

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

NXP USA, INC.,
Petitioner,

v.

IMPINJ, INC.,
Patent Owner.

IPR2020-01063
Patent 8,390,431 B1

Before KEN B. BARRETT, ROBERT J. WEINSCHENK, and
KEVIN C. TROCK, *Administrative Patent Judges*.

BARRETT, *Administrative Patent Judge*.

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

I. INTRODUCTION

A. *Background and Summary*

NXP USA, Inc. (“Petitioner”)¹ filed a Petition requesting *inter partes* review of U.S. Patent No. 8,390,431 B1 (“the ’431 patent,” Ex. 1002). Paper 1 (“Pet.”). The Petition challenges the patentability of claims 1–9, 19, and 20 of the ’431 patent. We instituted an *inter partes* review of all challenged claims on all proposed grounds of unpatentability. Paper 6 (“Institution Decision”). Impinj, Inc. (“Patent Owner”)² filed a Response to the Petition. Paper 10 (“PO Resp.”). Petitioner filed a Reply (Paper 12, “Pet. Reply”) and Patent Owner filed a Sur-reply (Paper 16, “PO Sur-reply”).

An oral hearing was held on September 9, 2021, and a transcript of the hearing is included in the record. Paper 22 (“Tr.”).

This Final Written Decision is entered pursuant to 35 U.S.C. § 318(a). For the reasons discussed below, we determine that Petitioner has shown by a preponderance of the evidence that claims 1, 3–6, 8, 19, and 20 of the ’431 patent are unpatentable, but Petitioner has *not* shown by a preponderance of the evidence that claims 2, 7, and 9 of the ’431 patent are unpatentable.

B. *Related Proceedings*

One or both parties identify, as matters involving or related to the ’431 patent, *Impinj, Inc. v. NXP USA, Inc.*, No. 4:19-cv-03161 (N.D. Cal.), and several Patent Trial and Appeal Board cases. Pet. 80; Paper 5, 2–4.

¹ Petitioner identifies NXP USA, Inc., NXP Semiconductors N.V., NXP B.V., and Freescale Semiconductor Holdings V, Inc. as real parties-in-interest. Pet. 80.

² Patent Owner identifies itself as the real party-in-interest. Paper 5, 2.

C. The '431 Patent

According to the '431 patent, it “addresses the field of Radio Frequency IDentification (RFID) systems, and more specifically to causing such systems to yield their data more expeditiously.” Ex. 1002, 1:32–35. “RFID systems can be used in many ways for locating and identifying objects to which the tags are attached.” *Id.* at 1:41–43. In a RFID system, a RFID reader may transmit an interrogating RF wave, and a RFID tag in the vicinity may sense the RF wave and respond by transmitting back another RF wave. *Id.* at 1:48–56. “The tag generates the transmitted back RF wave either originally, or by reflecting back a portion of the interrogating RF wave in a process known as backscatter.” *Id.* at 1:56–59.

The reflected-back RF wave may encode data stored in the tag, such as a number. The response is demodulated and decoded by the reader, which thereby identifies, counts, or otherwise interacts with the associated item. The decoded data can denote a serial number, a price, a date, a time, a destination, an encrypted message, an electronic signature, other attribute(s), any combination of attributes, and so on. The data items are sometimes known as codes. Accordingly, when a reader receives tag data (codes) it can learn about the item that hosts the tag and/or about the tag itself. *Id.* at 1:61–2:3.

According to the '431 patent, “[a] well-known problem in RFID systems is speed in reading the tags, especially when the reader reads more than one code from each tag.” *Id.* at 2:19–21. “The problem is exacerbated if there are many tags, or the host items are moving and thus allow only limited time to read their tags.” *Id.* at 2:21–23.

The '431 patent states that “the present invention provides RFID tags and integrated circuits (ICs) for RFID tags that store a first code and a second code in memory,” with the tags being capable of backscattering a

combination of at least portions of the first code and the second code, without receiving any commands in the interim. *Id.* at 2:28–36. In some embodiments, separate reader commands do not have to be sent for reading the first and the second codes. *Id.* at 2:37–39. “Not sending separate commands can save time in inventorying the tags. Plus, it can enable reading of tag codes during tag manufacturing that are not otherwise readily available to read in the field.” *Id.* at 2:39–42.

The ’431 patent explains that, in prior art systems, the reader would have to issue two commands to read two codes. *See id.* at 10:28–63. Figure 7, depicting a prior art method of reading tag data, is reproduced below. *Id.* at 10:28–32.

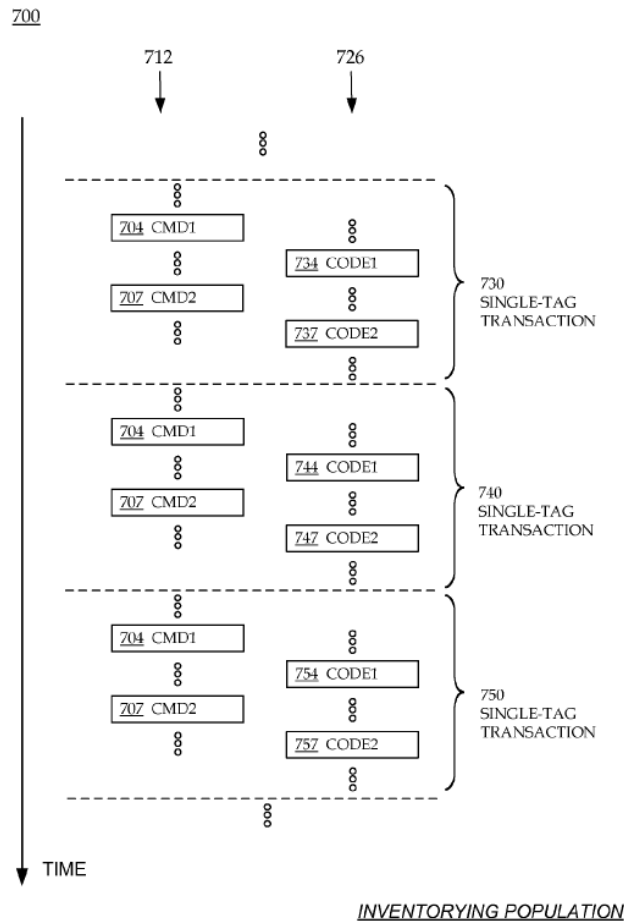


FIG. 7 (PRIOR ART)

Figure 7 “is a timing diagram showing conventional commands from an RFID reader and replies from a population of RFID tags for reading first and second codes of the tags.” *Id.* at 2:65–67. “In timing diagram 700, the reader singulates each tag successively, such that only one tag replies at a time, while the other tags are silent.” *Id.* at 10:37–39. “In first transaction 730 with one tag, a first command CMD1 704 elicits a first code CODE1 734 from the tag.” *Id.* at 10:52–54. “Then a second command CMD2 707 elicits a second code CODE2 737 from the tag.” *Id.* at 10:54–55. This cycle is repeated for other tags as shown in transactions 740 and 750. *Id.* at 10:55–64. According to the ’431 patent, each command and each reply takes time and there can be many transactions, and the time to read the tags may be limited, and “[t]he invention addresses this timeliness problem.” *Id.* at 11:14–17.

Figure 11 of the ’431 patent is reproduced below.

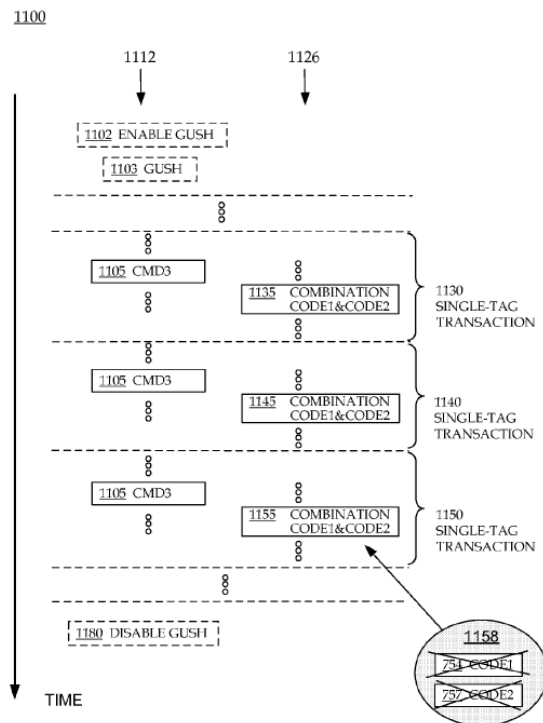


FIG. 11

INVENTORING POPULATION

Figure 11 “is a timing diagram showing commands from an RFID reader and replies from a population of RFID tags for reading combinations of the first and the second codes of the tags.” *Id.* at 3:7–9. In the timing diagram 1100 of Figure 11, “the reader singulates each tag successively, such that only one tag replies at a time, while the other tags are silent” and [w]hile each tag is thus singulated, the reader reads its data by having a transaction with the tag.” *Id.* at 13:34–38. Each transaction (1130, 1140, and 1150) includes a command (CMD3) which elicits a combination (1135, 1145, and 1155) of the first code and the second code stored in memory. *Id.* at 13:45–53. According to the ’431 patent, the transactions of Figure 11 can take less time than the respective transactions of Figure 7. *Id.* at 13:54–56.

The third command may be different from or identical to the first command. *Id.* at 13:63–65.

The Specification of the ’431 patent describes the codes stored in memory.

The first code and the second code can be any suitable codes. For example, the first code can be an Electronic Product Code (EPC) of the tag, associated with a host item to which the tag is attached. The second code can be a TID [Tag Identifier] code of the tag, which complies with the Gen2 Specification. Or, the second code can be any one or more of: a date of expiration of the tag’s host item, a date by which the host item is to be sold by, a date at which the host item was sold, a code for a sale of the host item, a receipt of the sale, an identifier for a retailer that made the sale, an identifier for a store through which the sale is made, an electronic signature, a cryptographic quantity, a random number, and so on. The second code could also alternately be an identifier for the tag, a password for the tag, an indicator for how a memory of the first tag is configured, and so on. Other codes can equivalently be used

for the first and the second codes. In addition, what is called first and second codes can be interchanged, and so on.

Id. at 10:64–11:13. “[O]ne or more error-checking codes can be generated for one or more individual codes and/or the combination, for the reader to check the correctness of the received back-scatter.” *Id.* at 14:47–50. The error-checking code may be a cyclic-redundancy check (CRC). *Id.* at 15:40–42.

The ’431 patent also explains that counterfeiters can clone tags lacking a hidden key or hidden secret simply by copying the tag memory contents. *Id.* at 18:38–40. However, “[c]ounterfeiters cannot easily clone tags built according to embodiments because the tags contain an unreadable TPRK [tag private key] and use challenge-response methods for authentication.” *Id.* at 18:14–15, 40–43. Figure 19 is reproduced below.

