamoto's branch unit 200 to base unit 100 are “confirmation signals” because they carry an ID determined by a combination of both units and are transmitted in response to signals received from the base unit. Pet. 30 n.4.

Patent Owner, relying on its proposed construction of “confirmation signals,” argues that the identified signals are not confirmation signals because they are signals transmitted during call setup and are not “sent regularly and periodically.” PO Resp. 43–44. As explained in Section II.A.2 above, a “confirmation signal” is “a signal confirming receipt of the identification signal” and need not be transmitted “regularly and periodically,” as Patent Owner understands those terms. Thus, Patent Owner’s argument is not persuasive. Yamamoto’s control signals are transmitted back and forth between base unit 100 and branch unit 200 and are “attached with an ID so that collation of this ID enables positive control of interconnection between the base unit 100 and branch unit 200.” Ex. 1004, 7:5–10. We find that this teaches a signal confirming receipt of the control signal identified as the identification code signal. Accordingly, we find that Yamamoto teaches “a first receiver for receiving a confirmation signal,” as recited in claim 1.

Claim 1 further recites “an alarm mechanism being activated when the confirmation signal received by said first receiver is below a predetermined value,” as part of the identification code transmission unit. Petitioner argues that Yamamoto describes an alarm mechanism (“vocal theft announcement”) in its branch unit 200 that is activated when a signal received from base unit 100 is below a predetermined value. Pet. 32 (citing Ex. 1004, 13:1–8, 13:12–20). Specifically Yamamoto describes:

When the branch unit 200 is moved away from the base unit 100, this causes the received field intensity of the base unit 100 to become weak, which leads to the fact that an error rate in synchronous bit is increased and eventually an out-of-synchronism takes place. Accordingly, when such a

phenomenon is detected, the theft detector 54 generates the theft signal.

Ex. 1004, 13:1–8.

Petitioner also argues that Mardirossian describes an alarm mechanism 42 in its pager 29 that is activated when a signal received from a phone is below a “predetermined threshold.” Pet. 33–34 (citing Ex. 1005, 4:15–63).

Petitioner argues that Yamamoto already teaches receiver/signal strength measurement circuitry (in branch unit 200) and that Mardirossian suggests using such circuitry in a corresponding unit, such as Yamamoto’s base unit 100. *Id.* at 20–21. According to Petitioner, incorporating such circuitry in Yamamoto’s base unit, to sound an additional alarm, would have beneficially alerted a wider audience to the theft of the branch unit.

Id. (citing Ex. 1003 ¶ 70). Dr. Quackenbush testifies:

A [person of ordinary skill in the art] would have found it routine and straightforward to implement an alarm that is activated when the signal received is below a predetermined value, as taught in Mardirossian, in base unit 100 because base unit 100 already includes a receiver and signal strength measurement circuitry and would have known that such a combination (yielding the claimed limitation) would work and provide the expected functionality. Further, a [person of ordinary skill in the art] would have recognized the advantages of doing so because including an alarm in base unit 100 would alert a wider audience to the potential theft of branch unit 200 and thereby improve the anti-theft capabilities of Yamamoto’s system, as Yamamoto itself indicates is desirable.

Ex. 1003 ¶ 70. Dr. Quackenbush’s testimony on this point is credible and has rational underpinning. On this evidence, including the interrelated teachings of Yamamoto and Mardirossian, we find that a skilled artisan would have incorporated an alarm mechanism into Yamamoto’s base unit

100 that is activated when the received confirmation signal is below a predetermined value.

Claim 1 further recites “a use prohibition canceling unit,” for which, Petitioner points to Yamamoto’s branch unit 200. Pet. 34–35. The “use prohibition canceling unit” recited in claim 1 comprises “a second transmitter for transmitting the confirmation signal at a constant level.” Ex. 1001, 9:41–42. Petitioner identifies transmitter 207 in the branch unit as a “second transmitter” of the use prohibition canceling unit and argues that the control signals it transmits include a “confirmation signal.” Pet. 36–38. Similar to its arguments regarding the alleged identification signal, Petitioner argues that the alleged confirmation signal would have been transmitted at a constant level in light of Mardirossian’s teachings. *Id.* at 36 n.7, 38. Claim 1’s use prohibition canceling unit also includes “a second receiver for receiving the identification code signal.” Petitioner identifies receiver 205 in Yamamoto’s branch unit 200 as corresponding to the second receiver. *Id.* at 38–39.

