

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

R-PAC INTERNATIONAL CORPORATION

Petitioner,

v.

ADASA INC,

Patent Owner.

IPR2024-01416

U.S. Patent No. 9,798,967

**DECLARATION OF THOMAS J. CLARE
IN SUPPORT OF PETITION FOR INTER PARTES REVIEW
OF U.S. PATENT NO. 9,798,967**

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EXHIBIT LIST

Exhibit	Reference
1001	U.S. Patent 9,798,967 (“’967 patent”)
1002	Ex Parte Reexamination Certificate for the ’967 patent
1003	File History of Application 15/042,993
1004	File History of 90/014,052 Ex Parte Reexamination
1005	This declaration
1006	Thomas J. Clare curriculum vitae
1007	Claim Construction Order from Adasa Inc. v. Avery Dennison Corp., 6:17-cv-01685 (Dkt. 68)
1008	Adasa Opening Claim Construction Brief from Adasa Inc. v. Avery Dennison Corp., 6:17-cv-01685 (Dkt. 57)
1009	Patrick J. Sweeney II, RFID for Dummies (2005) (“Dummies”)
1010	U.S. Patent 8,373,545 (“Traub”)
1011	EPC Tag Data Standards Version 1.1 Rev.1.24 (April 1, 2004) (“TDS-2004”)
1012	<i>Adasa Inc. v. Avery Dennison Corp.</i> , 55 F.4th 900 (Fed. Cir. 2022)
1013	U.S. Patent No. 5,420,757 (“Eberhardt”)
1014	David L. Brock, White Paper: The Electronic Product Code™ (EPCTM) as a Meta Code, Auto-ID Center, Massachusetts Institute of Technology (June 1, 2003) (“2003 MIT White Paper”)
1015	U.S. Patent 7,201,309 (“Oakes”)
1016	Bill Glover, et al., RFID Essentials (February 28, 2006)

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Exhibit	Reference
1017	U.S. Patent 7,425,888 (“Powell”)
1018	U.S. Patent 3,944,976 (“Rode”)
1019	U.S. Patent 4,580,041 (“Waldon”)
1020	5,745,036 (“Clare”)
1021	U.S. Patent 5,963,134 (“Bowers”)
1022	U.S. Patent 6,025,780 (“Bowers and Clare”)
1023	U.S. Patent. No. 3,194,154 (“Mckeag”)
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1028	Time to Trial Statistics for the Southern District of New York.
1029	Specification from Application No. 11/465,712
1030	Specification from Provisional Application No. 60/709,713
1031	Specification from Provisional Application No. 60/939,603
1032	Excerpts of the Transcript from the Invalidity Trial in <i>Adasa Inc. v. Avery Dennison Corp.</i> , 6:17-cv-01685 (Dkt. 572)

I, Thomas J. Clare, hereby declare:

I. BACKGROUND AND QUALIFICATIONS

1. I have been retained by Petitioner r-pac International Corporation (“r-pac” or “Petitioner”) to provide my opinions regarding claims 1-20 of U.S. Patent 9,798,967 (“the ’967 Patent,” Ex-1001).

2. A copy of my current curriculum vitae is submitted herewith as EX-1006, which provides details about my academic and professional background and qualifications.

3. I am being compensated at my consulting rate of \$615/hour for my services and reimbursed for reasonable expenses that I may incur while working on this matter. I have no financial interest in the outcome of this matter or any other matter that may exist between Petitioners and Adasa Inc. (“Adasa” or “Patent Owner”). My compensation does not depend in any way on the conclusions I reach.

A. Educational Background

4. In 1989, I received my Bachelor of Science in Electrical Engineering (BSEE) degree from the University of Pennsylvania (UPenn) in Philadelphia, PA. My undergraduate experience focused on integrated circuit design and fabrication. This included DARPA-funded independent research into NATO combat technology replicating human analog neural functionality in analog complementary metal-oxide (CMOS) integrated circuits. *See e.g.*, Mueller, et al., “A Programmable Analog

Neural Computer and Simulator,” Advances in Neural Information Processing Systems, IEEE NIPS 1988, pp. 712-719.

5. In 2003, I received my Master of Business Administration (MBA) degree from Yale University in New Haven, CT.

6. In 2011, I received my Juris Doctor from Temple University in Philadelphia, PA. I am a member of the bar of the Commonwealth of Pennsylvania, Reg. No. 311,640. In 2014, I took the United States Patent and Trademark Office bar to become a patent attorney, Reg. No. 72,458.

B. Professional Experience

7. From 1990 to 2001, I worked as a sensors and systems engineer for several companies related to developing technology that involved analog signal processing and microcontrollers for industrial, military, rail, and security applications.

8. From 1990 to 1993, I was an engineer at Drexelbrook Engineering Company in Horsham, PA, where I specialized in products exploiting custom and special-purpose integrated circuit technologies for industrial sensors for use in hazardous environments.