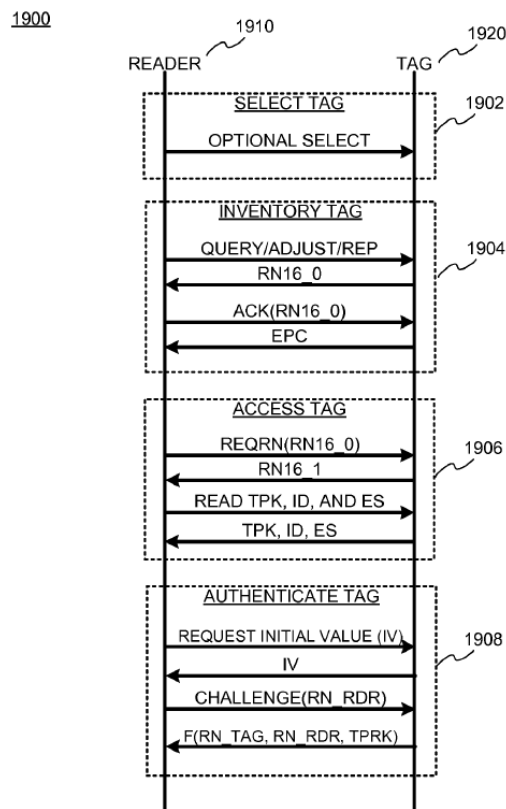


FIG. 19

Figure 19 illustrates command-response exchanges between a reader and a tag using the Gen2 Specification for their communications protocol. *Id.* at 18:63–67. “[A]ccess is followed by authentication 1908, where the reader authenticates the tag using a challenge-response dialog.” *Id.* at 19:23–25.

Figure 20 is reproduced below.

2000

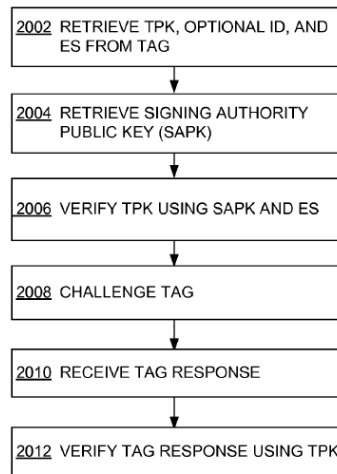


FIG. 20

Figure 20 depicts “a flowchart illustrating a process for a reader authenticating a tag.” *Id.* at 3:42–43.

At operation 2008 the reader challenges the tag. . . . At operation 2010 the reader receives a tag response to the challenge. In some embodiments the tag backscatters a combination of its tag response and one or more other codes. At operation 2012 the reader verifies the tag response using the TPK [a tag public key]. If the verification is successful then the tag is presumed genuine.

Id. at 18:15–16, 20:35–43.

D. Illustrative Claims

Of the challenged claims of the '431 patent, claims 1 and 19 are independent claims. The remaining challenged claims depend directly or indirectly from claim 1 or claim 19. Independent claims 1 and 19 are reproduced below.

1. An Integrated Circuit (IC) for use with a Radio Frequency Identification (RFID) tag having an antenna, comprising:
 - a memory storing a first code; and
 - a processing block coupled with the antenna and configured to:
 - cause the first code to be backscattered if a first command is received;
 - receive a challenge;
 - determine a response to the challenge;
 - receive a third command; and
 - in response to receiving the third command, cause to be backscattered a combination made from at least portions of the first code and the response, without receiving any commands while the combination is being backscattered.
19. A Radio Frequency Identification (RFID) integrated circuit (IC), comprising:
 - a memory storing a first code; and
 - a processing block configured to:
 - cause the first code to be backscattered if a first command is received;
 - receive a third command; and
 - in response to receiving the third command, cause to be backscattered a combination made from at least portions of the first code, portions of a second code, and at least one error-checking code associated with one of the first code, the second code, and the combination, without receiving any commands while the combination is being backscattered.

Ex. 1002, 24:30–45, 26:3–16.

E. Evidence

Petitioner relies on the following references:

Reference	Exhibit No.
US 2007/0069866 A1; filed Sept. 29, 2006; published March 29, 2007 (“Schuessler”)	1009
EPC™ RADIO-FREQUENCY IDENTITY PROTOCOLS CLASS-1 GENERATION-2 UHF RFID PROTOCOL FOR COMMUNICATIONS AT 860 MHZ–960 MHZ, Version 1.0.9, EPCglobal Inc., copyright 2004 (“Gen2”)	1010
KLAUS FINKENZELLER, RFID HANDBOOK: FUNDAMENTALS AND APPLICATIONS IN CONTACTLESS SMART CARDS AND IDENTIFICATION (John Wiley & Sons, Ltd., 2d ed. 2003) (“Finkenzeller”)	1013
US 2007/0194889 A1; filed Feb. 5, 2007; published Aug. 23, 2007 (“Bailey”)	1023

Petitioner also relies on the declarations of Jeffrey Fischer (Exs. 1003, 1030) in support of its arguments and Patent Owner relies on the declaration of Dr. Gregory Durgin (Ex. 2001) in support of its arguments. The parties rely on other exhibits as discussed below.

F. Asserted Grounds of Unpatentability

Petitioner asserts that the challenged claims are unpatentable on the following grounds:

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
19, 20	103(a)	Schuessler, Gen2
1–9	103(a)	Schuessler, Gen2, Bailey
19, 20	103(a)	Gen2, Finkenzeller

II. ANALYSIS

A. *Principles of Law*

Petitioner bears the burden of persuasion to prove unpatentability of the claims challenged in the Petition, and that burden never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). To prevail, Petitioner must establish by a preponderance of the evidence that the challenged claims are unpatentable. 35 U.S.C. § 316(e) (2018); 37 C.F.R. § 42.1(d) (2020).

A patent 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. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) any objective evidence of obviousness or non-obviousness.³ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

B. *The Level of Ordinary Skill in the Art*

In determining the level of ordinary skill in the art, various factors may be considered, including the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active

³ The parties have not directed our attention to any objective evidence of obviousness or non-obviousness.

workers in the field.” *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (internal quotation marks and citation omitted).

Petitioner’s expert, Jeffrey Fischer, opines that:

A person of ordinary skill in the art (“POSITA”) at the time of the alleged invention . . . would have had a bachelor’s degree in electrical engineering or computer engineering and at least two years of experience in the field of Radio Frequency Identification (RFID) systems, or an equivalent combination of education, work, and/or experience.

Ex. 1003 ¶¶ 78–79; *see* Pet. 13. Patent Owner does not propose a different definition. *See* PO Resp. 12 (“While Patent Owner does not necessarily agree with this definition, it will accept Petitioner’s definition for the purpose of this response.”). Patent Owner’s expert, Dr. Durgin, for purposes of his opinion testimony, adopts Mr. Fischer’s definition. Ex. 2001 ¶ 24.

We determine that the definition offered by Mr. Fischer comports with the technical level of the ’431 patent and the prior art of record. *Cf. Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (the prior art itself may reflect an appropriate level of skill in the art). We apply Mr. Fischer’s description of the person of ordinary skill in the art.

C. Claim Construction

We apply the same claim construction standard used in district court actions under 35 U.S.C. § 282(b), namely that articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). *See* 37 C.F.R. § 42.100(b) (2020).

In applying that standard, claim terms generally are given their ordinary and customary meaning as would have been understood by a person of ordinary skill in the art at the time of the invention and in the context of the entire patent disclosure. *Phillips*, 415 F.3d at 1312–13. “In determining

the meaning of the disputed claim limitation, we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence.” *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006) (citing *Phillips*, 415 F.3d at 1312–17).

Combination and Code

Independent claim 19, for example recites, “a processing block configured to . . . in response to receiving the third command, cause to be backscattered a combination made from at least portions of the first code, portions of a second code, and at least one error-checking code associated with one of the first code, the second code.” Ex. 1002, 26:6, 10–14; *see also id.* at 24:41–43 (Independent claim 1: “cause to be backscattered a combination made from at least portions of the first code and the response [to the challenge]”).

A key dispute in this case pertains to whether Petitioner’s identified data in the prior art references equates to the recited two codes or constitutes a single code, as Patent Owner argues. *See, e.g.*, PO Resp. 40 (“Schuessler’s normal mode describes backscattering a concatenated set of bits that are part of the same code . . . , but does not describe backscattering a combination that includes at least part of a *first code* and part of a *second code*.”).

Petitioner’s proposed construction of “code” is “a sequence of bits used to represent information.” Pet. Reply 2. Patent Owner’s proposed construction is that a “code” is “a discrete data item stored in memory, not any arbitrarily selected subset of data within a code.” PO Sur-reply 2. We do not find either party’s proposed construction helpful in resolving the disputed issues in this case.

In the context of its opposition to Petitioner’s challenges, Patent Owner’s claim construction position is that a “code,” within the meaning of the claimed invention, cannot consist of plural codes. For example, Patent Owner argues that Petitioner’s mapping of Schuessler’s serialized Global Trade Item Number (“sGTIN”) to the two codes is incorrect because, according to Patent Owner, the GTIN and the serial number together constitute a single “code.” *See, e.g.*, PO Resp. 53 (Patent Owner arguing that “the (full) sGTIN would be a single ‘code’ in the context of the challenged claims.”). We, for the reasons discussed below, conclude that a “code” can consist of more than one code.

The background section of the Specification of the ’431 patent explains that codes are data items stored in an RFID tag and that are encoded and decoded. *See* Ex. 1002, 1:61–2:3. Specifically, the Specification provides the following explanation.

The reflected-back RF wave may encode data stored in the tag, such as a number. The response is demodulated and decoded by the reader, which thereby identifies, counts, or otherwise interacts with the associated item. The decoded data can denote *a serial number*, a price, a date, a time, a destination, an encrypted message, an electronic signature, other attribute(s), any combination of attributes, and so on. *The data items are sometimes known as codes*. Accordingly, when a reader receives *tag data (codes)* it can learn about the item that hosts the tag and/or about the tag itself.

Id. (emphasis added).

The Specification also indicates that the drafter sought a broad definition of the term “code.” *See id.* at 10:64–11:13. The Specification states that “[t]he first code and the second code can be any suitable codes,” and follows that with a lengthy non-exclusive list of examples, including a random number. *Id.* Pertinent to Petitioner’s mapping of a serialized GTIN,

we note that the above-quoted provision indicates that a serial number can be a code. *Id.* at 1:65.

Importantly, the Specification states that “[t]he [backscattered] combination is a code that is made from at least a portion of the first code, a portion of the second code, and in some embodiments include even more codes.” *Id.* at 14:34–37. Thus, the Specification makes clear that something labeled a “code” can consist of a plurality of data items also each labeled as a “code.” Mr. Fischer testifies, consistent with this, that “a code may comprise codes,” and explains, as an example, “an EPC code may comprise a company prefix code, an object class code, and a serial number code.” Ex. 1030 ¶ 2018; *see* Pet. Reply 1 (citing the same).

Patent Owner further argues that portions of the Specification support its claim construction position by describing “the ’431 Patent’s inventive contribution,” which, according to Patent Owner, “was to provide the ability to backscatter a combination of *different* codes that would otherwise require . . . separate [read commands].” PO Sur-reply 3–4 (citing Ex. 1002, Fig. 11, 13:25–60). Patent Owner similarly argues that “the ’431 Patent makes clear that the claimed embodiments can retrieve any suitable codes as first and second codes . . . which are in completely separate memory banks and not subsections of the same code,” and contends that “[t]his is only possible for tags that are capable of retrieving different codes, rather than a single code encoding more than one piece of information.” *Id.* at 4 (citing Ex. 1002, 10:64–11:12⁴). Patent Owner’s arguments are unavailing. Patent

⁴ The cited portion of the Specification merely describes examples of data items that can be considered suitable codes. Ex. 1002, 10:64–11:12. It does

Owner does not explain how the desire to make an “inventive contribution” regarding a single command yielding a combination of different codes helps us resolve the disputed meaning of “code,” particularly where the parties’ dispute is not about a single command to backscatter but rather whether the backscattered combination is one code (as Patent Owner argues) or two codes (as Petitioner argues). To the extent that Patent Owner contends that the “inventive contribution” is related to storing codes in separate memory banks, any such contribution is not reflected in the claims, which do not recite “separate memory banks.” *See* Tr. 27:9–29:9 (Patent Owner’s counsel arguing that we should construe the claims as requiring codes in separate memory banks to reflect the purpose of the invention and on the way to construing the term “code” as Patent Owner now desires, but admitting that the claims do not recite separate memories).