We now discuss Yamamoto’s teachings of an identification code signal and a confirmation signal above, with respect to the circuitry in the base unit Petitioner identifies as transmitting and receiving them, respectively. Yamamoto describes that “[c]ontrol signals to be so far transmitted and received between the base unit 100 and branch unit 200 are transmitted through the control channel.” Ex. 1004, 7:5–7. Similarly, Yamamoto states that “signal transfer between the base unit 100 and branch unit 200 is carried out based on the frame format shown in FIG. 18.” *Id.* at 12:33–35. Thus, Yamamoto describes that the signals transmitted by base unit 100 are received by branch unit 200 and vice versa. We find that

Yamamoto's transmitter 207 of branch unit 200 transmits the confirmation signal received by receiver 106 of base unit 100. Likewise, we find that receiver 205 of branch unit 200 receives the identification code signal transmitted by transmitter 104 of base unit 100.

Claim 1 further recites:

said use prohibition canceling unit maintaining the electronic device in an operational state while the identification code signal received by said second receiver is at or above the predetermined value, and when the identification code signal is below the predetermined value, said use prohibition canceling unit at least partially disabling the electronic device.

Petitioner contends that theft detector 54, shown in Figure 19, maintains branch unit 200 in an operational state while the control signal received by receiver 205 is at or above a predetermined value. Pet. 40–41. Likewise, Petitioner argues, when the control signal is below the predetermined value, theft detector 54 disables subsequent calling operation of branch unit 200. *Id.* As explained above, Yamamoto describes theft detection circuitry that responds to signal 55, which is proportional to the received signal, dropping below a threshold. Ex. 1004, 12:50–64, 13:1–10. As a consequence, controller 208 drives a loudspeaker 211 to issue an audible warning and, if the condition exists for too long, controller 208 inhibits all transmitting operation of branch unit 200. *Id.* at 2:55–60, 13:11–30. On this evidence, we find that Yamamoto teaches “when the identification code signal is below the predetermined value, said use prohibition canceling unit at least partially disabling the electronic device,” as recited in claim 1.

Petitioner argues that Yamamoto's description that calling operation is inhibited when theft occurs carries the necessary (and inherent) implication, or at least the obvious suggestion, that the branch unit is operational prior to

detecting a theft. Pet. 40 n.9. As Dr. Quackenbush testifies, “maintaining the branch unit in an operational state while the intensity of the received signal is at or higher than a predetermined value would be beneficial for allowing the user to operate the device, as needed and desired, while the device is within the designated service area for Yamamoto’s branch unit.” Ex. 1003 ¶ 84. We agree that this is at least an obvious implication and find that Yamamoto teaches, or at least suggests, “said use prohibition canceling unit maintaining the electronic device in an operational state while the identification code signal received by said second receiver is at or above the predetermined value,” as recited in claim 1.

Patent Owner argues that Yamamoto “does not disclose that the control signals identified by Petitioner as corresponding to the claimed identification code signals are the same ones used by Yamamoto’s theft detecting means to alert one to the theft of Yamamoto’s branch unit” and that “Yamamoto does not link the signals used by its theft detecting means to the ones identified by Petitioner as corresponding to the identification code signals.” PO Resp. 30. According to Patent Owner, because the same identification code signal must be sent by the identification code transmission unit’s transmitter and used by the use prohibition canceling unit to enable or disable the electronic device, Petitioner has not shown that Yamamoto renders the claims obvious. *Id.* Patent Owner argues that “[t]he language ‘control signals to be so far transmitted’ refers to the specific control signals sent and received in column 6 [of Yamamoto], not control signals in general, as implied by Petitioner.” *Id.* at 32.