Patent Owner, at the hearing, argued that the claim phrase “portions of,” as in the claim recitation “a combination made from at least portions of the first code,” would “basically drop out of the claim if any subset of the code was a separate code.” Tr. 46:2–19. As an initial matter, we do not understand Petitioner’s challenge to involve simply *any* subset of a code or, in terms of Patent Owner’s proposed construction, “any arbitrarily selected subset of data within a code.” PO Sur-reply 2. Petitioner, for example, relies on a serialized GTIN, and there does not seem to be a disagreement that a GTIN and the serial number are recognized, non-arbitrary, components of the serialized GTIN. Additionally, construing a “code” as capable of consisting of plural codes is not inconsistent with the claim

not support the remainder of Patent Owner’s propositions as to what the patent purportedly “makes clear.” *See* PO Sur-reply 4.

language and does not render as surplusage the phrase “portion of.” That phrase indicates that the drafter desired to broadly claim the combination as not limited to the entirety of the two or more codes. After indicating, as discussed above, that the combination is a code made from at least portions of multiple codes, the Specification explains that

the combination can include *the first code, in whole or in part*, scrambled or not scrambled. . . . Additionally, the combination can include *the second code, in whole or in part*, with its bits scrambled or not scrambled. If the combination includes *other codes*, they *may also be included in whole or in part*, with their bits scrambled or not scrambled.

Ex. 1002, 14:38–39 (emphasis added). For example, the Specification identifies that a serial number can be a code (*id.* at 1:65, 2:1); therefore, half of a serial number would be a “portion of” that code.

For the reasons discussed above, we determine that a code may be comprised of a plurality of codes, and that two or more codes, as recited in the challenged claims, may form a “combination,” which also is considered a code.

On this record decision, we determine that no other claim terms require express construction.

D. The Alleged Obviousness of Claims 19 and 20 over Schuessler and Gen2

Petitioner alleges that claims 19 and 20 of the ’431 patent would have been obvious over Schuessler and Gen2. *See* Pet. 29–47.

1. Schuessler (Ex. 1009)

Schuessler is titled “Truncation, Compression, and Encryption of RFID Tag Communications.” Ex. 1009, code (54). According to Schuessler, transmitting a tag reply containing the entirety of, for example, a serialized Global Trade Item Number (“sGTIN”), is inefficient because

much of the payload bits are the unneeded serial number. *Id.* ¶ 10. “Thus there exists a need to reduce the amount of bits transmitted by tags during RFID communications while still maintaining compatibility with RFID communications standards.” *Id.* ¶ 13. To address this perceived need, Schuessler discloses an RFID tag where a command, depending on the mode selected, causes the tag to reply with data stored in memory in a complete, truncated or encrypted form. *See id.*, code (57) (Abstract). The data includes a first and a second plurality of bits. *Id.*

In an aspect of the invention, an RFID tag is capable of storing data, receiving a signal from a reader, determining a response taking into account the tag mode and the data, and transmitting a response to the reader. The data includes a first plurality of bits and a second plurality of bits. The tag mode may be set by a current or a prior command by the reader. Depending on the tag mode, the response may be complete (i.e., an unaltered response), or the second plurality of bits may be altered, such as truncated, compressed, or encrypted.

Id. ¶ 15.

If tag 202 is in normal mode, response 211 will include both first plurality of bits 306 and second plurality of bits 308. If tag 202 is in trailing truncate mode, response 211 will include first plurality of bits 306 and none of the second plurality of bits. If tag 202 is in trailing compress or trailing encrypt mode, response 211 will include the first plurality of bits 306 and an altered (e.g. compressed or encrypted) second plurality of bits.

Id. ¶ 54. Schuessler describes an embodiment of an EPC Generation 2, or Gen 2, tag that, when in Trailing-Truncation Mode, truncates a trailing portion of its identification data, i.e. with the serialized portion truncated.

Id. ¶ 77.

Schuessler's Figure 3A is reproduced below.

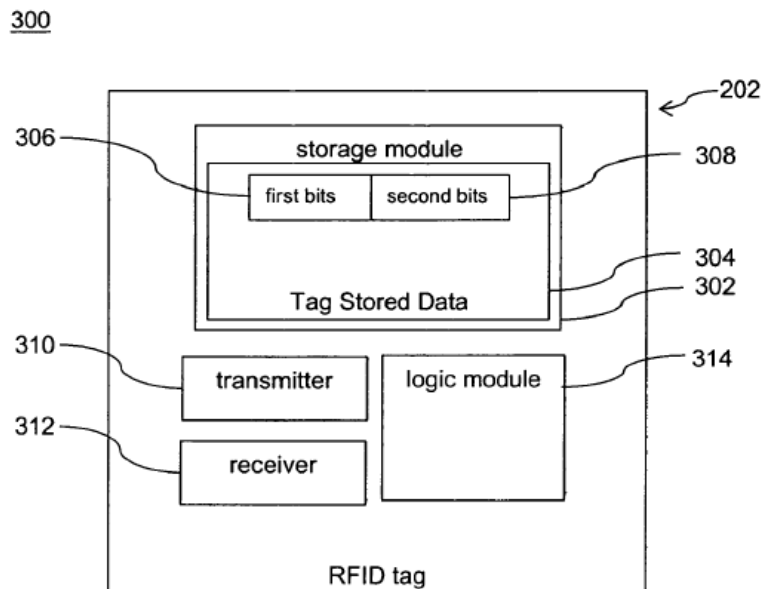


FIG. 3A

Figure 3A shows a block diagram of an RFID tag according to an embodiment of Schuessler. *Id.* ¶ 28. “Storage module 302 stores data 304, which includes a first plurality of bits 306 and a second plurality of bits 308.” *Id.* ¶ 52. “Logic module 314 determines a response 211 to a received signal 210 or 110.” *Id.*

2. Gen2 (Ex. 1010)

Gen2 is version 1.0.9 of the EPCglobal Generation-2 UHF RFID Protocol. Ex. 1010, 1. Gen2 “defines the physical and logical requirements for a passive-backscatter, Interrogator-talks-first (ITF), radio-frequency identification (RFID) system operating in the 860 MHz – 960 MHz frequency range.” *Id.* at 9 (“Introduction”). “The system comprises Interrogators, also known as Readers, and Tags, also known as Labels.” *Id.*

Gen2 discloses RFID tags having a memory logically separated into four banks. Ex. 1010, § 6.3.2.1. Figure 6.17 is reproduced below.

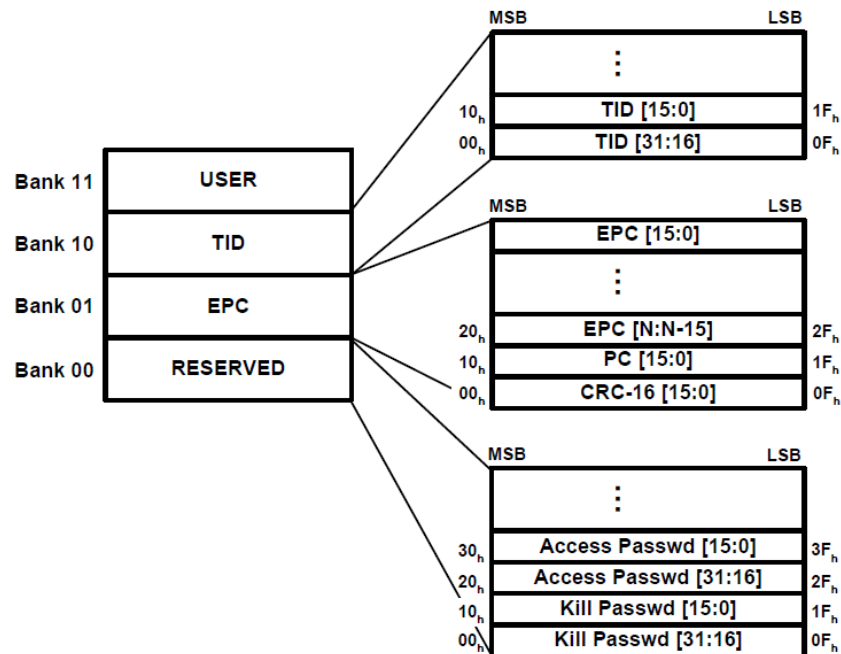


Figure 6.17 – Logical memory map

Figure 6.17 depicts a logical memory map. Ex. 1010, § 6.3.2.1. The memory banks are “Reserved memory,” “EPC memory,” “TID memory,” and “User memory.” *Id.* The EPC memory contains “a code (such as an EPC, and hereafter referred to as an EPC) that identifies the object to which the tag is or will be attached.” *Id.* The TID memory contains “sufficient identifying information . . . for an Interrogator to uniquely identify the custom commands and/or optional features that a Tag supports.” *Id.*

Figure E.1 is reproduced below.

E.1 Example inventory and access of a single Tag

Figure E.1 shows the steps by which an Interrogator inventories and accesses a single Tag.

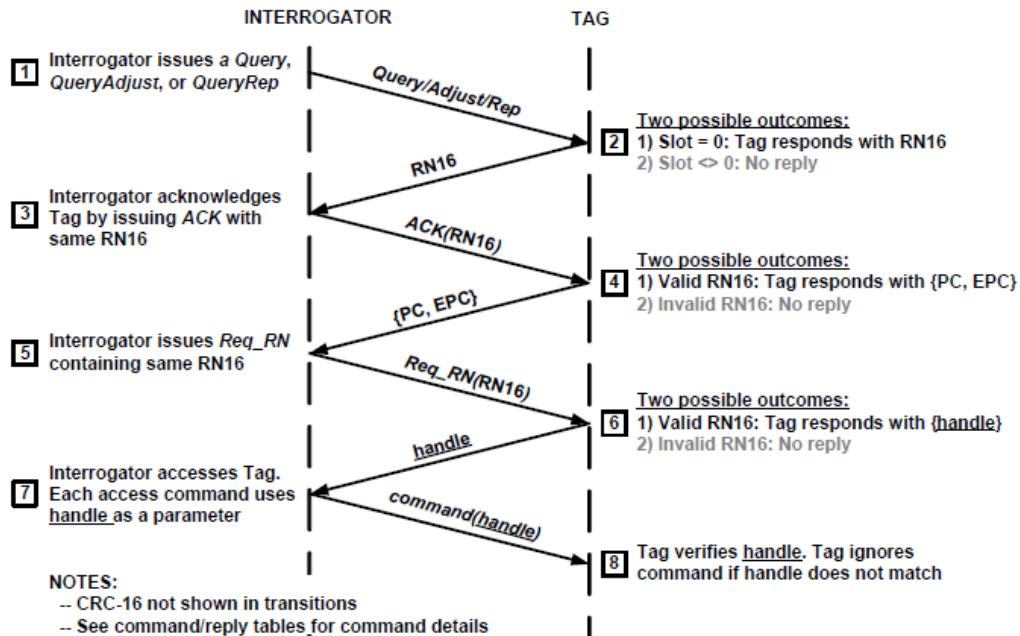


Figure E.1 – Example of Tag inventory and access

Id. at 85 (Annex E). Figure E.1 is an example and “shows the steps by which an Interrogator inventories and accesses a single Tag.” *Id.*

3. The Alleged Obviousness of Independent Claim 19 over Schuessler and Gen2

a. Summary of Petitioner’s Proposed Combination and the Alleged Failure to Comply with *Graham v. Deere*

Patent Owner argues that the Petition “fails to satisfy the required *Graham* factors analysis under 35 U.S.C. § 103(a).” PO Resp. 28 (referring to *Graham v. John Deere Co.*, 383 U.S. 1 (1966)); *see also* PO Sur-reply 14. Patent Owner also asserts that “Petitioner must show that 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 the subject matter

pertains.” PO Resp. 28 (citing *KSR Int’l Co. v. Teleflex, Inc.*, 550 U.S. 398, 406 (2007)).