We disagree with Patent Owner. Yamamoto describes transmitting control signals between branch unit 200 and base unit 100. For example,

the branch unit 200 receives at the receiver 205 the channel designation signal from the base unit 100 through the antenna 201 and antenna duplexer 202 and informs the controller 208 of the reception of the channel designation signal. In response to this signal, the controller 208 controls the synthesizer 206 to set the transmission frequency of the transmitter 207 and the reception frequency of the receiver 205 at frequencies corresponding to the channel designation signal (step 505).

Control signals to be so far transmitted and received between the base unit 100 and branch unit 200 are transmitted through the control channel. Each of the control signals is attached with an ID so that collation of this ID enables positive control of interconnection between the base unit 100 and branch unit 200.

Ex. 1004, 6:63–7:10. The parties appear to agree that the control signals discussed here are exchanged at least during call setup (and possibly during a call and at call teardown). PO Resp. 32 (contending that the control signals are the “call enable signal,” “calling signal,” and “channel designation signal” described at Ex. 1004, 6:27–56), 36 (“The ‘control signals’ of column 6 are sent and received between the base and branch units during a call setup operation.”); Ex. 2004 (Quackenbush Dep.), 44:7–46:3. As noted above, Petitioner contends that the control signals here, attached with an ID, are identification code signals. Pet. 26–27.

Yamamoto also describes a theft-detector circuit responding to the strength of a signal received by receiver 205, wherein that signal includes control signals:

The receiver 205 of FIG. 19 includes a receiver 51, a synchronizer circuit 52 for synchronizing respective circuit parts based on the synchronizing signal 21 shown in FIG. 18, a decoder 53 for converting the digital voice signal 23 shown in FIG. 18 into an analog voice signal, and a theft-detector 54 having a timer incorporated therein. *The theft detector 54 receives, as its inputs, a signal 55 (which may be a direct output from the received-field detecting circuit 109 shown in FIG. 2)*

proportional to the intensity of the received electric field from the receiver 51, an out-of-synchronism detection signal 56 from the synchronizer 52 and a line error detection signal 57 from the synchronizer 52, and generates a theft signal when these signals continue for more than a predetermined time.

Ex. 1004, 12:50–64 (emphasis added). Here, receiver 205 is described as receiving the signal of Figure 18. As noted above, the signal of Figure 18 includes “control signal 22 [that] contains various types of control signals for setting of a radio link, charging data, battery charging data, theft-proof data, etc.” *Id.* at 12:33–40. We find that this is a clear reference to control signals used in call setup, i.e., the same control signals discussed in columns 6 and 7 of Yamamoto. Patent Owner does not point to any other control signals exchanged in Yamamoto or point to any description in Yamamoto that would cast doubt on such a finding. Based on a straightforward reading of Yamamoto, we find that the control signals identified as including ID codes (Ex. 1004, 6:63–7:10) are the same control signals that are carried by the signal of Figure 18 and evaluated by the theft-detector (*id.* at 12:50–64).

Patent Owner argues that “Yamamoto does not disclose that its ‘theft detecting means’ makes use of any kind of control signals.” PO Resp. 32. Rather, Patent Owner argues, the only signal Yamamoto describes as measured by the theft detector is “an amorphous ‘electromagnetic wave.’” *Id.* at 33. Patent Owner argues that “[t]here is no indication in Yamamoto that the ‘electromagnetic waves’ utilized by the ‘theft detecting means’ are the ‘control signals’ previously identified by Petitioner.” *Id.* at 34. We disagree. As explained above, theft detector 54 can be triggered by signal 55, which “may be a direct output from the received-field detecting circuit 109” and is “proportional to the intensity of the received electric field from the receiver 51.” Ex. 1004, 12:50–60. The signal received by receiver 51 is

shown in Figure 18 (*id.* at 12:54), which includes control signals (*id.* at 12:33–40), which include ID codes (*id.* at 7:5–10). Thus, theft detector 54 can be triggered by a measurement of the strength of the identification code signal.