We agree that the *Graham* factors must be considered in an obviousness analysis, but we do not agree that the law requires the rigid application of *Graham v Deere* for which Patent Owner impliedly advocates. We do consider all of the *Graham* factors in our analysis, which is what *Graham v. Deere* and *KSR* require. Further, Patent Owner’s contention, at its core, is that Petitioner’s arguments and evidence are not persuasive. See PO Resp. 29 (“In the instant case, Petitioner has failed to provide *persuasive* evidence or argument concerning what differences exist between Schuessler and the claimed invention, what modification of Schuessler Petitioner proposes, and why the proposed modification would have been obvious.” (emphasis added; Patent Owner’s italicizing omitted)).

We acknowledge that the Petition does, as Patent Owner notes (PO Resp. 29–30), assert that both Schuessler and Gen2 disclose or teach certain limitations. However, Petitioner’s articulated challenges explicitly or impliedly address the underlying factual matters identified in *Graham* adequately and clearly enough for an analysis of those challenges to be conducted and for Patent Owner to respond, as it has.

As mentioned above, Gen2 is an industry specification setting forth requirements for certain RFID systems. See Ex. 1010, 9 (“Introduction”); see also PO Resp. 16. Schuessler addresses an inefficiency problem due to Gen2 tags encoding the entirety of the sGTIN (serialized Global Trade Item Number), where the serial number frequently is not needed and thus represents unnecessary payload. See Ex. 1009 ¶ 10. Schuessler improves upon a Gen2 tag by adding modes in addition to the “normal” mode,

including a Trailing-Truncation Mode, which reduces the payload bits. *See id.* ¶¶ 77–78. This existing improvement as disclosed in Schuessler becomes the foundation of Petitioner’s proposed combination. For example,

Petitioner contends that

Schuessler disclosed an “alternate, optional version of the [Gen2] Select command” that was “identical to the existing Select command, except that it also puts tags into a new mode of operation.” *Id.*, [0086]. Accordingly, in “normal mode,” tags would reply to a Gen2 ACK command with the serialized EPC, and in “trailing truncate mode,” the tag would omit the serial number portion of the EPC from its reply. *Id.*, [0077], [0085].

Pet. 31; *id.* at 33–44 (relying on Schuessler for most aspects of claim 19); Tr. 18:5–10 (“[W]e’re starting with Gen2. We’ve got a standard protocol that existed in the industry, and then we’re bringing in Schuessler’s innovations to add to that. Schuessler’s innovations are making then the standard Gen2 protocol more efficient. That’s the heart of the combination.”); *id.* at 19:3–9 (“Schuessler is improving Gen2. Gen2 does not have this trailing truncate mode. It does not have this more efficient operation. And the disclosures in Gen2 [*sic*, Schuessler] then describe this improvement over Gen2. And so that’s the combination that we’re pointing out is an improved Gen2 compliant system operation.”).

Petitioner contends that the two components of a serialized GTIN (sGTIN) are the product identification code and a serial number, and maps those to the recited first code and second code, respectively. Pet. 32–33. Petitioner maps Schuessler’s trailing truncate mode to the limitation of claim 19 where the first code is backscattered upon receipt of the first command, and maps Schuessler’s normal mode to the limitation where a combination of codes is backscattered upon the receipt of the third

command. *See id.* For both modes, Petitioner maps the Gen2 Ack command to the recited command. *Id.*; *see also id.* at 41 (noting that the '431 patent explains that the third command may be identical to the first command; citing Ex. 1002, 13:63–65). To complete the recited backscattered “combination” (for the normal mode), Petitioner contends that Gen2 teaches an error-checking code in the form of a CRC-16 and teaches that a CRC-16 is backscattered along with an EPC such as Schuessler’s sGTIN. *Id.* at 41–42.

Petitioner contends that “because Schuessler explicitly discloses tag embodiments operating according to the Gen2 protocol, a POSITA would know that the teachings of the two references could be combined with a reasonable expectation of success.” Pet. 32 (citing Ex. 1003 ¶¶ 222–223).

We now turn to Petitioner’s specific arguments and evidence regarding the subject matter of independent claim 19.

b. A Radio Frequency Identification (RFID) integrated circuit (IC), comprising:

For the preamble, Petitioner contends that Schuessler’s “Figure 3A illustrates an RFID tag embodiment that ‘includes a storage module 302, a transmitter 310, a receiver 312, and a logic module 314.’” Pet. 33 (citing Ex. 1009 ¶ 52; Ex. 1003 ¶ 226). Petitioner also argues that, “an integrated circuit (IC) for use with the RFID tag disclosed by Schuessler, having an antenna⁵, would have been obvious in view of Gen2” and that a person of ordinary skill in the art “would have known that an integrated circuit (IC) coupled to an antenna was a typical embodiment for an RFID tag.” *Id.* at

⁵ Independent claim 19 does not recite an antenna, but independent claim 1 does, and Petitioner refers back to the contentions here when discussing claim 1. Pet. 50.

34–35 (emphasis omitted) (citing Ex. 1010, 8–9; Ex. 1003 ¶ 227). Patent Owner does not dispute that the combination of Schuessler and Gen2 teaches or suggests the preamble of claim 19.

c. a memory storing a first code

Claim 19 recites “a memory storing a first code.” Ex. 1002, 26:5. Although not recited in this “memory” limitation, a “second code” appears later in claim 19, in the “backscatter” limitation. *Id.* at 26:11–14 (“a combination made from at least portions of the first code, portions of a second code, and at least one error-checking code associated with one of the first code, the second code”).

Petitioner argues that Schuessler discloses storage module 302 that stores first plurality of bits 306 and second plurality of bits 308, and further argues that those two plurality of bits are the recited first code and second code, respectively. Pet. 35. Petitioner argues that, as an example, Schuessler teaches that “tags may store the tag ID (i.e., EPC) using an sGTIN identifier as the first and second plurality of bits.” *Id.* (citing Ex. 1009 ¶¶ 10, 96, 98. Petitioner further argues, relying on the testimony of Mr. Fischer, that “[a]n sGTIN identifier consists of two codes—a Global Trade Item Number (‘GTIN’) that identifies a product (*a first code*) concatenated with a serial number that uniquely identifies an individual instance of the product (*a second code*).” *Id.* (citing Ex. 1009 ¶ 119; Ex. 1012, §2.1.2.1; Ex. 1003 ¶ 228).

There is no dispute that it was known in the art to have a memory storing codes. Rather, the dispute is whether Petitioner has identified two codes. Patent Owner argues that the full sGTIN, being an EPC, is a single code, not two codes as Petitioner contends. *See id.* at 53. Patent Owner asserts that a person of ordinary skill in the art, “in the context of RFID

communications, would have considered the EPC in its entirety (i.e., *an EPC*) as a single code that conveyed multiple types of information.” *Id.* at 54; *see also id.* at 61–62 (Patent Owner arguing that dependent claim 20 supports its position that the sGTIN is a single code). Patent Owner asserts that Gen2 refers to “all or part of the EPC” but does not identify those parts as codes and, therefore, a person of ordinary skill in the art “would not have considered one ‘part’ of the EPC[] as a first code and another ‘part’ of the EPC as a second code, as Petitioner asserts.” *Id.* (citing Ex. 2001 ¶¶ 131–135).

Patent Owner’s arguments and evidence are unavailing. To the extent that Patent Owner’s arguments are premised on the assertion that a “code,” within the meaning the claimed invention, cannot consist of plural codes, we have rejected that position for the reasons discussed above. *Supra*, II(C).

The testimony of Patent Owner’s expert, Dr. Durgin, in this regard is not credible. For example, Dr. Durgin testifies that an sGTIN would be understood to be single code and not comprised of separate codes. Ex. 2001 ¶¶ 132–134. In support, Dr. Durgin relies on Version 1.3 of the EPCglobal Tag Data Standards Specification (Ex. 1012). *Id.* ¶ 133. However, that document explicitly refers to the GTIN portion as a code. Ex. 1012 § 2.1.2.1 (“The serial number is not part of the GTIN code, but is formally a part of the SGTIN.”); Ex. 1003 ¶ 228 (Petitioner’s expert testifying that Exhibit 2012 “describes the sGTIN as two independent codes.”). Also, that document refers to the serial number field as a code. Ex. 1012 § 2.1.1 (Finally, the *Serial Number* code, or serial number, is unique within each object class.”); *see also* Ex. 1002, 1:61–2:1 (the background section of the ’431 patent listing a serial number as a data item that can be code).

Petitioner's expert, Mr. Fischer, in contrast, credibly testifies, consistent with the other evidence, that an sGTIN identifier is comprised of two codes. Ex. 1003 ¶ 228.

We find that Schuessler's sGTIN is comprised of two codes—the GTIN code and the serial number code. Accordingly, Schuessler discloses this limitation reciting, “a memory storing a first code.”

d. a processing block configured to . . .

Petitioner argues that Schuessler's logic module 314 is the recited “processing block.” Pet. 37 (citing Ex. 1003 ¶ 231; Ex. 1009 ¶ 52, Fig. 3A). Petitioner further argues that, “[t]o the extent Schuessler fails to disclose this limitation, a *processing block* coupled with the antenna would have been obvious in view of Gen2's tag state machine operation, which would be implemented by, for example, a processor or state machine logic circuitry.” *Id.* (citing Ex. 1003 ¶ 232; Ex. 1010 § 6.3.2.4, Fig. 6.19). Petitioner also argues that “a *processing block* coupled with the antenna of an RFID tag would have been obvious, in view of the common knowledge of a [person of ordinary skill in the art].” *Id.* (citing Ex. 1003 ¶ 232). Patent Owner does not dispute that the combination of Schuessler and Gen2 teaches or suggests this limitation of claim 19.

e. cause the first code to be backscattered if a first command is received

Petitioner contends that Schuessler discloses that, when in trailing truncate mode, the tag response includes first plurality of bits 306, which Petitioner maps to the first code, but none of second plurality of bits 308, mapped to the second code. Pet. 39 (citing Ex. 1009 ¶¶ 50, 54, claim 2; Ex. 1003 ¶ 233). Petitioner further contends that Schuessler discloses the recited first command in its example of the use of an existing

communication command. *Id.* (citing Ex. 1009 ¶ 51; Ex. 1003 ¶ 234). Schuessler discloses that its trailing-truncate mode modification uses the Gen2 specification and operates in response to an ACK command. Ex. 1009 ¶ 97 (“For example, FIG. 7A shows a flowchart 700 illustrating an embodiment of tag 202 in TTM, using the Gen 2 data specification, assembling a response to a valid ‘ACK [RN16] command from reader 204.’”). Petitioner summarizes its position in arguing that “a Gen2 tag configured to operate in the trailing truncate mode would respond to a Gen2 Ack (*a first command*) that *is received from an RFID reader*, by causing just the GTIN portion of the EPC (*the first code*) to be backscattered.” *Id.* at 39–40 (citing Ex. 1009 ¶¶ 45, 97, Fig. 7; Ex. 1010 (Gen2) §§ 6.3.2.10.2.4, 6.3.2.10.3; Ex. 1003 ¶ 234).

We do not understand Patent Owner to dispute Petitioner’s position regarding this limitation other than disagreeing with the proposition that the GTIN alone (without the serial number) is a code. For the reasons discussed above, we find that Schuessler’s GTIN is the recited “first code.”

f. receive a third command

Petitioner’s contentions regarding the claim limitations pertaining to the “third command” and backscattering a combination pertain to Schuessler’s normal mode. *See* Pet. 41. Petitioner argues Gen2 teaches that a tag may receive and respond to multiple types of commands. *Id.* at 40 (citing Ex. 1010 § 6.3.2.10, Fig. 6.19; Ex. 1003 ¶ 235). One of those disclosed commands is the ACK command (Ex. 1010 § 6.3.2.10) and Gen2 teaches that a tag responds upon receipt of an ACK command (*see, e.g., id.* at 85 (Annex. E, Fig. E.1)). Petitioner points to Schuessler’s reference to modifications being made in the context of the Gen2 specification, and argues that Schuessler discloses that the signal may include a third

command. Pet. 40–41 (citing Ex. 1009 ¶¶ 36, 40, 51; Ex. 1003 ¶ 235); *see also, e.g.*, Ex. 1009 ¶ 36 (“[S]ome of the exemplary embodiments are described in the context of the EPC Generation 2 (Gen 2) specification.”). Petitioner, noting that “[t]he ’431 Patent explains that a third command may even be identical to the first command,” contends that, “it would have been obvious to a [person of ordinary skill in the art], in view of the Gen2 specification, for an RFID tag to be operable to receive an Ack first command while operating in Schuessler’s trailing truncate mode, and an Ack *third command* while operating in Schuessler’s normal mode.” *Id.* at 41 (citing Ex. 1002, 13:62–65; Ex. 1010 §§ 6.3.2.10.2.4, 6.3.2.10.3; Ex. 1003 ¶ 235).

Because, *inter alia*, Gen2 teaches that an Ack command is used to prompt a response from the tag (*see, e.g.*, Gen2, 85 (Annex. E, Fig. E.1), we are persuaded that Petitioner has demonstrated that the proposed combination of prior art teaches the recited claim limitation.

g. in response to receiving the third command, cause to be backscattered a combination made from at least portions of the first code, portions of a second code, and at least one error-checking code associated with one of the first code, the second code, and the combination, without receiving any commands while the combination is being backscattered.

As mentioned, Petitioner’s contentions regarding this limitation pertain to Schuessler’s normal mode. Petitioner argues that Schuessler discloses that a tag may be instructed to change to the normal mode—where the response includes first plurality of bits 306 (mapped to the first code) and second plurality of bits 308 (mapped to the second code)—via a variant of the Gen2 Select command. Pet. 41 (citing Ex. 1009 ¶¶ 50, 90; Ex. 1010 § 6.3.2.10, Fig. 6.19; Ex. 1003 ¶ 236).

Schuessler discloses that, “[i]f tag 202 is in normal mode, response 211 will include both first plurality of bits 306 and second plurality of bits 308.” Ex. 1009 ¶ 54; *see* Pet. 41 (quoting the same). Petitioner maps the recited first code and second code respectively to Schuessler’s first plurality of bits (the GTIN portion of the EPC) and second plurality of bits (the serial number). Pet. 41–42.

The claim limitation requires, in addition to the first and second codes, an error-checking code associated with one of the first code, the second code, and the combination. Ex. 1002, 26:11–15. Petitioner, relying in part on the testimony of Mr. Fischer, contends that Gen2 teaches an error-checking code, namely a CRC-16 “that is a cyclic-redundancy check a tag generates to protect a backscattered response.” Pet. 41 (citing Ex. 1010 § 6.3.2.1.3; Ex. 1003 ¶ 236). Petitioner also contends that “Gen2 specifies that a tag backscatters a CRC-16 along with its EPC during an inventory operation.” *Id.* (citing Ex. 1010 § 6.3.2.1.3).

Petitioner’s contentions are supported by Gen2. *See* Ex. 1010 § 6.3.2.1.3 (“A CRC-16 is a cyclic-redundancy check that an Interrogator uses when protecting certain R=>T commands, and a Tag uses when protecting certain backscattered T=>R sequences.”). Mr. Fischer credibly testifies that a CRC-16 is an error-checking code. *See* Ex. 1003 ¶¶ 236–237; *see also* Ex. 1002, 15:40–42 (the ’431 patent: “In some embodiments, the error-checking code 1538 may be a cyclic-redundancy check (CRC).”).

Gen2 teaches, “[t]o facilitate message verification, an Interrogator or a Tag may add the CRC-16 to the transmitted message and recalculate the CRC-16.” Ex. 1010 § 6.3.2.1.3. Based on this teaching, a person of

ordinary skill in the art would have found it obvious to add a CRC-16 to Schuessler's transmitted sGTIN.

Petitioner, relying on the testimony of Mr. Fischer, additionally argues that transmitting without receiving any commands while the combination is being backscattered would have been obvious in view of Gen2. *Id.* at 43–44 (citing Ex. 1003 ¶ 238). According to Petitioner, Gen2 discloses that an RFID tag processes one command at a time and backscatters responses when it is not receiving a command. *Id.* (citing Ex. 1010, Fig. 6.16; Ex. 1003 ¶ 238). Mr. Fischer credibly and persuasively testifies that “it is normal operation that until the total reply is received from the tag for the particular command that was sent to the tag, the reader doesn't send any further commands” and that “Figure 6.16 of Gen2 illustrates that a tag backscatters the EPC in response to an Ack command without receiving any commands while the response is being backscattered.” Ex. 1003 ¶ 238 (citing Ex. 1010, 9 (Introduction), Figs. E.1, 6.16). Because Schuessler discloses an improved implementation of a Gen2 tag, the teaching of Gen2 in this regard would provide a person of ordinary skill in the art with a reason to have Schuessler's RFID backscatter the combination without receiving any commands while doing so.

Patent Owner argues that the combination of Schuessler and Gen2 fails to teach or suggest the backscattering of two codes in response to a single command and further argues that the backscattering of two codes, as recited in the claim, would not have been considered the “normal” mode. PO Resp. 49–50, 55–58; *see also* PO Sur-reply 15–19. Patent Owner argues that Schuessler is directed to reducing transmitted payload bits but the claimed invention is directed to reducing the number of commands and,

therefore, they are directed to two different objectives. *See* PO Resp. 24–27. Patent Owner relatedly argues that Petitioner’s mapping of Schuessler’s normal mode to command-reducing mode of the claimed invention is flawed because Schuessler’s normal mode is described as a fallback position for non-enhanced readers, and would not be viewed as improvement directed to reducing the number of commands. *See id.* at 27.

Patent Owner’s arguments are unavailing. Patent Owner does not explain how the allegedly innovating objective is expressed as a claim limitation that is not disclosed by Schussler. Additionally, these arguments are unavailing as they are premised on Schuessler’s sGTIN being a single code and not two codes. *See* Resp. 49–55. We have addressed and rejected that position for the reasons set forth above.

Patent Owner asserts that the relied-on combination in Schuessler (including the sGTIN) is a concatenated field of bits stored in memory. *See* PO Resp. 56; PO Sur-reply 15–17. Patent Owner argues the following:

The plain language of the claim requires more than a combined signal which includes a first code and second code (or portions thereof and an error-checking code); the claim specifically requires that the combination *be made* from such first and second codes in response to the third command. That is, the tag responds to the third command by backscattering a combination made from two or more codes, not by simply reading a concatenated field of bits from memory.

PO Resp. 56; *see also* PO Sur-reply 15 (“Petitioner ignores the claim language . . . that requires the combination to be made in response to receiving the command.”). In other words, Patent Owner argues that Schuessler’s combination was made prior to the receipt of a third command and, therefore, fails to satisfy the claim language. Patent Owner’s argument is unavailing as it not commensurate with the scope of the claim. The

relied-on language of claim 19 recites, “in response to receiving the third command, cause to be backscattered a combination made from at least portions of the first code, portions of a second code, and at least one error-checking code.” Ex. 1002, 26:10–13. The only chronological aspect of this language is the requirement that the backscattering occur in response to receiving the command. The remaining part of the claim phrase identifies the thing backscattered—the combination made from the recited components—but does not specify when that combination was made. If the combination was, as Patent Owner argues, made at an earlier time, the claim language still would be satisfied where the pre-made combination is backscattered in response to the command.

Patent Owner argues that its interpretation of the “combination made” phrase is “clear” from “illustrative embodiment[s].” PO Resp. 56–58. Even if the described embodiments are consistent with Patent Owner’s theory, those are non-limiting examples that do not justify rewriting the claim to recite, for example, “in response to receiving the third command, cause ~~to be backscattered~~ a combination to be made from at least portions of the first code, portions of a second code, and at least one error-checking code and cause the combination to be backscattered.” Cf. IPR2020-01062, Paper 16, 3 (Patent Owner arguing that it is proposing to amend a similar limitation in a related patent by “include[ing] narrowing limitations related to concatenating the retrieved EPC and the code that is different from EPC to form a combination in response to receiving the first command in the Gush mode that is backscattered.”); *id.* at App’x A, 1–2 (Proposed substitute claim 26).

We are persuaded that Petitioner has demonstrated that the proposed combination of prior art teaches the recited claim limitation.

h. Conclusion as to Independent Claim 19

Based upon consideration of the entire record, we are persuaded by Petitioner's arguments and evidence and determine that Petitioner has demonstrated by a preponderance of the evidence that independent claim 19 is unpatentable under 35 U.S.C. § 103(a) as obvious over the combined teachings of Schuessler and Gen2.

4. The Alleged Obviousness of Dependent Claim 20 over Schuessler and Gen2

Dependent claim 20 recites "[t]he IC of claim 19, wherein the second code includes at least one of" followed by a list of items including, for example, "a date of expiration of a host item that the tag is attached to" and "a date by which the host item is to be sold by." Ex. 1002, 26:17–19. Petitioner, in articulating its case, underlines the listed, "an identifier for the tag." Pet. 44.

Mr. Fischer credibly explains that a Tag Identifier (TID) includes manufacturer and model number information. Ex. 1003 ¶ 241 (citing Ex. 1010 § 6.3.2.1; Ex. 1012 § 3.2); *see also* Ex. 1010 § 6.3.2.1 ("TID memory shall contain sufficient identifying information above 07h for an Interrogator to uniquely identify the custom commands and/or optional features that a Tag supports."). Petitioner maps a TID to the second code of claim 20. Pet. 46. Petitioner argues that, in its proposed combination of Schuessler and Gen2, it would have been obvious for the first code to be an Electronic Product Code (EPC) and the second code to be a TID. *Id.* at 45–47. Petitioner points to Schuessler's disclosure that it was known for an RFID tag to store an EPC. Pet. 45 (citing Ex. 1009 ¶ 8). Thus, argues

Petitioner, a person of ordinary skill in the art would have found it obvious to store an EPC as the first plurality of bits in Schuessler's memory. *Id.* at 46 (citing Ex. 1003 ¶ 240. Petitioner further argues, with the support of Mr. Fischer's testimony, that, "[w]here for example an EPC is stored as a first code, it would have been obvious to store another code disclosed by Gen2, such as a Tag identifier ('TID') (*a second code*) that includes manufacturer and model number information, as the second plurality of bits 308." *Id.* (citing Ex. 1003 ¶ 241; Ex. 1009 ¶ 52; Ex. 1010, §6.3.2.1). Petitioner reasons that this is because, as Gen2 teaches, the TID provides identification information that can be used by the reader. *Id.* (citing Ex. 1003 ¶ 241; Ex. 1012 §3.2)

Other than the arguments addressed above regarding Petitioner's combination for claim 19, Patent Owner does not dispute Petitioner's position that the combination of the references' teachings render obvious having an identifier for the tag in the form of a TID be the recited second code. Petitioner's arguments are supported by the cited evidence. Based on the evidence of record, we are persuaded that Petitioner has demonstrated that dependent claim 20 would have been obvious in light of Schuessler and Gen2. We need not reach Petitioner's argument that claim 20 recites non-functional descriptive material "[u]nder the printed matter doctrine." Pet. 44–45.