Patent Owner contends that Yamamoto’s signal 55, which is received by the theft detector and proportional to the signal of Figure 18, is internal to the branch unit and, thus, “cannot correspond to the claimed identification code signal, which is required to be wirelessly transmitted between the two physical units recited in the Challenged Claims (i.e., an identification code transmission unit with a first transmitter for transmitting the identification code signal, and a use prohibition canceling unit with a second receiver for receiving the identification code signal).” PO Resp. 34–35. Patent Owner’s argument is not commensurate with the scope of claim 1, which recites “maintaining the electronic device in an operational state while the identification code signal received by said second receiver is at or above the predetermined value,” and does not preclude determining that the identification code signal is at or above the predetermined value by measuring an internal signal representative of the identification code signal.

Patent Owner also argues that it is “implausible” that the control signals of Yamamoto used during call setup, during a call, and at call teardown would be used by the theft detector because such signals would only be effective to detect theft during a phone call, permitting a thief to walk away with the branch unit when not on a call. PO Resp. 38. Patent Owner further argues that Yamamoto’s base unit and branch unit would not function properly under Petitioner’s theory when a call is not in progress

because it would emit an alarm signal and become disabled once the call is torn down and the control signals stop. *Id.* at 39–40.

Petitioner responds that Yamamoto’s theft detection function is used in conjunction with other features that serve to prevent theft when a call is not taking place. Reply 21. For example, after a call has ended, a timer starts, if the branch unit is not returned to the base unit within that time, the branch unit gives an audible prompt to return the branch unit, and, if the branch unit is not returned, the user’s payment card or change is withheld. Ex. 1004, 2:34–38, 12:7–28. In light of this additional description, we are not persuaded by Patent Owner’s argument as to the implausibility of using signals exchanged only during a call in Yamamoto’s theft-detection circuitry.

Patent Owner argues that Yamamoto’s use prohibition system does not maintain the device in an operational state “*while*” the ID code signal is at or above the predetermined value. PO Resp. 44–45. Rather, Patent Owner argues, after Yamamoto’s branch unit is disabled and the branch unit subsequently is brought back within the predetermined service area, the branch unit is not re-enabled. *Id.* at 45. According to Yamamoto,

When such a condition continues for more than a predetermined time, the controller 208 is operated to inhibit all the transmitting operation, which results in that, *even when the user later tries to use the branch unit 200 within the predetermined service area of the base unit 100, the branch unit 200 cannot perform its transmitting operation.*

Ex. 1004, 13:24–30 (emphasis added). Thus, we agree that Yamamoto describes keeping the branch unit disabled even after the branch unit is returned to the service area. Patent Owner argues that Yamamoto’s “contemplat[ion of] a persistent disabled state once the use prohibition unit

has disabled the branch unit” teaches away from “maintaining the electronic device in an operational state while the identification code signal received by said second receiver is at or above the predetermined value,” as recited in claim 1. PO Resp. 45.

Patent Owner contends that the challenged claims “require that the electronic device’s operational capabilities are maintained in such a situation.” *Id.* Patent Owner does not dispute that Yamamoto maintains the branch unit in an operational state while the ID code is above a predetermined value prior to the branch unit becoming disabled. Patent Owner argues that this is insufficient. According to Patent Owner, “[a]lthough the use prohibition system from Yamamoto permits the device to be operational *when* the device is in range, to operate only a portion of the time is fundamentally different than a claim limitation which requires the device to operate all of the time.” *Id.* at 46.