*E. The Alleged Obviousness of Claims 1–9
over Schuessler, Gen2, and Bailey*

Petitioner alleges that claims 1–9 of the '431 patent would have been obvious over Schuessler, Gen2, and Bailey. *See* Pet. 48–56 (addressing independent claim 1). For this ground, Petitioner builds upon its proposed

combination of Schussler and Gen2 with the addition of Bailey for teachings related to authentication. *See* Pet. 48.

1. Bailey (Ex. 1023)

Bailey “relates generally to radio frequency identification (RFID) tags or other types of RFID devices, and more particularly to techniques for authenticating such devices or otherwise providing security in RFID systems.” Ex. 1023 ¶ 3. According to Bailey, “[s]ome commercially available RFID tags can perform cryptographic challenge-response protocols” and “[s]uch tags offer resistance to cloning attacks involving skimming.” *Id.* at ¶ 12.

In an aspect of the invention, a first command is transmitted from the reader to write a first data unit to a memory of given one of the RFID devices. A reply is received in the reader from the given RFID device indicating that a second data unit determined based on contents of the first data unit is available in the memory to be accessed by the reader. A second command is transmitted from the reader to the given RFID device to allow the reader to read the memory to thereby obtain the second data unit. The first and second data units comprise information exchanged as part of a cryptographic protocol carried out between the reader and the given RFID device.

Id. at ¶ 20. “The cryptographic protocol carried out between the reader and the given RFID device may comprise a challenge-response authentication protocol.” *Id.* at ¶ 22. “In such an arrangement, the first and second data units may comprise respective challenge and response values of the challenge-response authentication protocol.” *Id.* The commands may be existing commands of the Gen-2 standard or may be new or custom commands compliant with that standard. *Id.* at ¶ 21.

2. *The Alleged Obviousness of Independent Claim 1 over Schuessler, Gen2, and Bailey*

Independent claim 1 is somewhat similar to independent claim 19, which is discussed above in the context of the first ground. Claim 1 differs at least in reciting that the processing block is configured to receive a challenge, determine a response to the challenge, and, in response to receiving a third command, backscatter a combination of portions of a first code and the response. *See* Ex. 1002, 24:30–45. For the preamble and the first command/first code limitations of claim 1, Petitioner relies on the combination of Schuessler and Gen2 and on its arguments and evidence set out for claim 19. *See* Pet. 50–51, 53. Petitioner turns to Bailey for the challenge-response limitations, relying on Bailey’s “simple challenge-response authentication protocol.” *See id.* at 51–56 (citing, *inter alia*, Ex. 1023 ¶¶ 53–56).

For the limitations reciting “receive a challenge” and “determine a response to the challenge,” Petitioner maps Bailey’s C_R to the recited “challenge” and R_T to the recited “response.” Pet. 51–52. Bailey discloses that “ C_R denotes the challenge from the reader” and “ R_T denotes the response from the tag.” Ex. 1023 ¶ 56.

For the limitation reciting “receive a third command,” Petitioner maps Bailey’s “ACKSecure” command to the “third command.” Pet. 53. Petitioner refers to its earlier explanation, made in the context of claim 19, as to why it would have been obvious to use a Gen2 Ack command, and notes that Bailey teaches that the ACKSecure command is a modification of the existing Gen2 ACK command. *Id.* (citing Ex. 1003 ¶ 258–259; Ex. 1023 ¶ 96); *see also* Ex. 1023 ¶ 96 (Bailey explaining: “The ACKSecure

command likewise simply appends the Response Data and Status Bytes fields to the existing ACK command.”).

For the “backscattered” limitation, Petitioner argues:

[I]n combination with Bailey, a Gen2 tag configured to operate in the normal mode disclosed by Schuessler would be capable of responding to the newly-defined AckSecure command (*third command*) that *is received from an RFID reader*, by causing the GTIN portion of the EPC (*at least portions of the first code*), the serial number portion (the second code), and R_T (*the response*) to be backscattered, without receiving any commands while the combination is being backscattered.

Id. at 54 (citing Ex. 1009 ¶ 97; Ex. 1003 ¶ 262).

Petitioner reasons that a person of ordinary skill in the art would have been motivated to include Bailey’s protocol in the Schuessler and Gen2 combination “to authenticate the validity of the RFID tags being implemented,” asserting that persons of ordinary skill in the art viewed mitigating the risk of tag cloning as an essential security goal. *Id.* at 48 (citing Ex. 1003 ¶ 245; Ex. 1023 ¶¶ 5, 7–8; Ex. 1024, 4). Petitioner argues that a person of ordinary skill in the art would have been motivated to use known challenge-response authentication protocols in the tags of the Schuessler-Gen2 combination in the same way as taught in Bailey. *Id.* at 50 (citing Ex. 1003 ¶ 249; Ex. 1024 ¶¶ 12–13, 16). Petitioner further argues that, “[b]ecause Bailey explicitly discloses tag embodiments operating according to the Gen2 protocol, a [person of ordinary skill in the art] would know the teachings of these references could be combined, along with Schuessler, with a reasonable expectation of success.” *Id.* (citing Ex. 1003 ¶ 249).

Patent Owner, in arguing that the Petition fails to comply with *Graham v. Deere*, asserts that “[t]he Petition . . . glosses over the

deficiencies of Schuessler and/or Gen2 with respect to the first three limitations of claim 1. PO Resp. 30 (citing Pet. 51). For those limitations, Petitioner refers back to its earlier arguments directed to the same or similar limitations recited in independent claim 19. Pet. 51. We do not find this to constitute a failure to comply with *Graham v. Deere*, particularly where much of the subject matter of those limitations is not in dispute. For example, Petitioner argues that the limitation of claim 1 reciting “a processing block coupled with the antenna” “would have been obvious over Schuessler in view of Gen2, as explained in section V.A.2(c) (claim [19-b]).” *Id.* Patent Owner does not contend that it was not known in the art that RFID tags contained processing blocks coupled to antennas, even though that was not explicitly disclosed in Schuessler. *Cf.* Ex. 1002, 2:4–6 (The background section of the ’431 patent stating that “[a]n RFID tag typically includes an antenna system, a radio section, a power management section, and frequently a logical section, a memory, or both.”).

Patent Owner argues that Petitioner’s case lacks adequate reasoning why a person of ordinary skill in the art would have combined Bailey with the Schuessler-Gen2 combination. PO Resp. 30–32; *see also* PO Sur-reply 5–7. Specifically, Patent Owner argues that “[m]ost of Petitioner’s reasoning for the combination (Petition at 48–50) is simply a recitation of the benefits of the encryption taught by Bailey, which was disclosed during prosecution of the ’431 Patent.” PO Resp. 31; *see id.* (Patent Owner stating that Bailey was listed among twelve references on an information disclosure statement filed).

Patent Owner’s arguments are unavailing. The applicant’s disclosure of Bailey to the examiner does not negate the applicability of its teachings in

this proceeding. We find the Petitioner’s recitation of the benefits of encryption to constitute an adequate and persuasive reason why a person of ordinary skill in the art would be motivated to combine Bailey with Schuessler and Gen2. Bailey identified a problem to be solved by its teachings—“EPC tags are vulnerable to counterfeiting or other types of cloning attacks.” Ex. 1023 ¶ 7. Mr. Fischer credibly and persuasively testifies regarding “the well-known problems associated with skimming and cloned tags” and that persons of ordinary skill in the art “viewed ‘[m]itigating the risk of tag cloning [as] an essential security goal in an RFID system.’” Ex. 1003 ¶¶ 246–249 (quoting Ex. 1024, 4). In contrast, Dr. Durgin applies an inappropriately rigid and narrow analysis, unpersuasively opining, for example, that there is nothing about Schuessler’s payload-length problem “that would lead a person of ordinary skill in the art to look to Bailey to fix deficiencies in Schuessler.” Ex. 2001 ¶ 106.

Patent Owner also argues that Schuessler teaches away from the proposed combination because Schuessler’s purpose is to reduce payload whereas Petitioner’s proposal would increase the payload length. PO Resp. 34–36; *see also* PO Sur-reply 7–8. According to Patent Owner, “Petitioner’s proposed combination of Schuessler and Bailey would completely contradict the main objective of Schuessler by increasing bit traffic between the tag and the reader.” PO Resp. 35.

Patent Owner’s arguments are unavailing. Patent Owner acknowledges that “Schuessler teaches the option to not reduce that payload in some circumstances, which is why it has the ‘normal’ mode that the Petition relies on.” PO Resp. 35. Petitioner’s subject modification is of the normal mode (Pet. 53–54) and, thus, increasing payload length would not

frustrate Schuessler's purpose of reducing payload via, for example, the trailing truncate mode. Also, Schuessler's purpose of reducing payload is to avoid the wasteful transmission of unnecessary data. *See* Ex. 1009 ¶ 10 (explaining that it is inefficient for the payload to contain the serial number, which frequently is discarded because it is not needed). Patent Owner does not offer persuasive argument or evidence that a person of ordinary skill in the art would regard anti-cloning measures as unnecessary payload.

Based upon consideration of the entire record, we are persuaded by Petitioner's arguments and evidence and determine that Petitioner has demonstrated by a preponderance of the evidence that independent claim 1 is unpatentable under 35 U.S.C. § 103(a) as obvious over the combined teachings of Schuessler, Gen2, and Bailey.

3. Dependent Claim 2

Dependent claim 2 recites: "The IC of claim 1, wherein the third command includes the challenge." Ex. 1002, 24:46–47.

Petitioner contends that "[i]t would have been obvious to include Bailey's challenge C_R in that newly-defined ACKSecure command (*the third command*)." Pet. 57 (citing Ex. 1003 ¶ 265). Petitioner reasons that a person of ordinary skill in the art "would have recognized that including the challenge in Bailey's ACKSecure command would permit a unique challenge to be sent to each tag for certain applications (such as applications where 'entity authentication' is not desirable), rather than sending a common challenge to the entire tag population (such as by using Bailey's QuerySecure command)." *Id.* (citing Ex. 1003 ¶ 265).

Patent Owner argues that Petitioner's reasoning premised on sending a unique challenge to each tag is flawed in that it is contradictory to Bailey's teachings. PO Resp. 36–39. Patent Owner notes that Bailey teaches the use

of non-unique challenges. *Id.* (citing Ex. 1023 ¶ 96). Bailey states that “[p]erforming entity authentication of a group of tags can be greatly optimized by delivering C_R to all tags and allowing them to respond individually. Toward this end, QuerySecure and ACKSecure commands may be defined that perform these functions using the techniques described above.” Ex. 1023 ¶ 96.

Petitioner replies by arguing that Bailey’s referenced teaching is merely exemplary and that Bailey teaches that its authentication protocol may be implemented in different ways. *See* Pet. Reply 15–17.

Patent Owner’s arguments are persuasive. Even if, as Petitioner argues, Bailey does not explicitly preclude the proposed combination, Petitioner has not adequately explained why a person of ordinary skill in the art would find it obvious to do the opposite of that taught by Bailey. Specifically, Bailey teaches that using a “non-unique challenge” greatly optimizes entity authentication, and Petitioner does not provide a specific reason why a person of ordinary skill in the art would have found it obvious to instead use a unique challenge. *See* Pet. 57; Ex. 1003 ¶ 265; Ex. 1023 ¶ 96.