“Just as ‘an accused product that sometimes, but not always, embodies a claimed method nonetheless infringes,’ *Bell Communications Research, Inc. v. Vitalink Communications Corp.*, 55 F.3d 615, 622–623 (Fed. Cir. 1995), a prior art product that sometimes, but not always, embodies a claimed method nonetheless teaches that aspect of the invention.” *Hewlett-Packard Co. v. Mustek Sys., Inc.*, 340 F.3d 1314, 1326 (Fed. Cir. 2003)). For example, in *Power Integrations, Inc. v. Fairchild Semiconductor International, Inc.*, 843 F.3d 1315, 1336 (Fed. Cir. 2016), the Federal Circuit determined that it was sufficient to show that a reference anticipated in “the process of startup,” even if the reference did not show anticipation during “normal operation,” reasoning that “[n]othing in the claims requires that the current threshold increase during the power supply’s normal operation.”

In this case, as Petitioner points out (Reply 15–16), nothing in claim 1 recites and nothing in the '493 patent specification describes re-establishing an operational state after the electronic device is disabled and subsequently returns within range of the identification code transmission unit. Patent Owner does not present persuasive evidence that claim 1 includes such a requirement. It is undisputed that Yamamoto teaches maintaining the electronic device in an operational state while the identification code signal received by the second receiver is at or above a predetermined value, at least until the electronic device is disabled—meeting the relevant limitations of claim 1.

Patent Owner also makes several arguments challenging Petitioner's reasons to combine Yamamoto and Mardirossian. PO Resp. 46–49. First, Patent Owner points to an alleged “incongruity” between Yamamoto and Mardirossian, namely “Yamamoto relates to a public cordless telephone system, one which is meant to be used by an unknown number of public users,” while “Mardirossian relates to cellular phone systems, where there is likely only a single authorized user.” *Id.* at 46–47. This argument is unpersuasive, as Petitioner does not argue that Yamamoto's solution would have been bodily incorporated into Mardirossian's system, or vice versa. *See In re Mouttet*, 686 F.3d 1322, 1332 (Fed. Cir. 2012) (“It is well-established that a determination of obviousness based on teachings from multiple references does not require an actual, physical substitution of elements.”). Rather, Petitioner cites to Mardirossian as evidence that it was known to include alarm circuitry in a unit paired with a phone and also as an example of the transmission of a constant signal for use in determining the distance between two devices in a security system, teachings that would

have been equally applicable to the problems faced in Yamamoto. Pet. 19–21. *See also KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007) (“When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability. For the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.”).

Patent Owner further argues that the alleged incongruity is underscored by the disclosure of a reference (Ex. 1009, Sakakura) raised by Petitioner but on which we did not institute. PO Resp. 47. Sakakura described a prior art technique in which a “user’s telephone charge card is returned when, after completion of telephone calls, [a] portable telephone terminal has been returned to a specified location,” and noted that

this sort of conventional theft prevention method for portable telephone terminals relates to public cordless telephone systems used by an unspecified large number of users by means of a telephone charge card and is difficult to apply to portable telephone terminals used in cordless telephone systems or mobile communication systems generally used by individuals under contract.

Ex. 1009 ¶¶ 3–4. This argument is unpersuasive, as Yamamoto describes a technique substantially different from that noted in Sakakura’s background.

Patent Owner further argues that a skilled artisan would not have combined the references because “Yamamoto’s base unit does not alarm or otherwise prohibit use based on a threshold determination,” and in Mardirossian, “[t]his second alarm is activated not because a confirmation

signal is below a threshold value, but rather would be activated because the ‘return signal’ is above a threshold value — i.e. the return signal must be affirmatively detected.” PO Resp. 47–48. These arguments are not persuasive because they merely attack the references individually without considering their combined teachings. See *In re Keller*, 642 F.2d 413, 426 (CCPA 1981) (“[O]ne cannot show non-obviousness by attacking references individually where, as here, the rejections are based on combinations of references.”).

Patent Owner also argues that Mardirossian teaches away from incorporating a dual-threshold system. PO Resp. 48–49. According to Patent Owner, Mardirossian teaches that the transmitter logic is in one device and the receiver logic is in another, but not both. *Id.* “A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant.” *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994). Patent Owner does not show persuasively that Mardirossian’s teaching of a one-way threshold system would have discouraged or led in a direction divergent from a dual-threshold system.