Petitioner has not demonstrated that dependent claim 2 is unpatentable.

4. Dependent Claim 3

Dependent claim 3 recites: “The IC of claim 1, wherein the third command is a singulation command.” Ex. 1002, 24:48–49.

Petitioner, relying on the testimony of Mr. Fischer, points to Bailey’s teachings regarding sending the same challenge to all the tags and allowing them to respond individually. Pet. 57–58 (citing Ex. 1023 ¶ 96; Ex. 1003, ¶ 266). Mr. Fischer testifies that “[t]he ACKSecure command is a

singulation command because, like the ACK command, it causes only one tag to reply at a time.” Ex. 1003 ¶ 266.

Patent Owner does not dispute Petitioner’s position. Petitioner’s arguments are supported by the cited evidence. Based on the evidence of record, we are persuaded that Petitioner has demonstrated that dependent claim 3 is unpatentable over Schuessler, Gen2, and Bailey.

5. Dependent Claim 4

Dependent claim 4 recites: “The IC of claim 1, wherein the first code is an Electronic Product Code (EPC) of the tag for a host item to which the tag is attached.” Ex. 1002, 24:50–52.

Petitioner argues that this claim recites non-functional descriptive material (“under the printed matter doctrine”) that should be given no weight. Pet. 58. Petitioner also argues that it would have been obvious to have the first code be an EPC. *Id.* at 58–59 (citing Ex. 1003 ¶ 269). In support, Petitioner points to Schuessler’s and Gen2’s disclosures of RFID tags storing EPCs. *Id.* at 59 (citing Ex. 1009 ¶ 8; Ex. 1010 § 6.3.2.1.5).

Patent Owner disputes Petitioner’s argument that claim 4 recites non-functional descriptive material but does not dispute Petitioner’s argument that it would have been obvious for the first code to be an EPC. *See* PO Resp. 63–64 (arguing, in part, that an EPC is functional because “the provision of an EPC in the memory of an RFID tag, as claimed, is critical for RFID system operations.”).

Based on the evidence of record, we are persuaded that Petitioner has demonstrated that dependent claim 4 would have been obvious in light of Schuessler, Gen2, and Bailey. We need not reach the issue of whether claim 4 recites non-functional descriptive material.

6. *Dependent Claim 5*

Dependent claim 5 recites: “The IC of claim 1, wherein the combination further includes at least portions of a second code, and the processing block is configured to backscatter the second code responsive to receiving a second command.” Ex. 1002, 24:53–56.

For the “second code” aspects, Petitioner relies on its earlier arguments, made in the context of claim 19, that the recited second code is the serial number of an sGTIN. Pet. 60; *see id.* at 41–42 (the referenced section V.A.2(f) (claim [19-b(iii)])). Petitioner (*id.* at 60) points to Schuessler’s teaching that “the EPC Gen 2 spec provides an explicit reader command to the tags to truncate their replies by leaving off the known leading portion of their identifier, thus reducing transmission times.” Ex. 1009 ¶ 12. Petitioner, relying on the testimony of Mr. Fischer, contends that Schuessler was referring to the Gen2 Select command that causes the tag to truncate the leading portion, and, based on the teachings of Schuessler and Gen2 in this regard, would have found it obvious to configure the tag to truncate the leading portion (the GTIN) leaving the serial number (mapped to the second code) in response to an Ack command as specified by the Gen2 Select command. Pet. 60–61 (citing Ex. 1010 §§ 6.3.2.10.1.1, 6.3.2.10.2.1, Fig. 6.18; Ex. 1003 ¶¶ 272–273).

Patent Owner repeats its unavailing arguments, made earlier in the context of claim 19 and addressed above, that the sGTIN is only a single code, not two, and that the recited combination of the two codes must be made after a command is received. PO Resp. 39–41; *see also* Ex. 2001 ¶ 116 (Dr. Durgin, for claim 5: “the combination of these references does not teach this [second code] element for the reasons that I discuss below in regard to Claim 19.”).

Based on the evidence of record, we are persuaded that Petitioner has demonstrated that dependent claim 5 is unpatentable over Schuessler, Gen2, and Bailey.

7. Dependent Claim 6

Dependent claim 6 recites: “The IC of claim 1, wherein determining the response includes computing the response using a key stored in the memory.” Ex. 1002, 24:57–59.

Petitioner, as discussed above, explains how and why Bailey’s challenge-response authentication protocol would be used in Schuessler’s RFID tag. For dependent claim 6, Petitioner contends that “Bailey discloses that *determining the response includes computing* response R_T ‘as a function $H(K_{TS}, C_R)$ where $H()$ is a cryptographic function like a block cipher, K_{TS} is a secret *key* known to the tag and the reader’” and that it would have been obvious to store the key in Bailey’s disclosed memory. Pet. 62 (quoting Ex. 1023 ¶ 57; citing Ex. 1023 ¶ 45, Fig. 3; Ex. 1003 ¶ 275).

Patent Owner does not dispute Petitioner’s position. Petitioner’s arguments are supported by the cited evidence. Based on the evidence of record, we are persuaded that Petitioner has demonstrated that dependent claim 6 is unpatentable over Schuessler, Gen2, and Bailey.

8. Dependent Claim 7

Dependent claim 7 recites: “The IC of claim 1, wherein the third command is identical to the first command.” Ex. 1002, 24:60–61.

Petitioner argues that it explained earlier that the recited third command is a Gen2 Ack command, and that it is identical to that mapped to the first command. Pet. 63 (citing Ex. 1003 ¶ 277).

As Patent Owner notes (PO Resp. 41), Petitioner’s articulated combination for the underlying independent claim 1 utilizes the Ack

command for the trailing truncate mode (mapped to the first command of the first part of the claim) and the ACKSecure command for the normal mode (mapped to the third command of the second part of the claim). *See* Pet. 39 (using the Ack command for the “first command” limitation 19-b(i)), 51 (incorporating by reference, for limitation 1-b(i), the articulation for limitation 19-b(i)), 53 (using the ACKSecure command for the “third command” limitation 1-b(iv)); *see also* Pet. Reply 18 (summarizing its earlier position for the independent claim). Patent Owner argues that “Petitioner has failed to identify any situation in which the ‘first command’ and ‘third command’ of claim 1 are identical and still satisfy the remaining elements of claim 1.” PO Resp. 41.

Petitioner’s theory in the Petition is that it had explained earlier in the Petition that the first and third commands would be identical. Pet. 63 (cross-referencing earlier sections of the Petition). In the Reply, Petitioner impliedly acknowledges that the explanation was that it mapped the ACK command to the recited first command and that, for the third command, “it would have been obvious for a tag to backscatter a combination of *the first code* and R_T (*the response to the challenge*) in response to a ‘new ACKSecure command,’ which is an alternate version of the Gen2 Ack command.” Pet. Reply 18 (internal quotations omitted; citing Pet. 53–54; associating, by parenthetical citations, the ACK command to both commands of claim 19 and the ACKSecure to third command of claim 1).

After Patent Owner’s argument that the Petition’s theory is flawed because ACK and ACKSecure are not identical, Petitioner pivots in the Reply and, relying on a new expert declaration, argues (to the extent we understand the argument) either that it would have been obvious to create

another command that merged the operability of the Ack and ACKSecure commands or to change modes so that the Ack command does, in a particular mode, that which the ACKSecure command does in Petitioner's original articulation. *See* Pet. Reply 18 ("A POSITA would have been motivated to combine these teachings [regarding the Ack and ACKSecure commands] with a reasonable expectation of success to elicit these responses using an identical command."); *id.* at 19 ("It would have been obvious to elicit these responses using an identical command, such as a Gen2 Ack command, with the differing operation of the tag being dictated by the mode of the tag for example, where the challenge had been delivered by Schuessler's Select command."); *id.* at 17–19 (citing Ex. 1030 ¶¶ 2047–2051). In other words, the theory in the Reply no longer relies on the Petition's mapping of the ACKSecure command to the recited "third command. These new arguments and evidence are untimely. *See* Patent Trial and Appeal Board Consolidated Trial Practice Guide 73 (Nov. 2019), available at <https://www.uspto.gov/sites/default/files/documents/tpgnov.pdf> ("Consolidated Trial Practice Guide").

We agree with Patent Owner (PO Resp. 41) that an Ack command and an ACKSecure command are not identical. We also agree with Patent Owner (PO Sur-reply 11–12) that the new theory in the Reply fails to show why it would have been obvious to have both commands identical. Neither the Petition nor the Reply contains an adequate and persuasive explanation as to why the first and third commands in its articulated proposed combination would become identical or whether the proposed combination modified to have identical commands would continue to satisfy the claimed subject matter of the underlying independent claim 1. *See* Pet. 52–53

(Petitioner relying on the ACKSecure command to meet the limitations pertaining to the combination containing a response to the challenge); Pet. Reply 19 (arguing that it would be obvious to use the ACK command for the same combination). Additionally, Petitioner's theory in the Reply is flawed to the extent it builds on in its unpersuasive argument regarding dependent claim 2 (addressed above) that it would have been obvious to include the challenge in the third (Select) command. *Id.* (citing Pet. 57 and arguing that the Ack command could satisfy the claim limitations "where the challenge had been delivered by Schuessler's Select command").

Petitioner has not demonstrated that dependent claim 7 is unpatentable.

9. Dependent Claim 8

Dependent claim 8 recites: "The IC of claim 1, wherein the processing block is further configured to receive a Gush command and cause the combination to be backscattered in response to receiving the Gush command and the third command." Ex. 1002, 24:62–65.

The parties agree, for purposes of this proceeding, that a "Gush command" is a "command that instructs a tag to enter a mode in which it backscatters the combination if it receives the third command." Pet. 17–18; Tr. 36:20–37:5 (Patent Owner stating, "for the purposes of this hearing, we've adopted [Petitioner's proposed construction]."); *id.* at 37:21–38:12 (Patent Owner: "for purposes of this proceeding, at least with respect to the prior art that's in front of the Board right now, we don't disagree with the construction that NXP proposed for the Gush command.").

Petitioner, in its articulation regarding the underlying independent claim and relying on the testimony of Mr. Fischer, contends that it is

Schuessler’s variant of the Gen2 Select command that switches modes of operation. *See, e.g.*, Pet. 31 (“Schuessler disclosed an ‘alternate, optional version of the [Gen2] Select command’ that was ‘identical to the existing Select command, except that it also puts tags into a new mode of operation.’” (citing Ex. 1009 ¶ 86; Ex. 1003 ¶¶ 222–223)); *id.* at 53 (citing Ex. 1009 ¶¶ 50, 90; Ex. 1010, § 6.3.2.10, Fig. 6.19; Ex. 1003 ¶ 260); *id.* at 64; *see also* Pet. Reply 19–20. Thus, that command results in the backscattering of the combination in Petitioner’s articulated case. For dependent claim 8, Petitioner maps Schuessler’s newly-defined Select command to the recited “Gush command.” *See* Pet. 63–64 (citing Ex. 1009 ¶ 86; Ex. 1003 ¶ 280).

Patent Owner argues that Petitioner relies only on Schuessler for the limitation of claim 8, and that Schuessler does not disclose a combination including the recited response to a challenge. PO Resp. 45–46. Patent Owner’s argument is unavailing as, for the reasons discussed above in the context of the underlying independent claim 1, Petitioner has explained adequately how and why Bailey’s response would be included in the backscattered combination. *See, e.g.*, Pet. 54–55.