Finally, Patent Owner contends that the combination of Yamamoto and Mardirossian, resulting in a dual-threshold system, would have changed the basic principles of operation of the underlying one-way threshold systems of the individual references. PO Resp. 48–49 (citing *In re Ratti*, 270 F.2d 810, 813 (CCPA 1959)). Patent Owner argues that Yamamoto and Mardirossian considered their one-way threshold detection systems to be sufficient and that Petitioner has not identified a reason to switch to a dual-

threshold system. *Id.* We disagree with Patent Owner. Petitioner introduces evidence that providing an alarm in both Yamamoto's base unit and branch unit would have provided the benefit of increasing the audience available to hear an alarm. Pet. 21. Patent Owner does not explain persuasively why adding such a feature would change the principles of operation of the systems described in Yamamoto and Mardirossian.

We have considered the testimony of Dr. Jones on these points and find it unpersuasive. In particular, Dr. Jones testifies that "[t]o include additional detection circuitry at the time may have had financial and resource costs. In 1997, electronics were more expensive than they are today, and each additional component included in a device can drain battery resources and cause [a]n increase in form factor." Ex. 2003 ¶ 87. Dr. Jones's testimony here is conclusory and speculative in that Dr. Jones does not evaluate the alleged cost impact on the particular combination proposed by Petitioner, and does not identify the bases for the opinions. *See* 37 C.F.R. § 42.65(a) ("Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.").

In sum, Petitioner's evidence shows that Yamamoto describes both circuitry that disables or maintains a device in an operational state and circuitry that activates an alarm mechanism, albeit both of these circuitry examples are in Yamamoto's branch unit. Nevertheless, Petitioner has introduced evidence that a skilled artisan would have incorporated into Yamamoto's system Mardirossian's teaching of alarm circuitry in a pager separate from a cell phone and Mardirossian's teaching of transmitting control signals at constant levels. Patent Owner's arguments to the contrary

are unpersuasive. On the complete record, we find that Yamamoto and Mardirossian teach each limitation of claim 1.

We note that Patent Owner contends that Petitioner does not analyze the *Graham* factors adequately, in particular, “the Petition fails to identify the differences between the invention recited in independent Challenged Claim 1 and Yamamoto,” PO Resp. 49–51. This argument is without merit. We explain in detail above Petitioner’s contentions as to the differences between Yamamoto and claim 1.

Claim 2 depends from claim 1 and adds “wherein the electronic device comprises a cellular phone.” Petitioner cites Mardirossian for a teaching that the electronic device could be a cellular phone. Pet. 42–43. Patent Owner does not present separate arguments as to this claim. On the complete record, we find that the combination of Yamamoto and Mardirossian teaches the additional limitation of claim 2.

Claim 3 depends from claim 2 and adds:

wherein said identification code transmission unit further comprises a first transmit-receive control timer for transmitting the identification code signal and receiving the confirmation code signal as intermittent signals and said use prohibition canceling unit further comprises a second transmit-receive control timer for transmitting the confirmation code signal and receiving the identification code signal as intermittent signals.

Claim 8 depends from claim 1 and adds the same limitation as claim 3. Petitioner argues that a skilled artisan “would have understood that each of Yamamoto’s base unit controller 107 and branch unit control circuit 208 necessarily, and thus inherently, uses a timer to intermittently transmit signals (e.g., between base unit 100-1 and branch unit 200-1) on a ‘(TDMA) basis.’” Pet. 43 n.11. Yamamoto states that “signals between the base unit 100-1 and branch units 200-1, 200-2 and 200-3 can be transmitted on a time

division multiple accessing (TDMA) basis.” Ex. 1004, 14:7–9. This is illustrated in Figure 21 of Yamamoto. Dr. Quackenbush testifies:

Because TDMA multiplexes signals by assigning them to specific time slots, both transmitters and receivers require a timer to determine when to initiate and stop transmitting or receiving. Without a timer, a transmitter or receiver would not be able to determine when its designated time slot has arrived, conflicting with TDMA’s fundamental principle of operation.

Ex. 1003 ¶ 90. We credit Dr. Quackenbush’s testimony, which is uncontroverted on this point.

Petitioner (Pet. 44 n.11, 46–47) also argues that Mardirossian inherently teaches this limitation through its description of transmitting a low power RF signal to pager 29 “intermittently on a continual basis,” for example “every ten seconds.” Ex. 1005, 4:36–38. Dr. Quackenbush testifies that “[w]ithout a timer, a transmitter or receiver would not be able to determine the appropriate interval (e.g., once ‘every ten seconds’) at which to transmit/receive the signals.” Ex. 1003 ¶ 93.

Patent Owner does not present separate arguments as to these claims. On the complete record, we find that Yamamoto and Mardirossian teach the additional limitation of claims 3 and 8.

b. Claims 4–6

Claim 4 depends from claim 2 and claim 5 depends from claim 1. Both claims 4 and 5 add, “wherein at least one of the identification code signal and the confirmation signal comprises a binarized pseudo-irregular signal and a particular code signal.” Claim 6 depends from claim 5 and adds limitations similar to those of claim 3 (which we address above).

Petitioner cites to Takeuchi for a description of a signal comprising a binarized pseudo-irregular signal (Takeuchi's "M series signal") and a particular code signal (Takeuchi's "I.D. code") in the context of security devices for electronics. Pet. 23, 47–48. Citing to Dr. Quackenbush's testimony, Petitioner argues that Takeuchi's teachings "would advantageously provide for identification codes that are more secure since adding a pseudo-irregular signal to an existing identification code makes the code more complex, and thus makes it more difficult for unauthorized users to gain access to the security system." *Id.* at 23 (citing Ex. 1003 ¶¶ 98–99).

Patent Owner does not present separate arguments as to these claims. On the complete record, we find that Yamamoto, Mardirossian, and Takeuchi teach the additional limitation of claims 4 and 5. Moreover, for the additional reasons given for claim 3, above, we also find that Yamamoto, Mardirossian, and Takeuchi teach each limitation of claim 6.

c. Claim 9

Claim 9 depends from claim 1 and adds, "wherein the identification code signal and the confirmation signal comprise the same signal."

Petitioner cites to Olah as teaching an identification code signal and a confirmation signal, each using the same identification code. Pet. 23–24, 49–50. For example, Olah states that "[i]f cards 10 and 11 have the same identification code, register 23 may be replaced by register 24 on card 10 and register 44 may be replaced by register 24' on card 11." Ex. 1007, 4:20–23. According to Petitioner, "[b]ecause Olah teaches transmitting the same identification code between cards 10 and 11, a [person of ordinary skill in the art] would have understood that the signals transmitted between the cards comprise the same signal (and also are the same signal)." Pet. 49 n.14.

(citing Ex. 1003 ¶ 103). Citing to Dr. Quackenbush's testimony, Petitioner argues that a skilled artisan would have combined Olah's teaching with Yamamoto and Mardirossian "to avoid having to keep track of different codes." *Id.* at 24 (citing Ex. 1003 ¶ 104).

Patent Owner does not present separate arguments as to this claim. On the complete record, we find that Yamamoto, Mardirossian, and Olah teach the additional limitation of claim 9.

d. Claim 10

Claim 10 depends from claim 1 and adds:

wherein said use prohibition canceling unit transmits a use prohibition canceling signal to the electronic device to maintain the electronic device in the operational state while the identification code signal received by said second receiver is at or above the predetermined value, and when the identification code signal is below the predetermined value, said use prohibition canceling unit stops transmitting the use prohibition canceling signal to the electronic device to at least partially disable the electronic device.

Petitioner does not contend that Yamamoto, by itself, discloses this limitation.