Based on the evidence of record, we are persuaded that Petitioner has demonstrated that dependent claim 8 is unpatentable over Schuessler, Gen2, and Bailey.

10. Dependent Claim 9

Dependent claim 9 recites: “The IC of claim 8, wherein the Gush command includes the challenge.” Ex. 1002, 24:66–67.

For this claim, Petitioner reiterates its position that Schuessler’s modification of the Gen2 Select command switches tag modes, and asserts

that Bailey discloses that new or custom commands may be defined.

Pet. 64. Based on these contentions, Petitioner argues that,

Accordingly, it would have been obvious to a [person of ordinary skill in the art] for a tag to receive a newly-defined Select command as disclosed by Schuessler (*a custom Gush command*) to command the tag to change from, for example the trailing truncate mode, to the normal mode of operation, as explained in section V.B.2 (claim [1-b(iv)] and [1-b(v)]), and for that newly-defined Select command to *include the challenge* as disclosed by Bailey.”

Id. at 65 (citing Ex. 1003 ¶ 284).

Patent Owner argues that Petitioner has not explained adequately why the proposed combination would have the challenge be included as part of the Schuessler’s Select command. *See* PO Resp. 46–48. Patent Owner further argues that Bailey’s statement that custom commands can be used does not provide a reason why one of ordinary skill in the art would make the specific modification of Schuessler’s already modified Gen2 Select command, as proposed by Petitioner. *See* PO Sur-reply 13.

Patent Owner’s arguments are persuasive. The Petition does not contain an adequate explanation as to why Bailey’s general teaching of the possibility of custom commands renders obvious the specific modified command proposed. Petitioner’s argument (Pet. 65) that, “[a]ccordingly, it would have been obvious to a [person of ordinary skill in the art] . . . for that newly-defined Select command to *include the challenge* as disclosed by Bailey” is too conclusory to meet its burden.

Petitioner has not demonstrated that dependent claim 9 is unpatentable.

*F. The Alleged Obviousness of Claims 19 and 20
over Gen2 and Finkenzeller*

Petitioner alleges that claims 19 and 20 of the '431 patent would have been obvious over Gen2 and Finkenzeller. *See* Pet. 65–80.

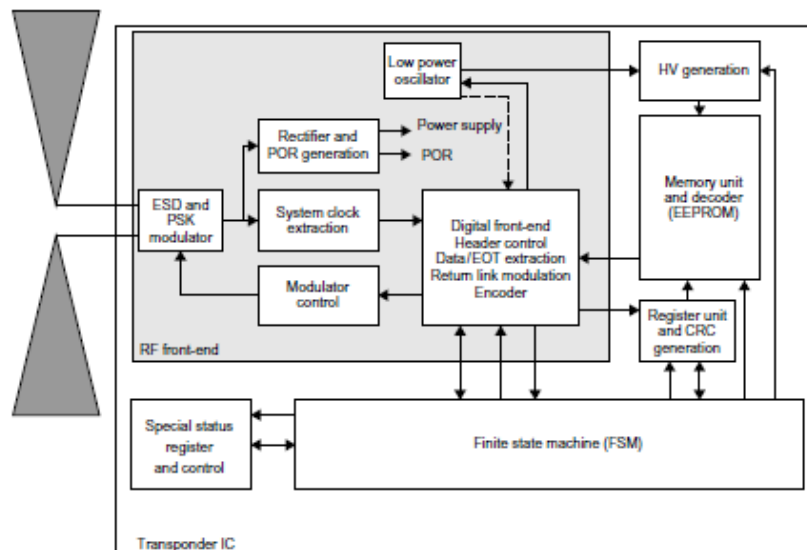
1. Finkenzeller (Ex. 1013)

Finkenzeller is a textbook bearing the title “RFID Handbook: Fundamentals and Applications in Contactless Smart Cards and Identification.” Ex. 1013, cover.

A few basic chapters are provided for this audience describing the functionality of RFID technology and the physical and IT-related principles underlying this field. The book is also intended for practitioners who, as users, wish to or need to obtain as comprehensive and detailed an overview of the various technologies, the legal framework or the possible applications of RFID as possible.

Id. at xiii.

Figure 4.88 of Finkenzeller is reproduced below.



Id. at 145. Figure 4.88 is a block diagram of a passive UHF transponder, and specifically a RFID transponder integrated circuit. *Id.* at 145, Fig. 4.88.

2. Discussion

Petitioner, for its proposed combination, relies on Gen2 for the disclosure of RFID tag operations and certain structural components, and turns to Finkenzeller for the structure to embody a Gen2 compliant RFID tag. *See, e.g.*, Pet. 65–66. Petitioner relies on Finkenzeller for the general structure of an RFID and offers the unremarkable proposition that a person of ordinary skill in the art “would have been motivated to combine the recently ratified Gen2 with Finkenzeller to obtain an RFID tag that would function to operate in conformance with the Gen2 standard.” *Id.* at 66. Petitioner primarily relies on Finkenzeller for disclosure of such “structural aspects of RFID tag embodiments including a Transponder Integrated Circuit (IC) for use with a Radio Frequency Identification (RFID) tag having an antenna, comprising a memory (EEPROM).” *Id.* These RFID components do not appear to be in dispute.

Petitioner relies almost completely on Gen2 and its expert’s testimony in addressing the aspects of subject matter of claim 19 that are in dispute—the steps performed by the processing block when a first command is received and when a third command is received. *See* PO Resp. 59 (Patent Owner arguing that Petitioner “relies primarily on Gen2 itself for its second attempt, only invoking Finkenzeller to fill in elements relating to the basic circuitry of a tag.”).

Patent Owner argues that “Gen2 is a large document with 90-plus pages of text covering over 100 sections and subsections, close to 40 annexes, and numerous parameters and commands with optional, mandatory, proprietary and custom flavors.” PO Resp. 33 (citing Ex. 1010, 2–4 (the Gen2 Table of Contents)). Patent Owner further argues that Petitioner’s

arguments regarding the limitation directed to backscattering a combination are conclusory, unsupported, and unexplained. *Id.* at 59–61.

We determine that Petitioner’s articulation of its challenge is too conclusory and undeveloped to meet Petitioner’s burden of demonstrating that the claimed subject matter as a whole would have been obvious. We identify a few examples of the shortcomings here.

As an initial matter, Petitioner’s single challenge to claim 19 as obvious over Finkenzeller and Gen2 contains at least two different options as to how various aspects of Gen2 purportedly would be configured to reach the claimed subject matter. For example, the Petition, on the same page, maps an sGTIN to the two recited codes and posits that those would be stored together in the EPC memory bank, and also maps TID data (a Tag mask-designer identifier and a Tag model number) as the two codes and presumably posits that those would be stored together in the TID memory bank. Pet. 69 (reproducing the memory bank map of Gen2 (Ex. 1010), Fig. 6.17). Proposing two paths concurrently makes it somewhat difficult to determine whether Petitioner has addressed adequately the overall claimed subject matter in a cohesive manner.

For the limitation reciting, “cause the first code to be backscattered if a first command is received,” Petitioner contends that Gen2 specifies a read command that allows information stored in a memory bank to be read in full or in part. Pet. 72. Petitioner follows this immediately with the conclusory assertion that “[a]n RFID tag operable to receive a Gen2 Read command (*a first command*) that specified the starting address of the first code and the number of words to be read from the tag’s EPC memory bank in order to instruct a tag to respond with just the GTIN portion of the EPC code (*the*

first code) would have been obvious to a POSITA.” *Id.* (citing Ex. 1003 ¶ 297). The Petitioner lacks an explanation as to why it would have been obvious to read only a portion of the EPC, leaving little more than the conclusory assertion that the recited limitation would have been obvious. Similarly, Petitioner concludes without elaboration that “[a]s another example, it would have been obvious to configure the Gen2 Read command to read from the TID memory bank in order to instruct a tag to respond with just the Tag mask-designer identifier (*the first code*).” *Id.* at 72–73 (citing Ex. 1003 ¶ 297).

For the limitation reciting, “receive a third command” that results in backscattering of a combination of codes, Petitioner, citing Gen2, contends a person of ordinary skill in the art would have understood that a tag could use multiple types of commands, and argues that, “[f]or example, it would have been obvious to a POSITA, in view of the Gen2 specification, that an RFID tag would receive a Gen2 Read first command and a Gen2 Read *third command*.” Pet. 73 (citing Ex. 1010 § 6.3.2.10, Fig. 6.19; Ex. 1003 ¶ 299). Petitioner does not explain adequately why, from the general teachings of Gen2, that it would have been obvious to use a Gen2 Read command in both situations—to elicit one code and also to elicit a combination of a plurality of codes. *Id.*

The last limitation of claim 19 requires that the combination backscattered in response to the third command be made from at least portions of a first code, at least portions of a second code, and an error-checking code. Ex. 1002, 26:10–16. Petitioner again asserts that Gen2 specifies that a Read command allows all or part of the stored information to be read, and asserts, as an example, “by specifying the starting address of the

first code in EPC memory and the number of words to be read from tag memory as parameters of the Gen2 Read command, a tag would respond with *a combination made from the GTIN code (the first code) and the serial number code (the second code) of the sGTIN.*” Pet. 74 (citing Ex. 1010 § 6.3.2.10.3.2; Ex. 1003 ¶ 301). This merely is an assertion of what *could* happen without an adequate explanation as to why it would have been obvious to do so.

Similarly, Petitioner offers the conclusory assertion that, “[a]s another example, it would have been obvious to configure the Gen2 Read command to read from the TID memory bank in order to cause the tag to respond with a combination made from the Tag mask-designer identifier (*the first code*) and the Tag model number (*the second code*).” Pet. 74 (citing Ex. 1003 ¶ 301). Petitioner again does not explain why this would have been obvious. *Id.* We acknowledge Petitioner’s argument in the Reply that its discussion regarding dependent claim 20 provided the necessary explanation for independent claim 19. *See* Pet. Reply 11 (citing Pet. 78). Petitioner argues that it would have been obvious to have memory banks as one continuous address space and that it would have been obvious to have the data items it mapped to the two codes adjacent each other in memory. Pet. 78–79. However and as an example, Petitioner still does not explain adequately why it would have been obvious to craft “a custom Read command that, for example, specified the starting physical memory address of the stored EPC and the number of words to be read through the ending physical address of the stored TID.” *Id.* at 79.

Petitioner has not demonstrated that independent claim 19 or its dependent claim 20 are unpatentable as obvious over Finkenzeller and Gen2.

III. CONCLUSION⁶

Petitioner has shown by a preponderance of the evidence that claims 19 and 20 of the '431 patent are unpatentable over Schuessler and Gen2 and that claims 1, 3–6, and 8 are unpatentable over Schuessler, Gen2, and Bailey. Petitioner has *not* shown by a preponderance of the evidence that claims 2, 7, and 9 are unpatentable over Schuessler, Gen2, and Bailey, or that claims 19 and 20 are unpatentable over Gen2 and Finkenzeller.

In summary:

Claims	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
19, 20	103(a)	Schuessler, Gen2	19, 20	
1–9	103(a)	Schuessler, Gen2, Bailey	1, 3–6, 8	2, 7, 9
19, 20	103(a)	Gen2, Finkenzeller		19, 20
Overall Outcome			1, 3–6, 8, 19, 20	2, 7, 9

IV. ORDER

For the foregoing reasons, it is

ORDERED that claims 1, 3–6, 8, 19, and 20 of the '431 patent have been proven to be unpatentable;

⁶ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. § 42.8(a)(3), (b)(2).

FURTHER ORDERED claims 2, 7, and 9 of the '431 patent have not been proven to be unpatentable; and

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

IPR2020-01063
Patent 8,390,431 B1

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