As explained above, with reference to Figure 19 of Yamamoto, Yamamoto describes theft detector circuitry 54 (part of controller 208) at the branch unit (the asserted use prohibition canceling unit) that receives signal 55 proportional to an identification code signal received by receiver 51, and, if that signal is too weak, generates a theft signal (output of theft detector 54). Ex. 1004, 12:45–13:10. When controller 208 receives the theft signal, it, for example, drives loudspeaker 211 (shown in Figure 2) and inhibits the transmission operation of the branch unit. *Id.* at 13:11–30. Here,

Yamamoto does not disclose that the use prohibition canceling unit transmits a use prohibition canceling signal that maintains the branch unit in an operational state. Rather, the branch unit remains operational during the absence of a theft signal.

Nevertheless, Petitioner argues that a skilled artisan would have modified Yamamoto's use prohibition canceling unit to transmit a use prohibition canceling signal to Yamamoto's branch unit. Pet. 50 n.15. We understand this to reflect Petitioner's ground that claim 10 would have been obvious over Yamamoto, Mardirossian, and the knowledge of a person of ordinary skill in the art. Petitioner notes that Yamamoto already describes a theft signal. *Id.* According to Petitioner, "[i]t would have been routine and obvious and a simple matter of design choice to implement Yamamoto's system to transmit a signal to keep the device in an operational state and to stop transmitting the signal to at least partially disable the device." *Id.* In other words, Petitioner argues that a skilled artisan would have replaced Yamamoto's theft signal with a signal that is asserted when the received identification code signal is strong and removed when it is weak, rather than the other way around, as Yamamoto teaches.

Petitioner relies on the testimony of Dr. Quackenbush, who testifies that this modification would have been a routine matter of design choice and that requiring an active signal to the branch unit, rather than a lack thereof, to maintain the branch unit in an operational state would have provided additional security. *Id.* (citing Ex. 1003 ¶ 107). We credit Dr. Quackenbush's testimony, which is uncontroverted as to this point.

Patent Owner does not present separate arguments for claim 10.

On the complete record, we find that Yamamoto and Mardirossian, in light of the knowledge of a person of ordinary skill in the art, teach the additional limitation of claim 10.

4. Conclusion of Obviousness

As explained above, the combination of Yamamoto and Mardirossian teaches or suggests each limitation of claims 1–3 and 8; the combination of Yamamoto, Mardirossian, and Takeuchi teaches or suggests each limitation of claims 4–6; the combination of Yamamoto, Mardirossian, and Olah teaches or suggests each limitation of claim 9; and the combination of Yamamoto and Mardirossian, in light of the knowledge of a person of ordinary skill in the art, teaches or suggests each limitation of claim 10. Petitioner has introduced persuasive evidence that a skilled artisan would have had reasons to combine the teachings of Yamamoto, Mardirossian, Takeuchi, and Olah. Patent Owner does not argue or introduce evidence of objective indicia of nonobviousness.

In sum, upon consideration of all the evidence, we conclude that Petitioner has proved by a preponderance of the evidence that claims 1–3 and 8 would have been obvious over the combination of Yamamoto and Mardirossian; claims 4–6 would have been obvious over the combination of Yamamoto, Mardirossian, and Takeuchi; claim 9 would have been obvious over the combination of Yamamoto, Mardirossian, and Olah; and claim 10 would have been obvious over the combination of Yamamoto and Mardirossian in light of the knowledge of a person of ordinary skill in the art.

III. CONCLUSION

Petitioner has proved by a preponderance of the evidence that claims 1–6 and 8–10 are unpatentable.

IV. ORDER

For the reasons given, it is:

ORDERED, based on a preponderance of the evidence, that claims 1–6 and 8–10 are unpatentable; and

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

IPR2016-01522
Patent 6,151,493

PETITIONER:

J. Steven Baughman
Gabrielle E. Higgins
Kathryn N. Hong
ROPES & GRAY LLP
steven.baughman@ropesgray.com
gabrielle.higgins@ropesgray.com
kathryn.hong@ropesgray.com

PATENT OWNER:

Brent N. Bumgardner
John Murphy
NELSON BUMGARDNER, P.C
bbumgardner@nbclaw.net
tom@nelbum.com muphy@nelbum.com