9. From 1993 to 1996, I was an engineer at Checkpoint Systems, Inc., in Thorofare, NJ, where I led radio frequency identification (RFID) reader, tag, and systems development. This included exploiting Sielox chip technology, which was

among the first 13.56 MHz RFID solutions. My work at Checkpoint included work in mounting RFID chips on flexible printed circuit substrates and developing supply chain and library solutions exploiting uniquely serialized tags and network perimeter micro-databases in anticipation of economical anti-collision protocol chips. In this first tenure at Checkpoint, I was an inventor on five RFID patents related to inventory control using RFID tags: U.S. Pat. Nos: 5,745,036; 5,963,134; 6,025,780; 6,195,006; and 6,693,539.

10. In 1996 and 1997, I was an engineer at Elcom Technologies and PurePower in Malvern, PA, focusing on the use of special purpose integrated circuits and protocols for powerline communications.

11. In 1997 and 1998 I was an engineer at ABC Deco in Malvern, PA, where I crafted Doppler radar solutions for robotic freight rail car sorting systems.

12. From 1998 to 2001, I was an engineer at Goodrich Pump and Engine Control Systems in West Hartford, CT, where I designed NATO arsenal weapons platform jet turbine engine controls.

13. From 2003 to 2007, I rejoined Checkpoint Systems, Inc., as Director of Technology Worldwide. My duties included shepherding the development of RFID technology within Checkpoint and monitoring the development of RFID standards which evolved into the Electronic Product Code (“EPC”) standard of GS1. In this second tenure at Checkpoint, I was an inventor on seven additional RFID patents:

U.S. Pat. Nos 7,042,413; 7,138,919; 7,384,496; 7,436,305; 7,568,108; 7,709,294; and 7,961,102.

14. In 2007, I joined Caesar, Revise, Bernstein, Cohen & Pokotilow, Ltd., of Philadelphia, PA, as a non-attorney technical advisor. Working in that capacity while studying law from 2007 to 2011, I advised on attorneys and clients on technical aspects of patent applications, office action responses, mergers, acquisition, patent portfolio management, and litigation for RFID and other clients. In assisting Caesar client Checkpoint with development of their patent portfolio during this period, I became inventor on two further RFID patents: U.S. Pat. Nos. 8,786,440; and 9,449,202. In 2011, after I passed the Pennsylvania bar, I began working as an attorney at Caesar until 2014.

15. In 2014, I joined Baker & Hostetler, LLP, of Philadelphia, PA, where I remained until 2022, primarily working in patent prosecution and litigation that focused on semiconductor design and telecommunications signal and protocol technologies.

16. From 2022 to the present, I am employed at Ice Miller, LLP, of Philadelphia, PA, focusing on patent prosecution and litigation pertaining to variety of electrical, electronic, tech, and mechanical sciences, including, e.g., medical devices, AI, blockchain, industrial devices, and Internet security.

II. MATERIALS CONSIDERED

17. The opinions contained in this declaration are based on the documents I reviewed, my professional judgment, as well as my education, experience, and knowledge regarding radio frequency identification (“RFID”) technology.

18. In forming my opinions expressed in this declaration, I reviewed all the materials cited within this declaration, including the documents identified in the Exhibit List (above).

19. All of the opinions contained in this declaration are based on the documents I reviewed and my knowledge and professional judgment. My opinions have also been guided by my appreciation of how a person of ordinary skill in the art would have understood the claims and the specification of the ’967 patent at the time of the alleged invention, which as, I discuss later in this declaration, is May 21, 2008.

20. Based on my experience and expertise, as I will explain in more detail below, it is my opinion that certain references disclose and/or suggest, alone or in combination, all the features recited in claims 1-20 (“Challenged Claims”) of the ’967 patent.

21. My analysis of the materials produced in this matter is ongoing and I will continue to review any new material as it is provided. This declaration represents only those opinions I have formed to date.

III. RELEVANT LEGAL STANDARDS

22. Below I outline the basic legal principles relevant to my analysis herein.

23. I understand that “the time the claimed invention was made” is often referred to as the priority or critical date.

24. I understand that, before considering the prior art, the claims are first construed to determine their scope. I understand that the claims are read from the perspective of a person of ordinary skill in the art (“POSITA”) at the time of the alleged invention. I understand that the words of a claim are generally given their ordinary and customary meaning as understood by a POSITA in light of the entire patent specification in which they appear, as well as the prosecution history of the patent.

25. I understand, however, that the words of a claim may be given a meaning other than their plain and ordinary meaning if: (1) a patentee expressly and unambiguously defined a term in a way that is different from its plain meaning; or (2) a patentee “disclaims” the full scope of a claim term’s plain meaning, for instance, by making clear and unambiguous statements during prosecution that a claim term does or does not encompass certain features.

26. I understand that, after construing the claims, the teachings of the prior art are considered. I also understand that a POSITA is assumed to be aware of all

relevant prior art in the field of endeavor covered by the patent-at-issue and all analogous prior art.

27. I understand that although the ultimate question of the obviousness of a claimed invention is a legal determination, obviousness is based on several factual inquiries, including: the scope and content of the prior art, the differences between the claimed subject matter and the prior art, the level of ordinary skill in the art at the time of the invention, and any “objective indicia” or “secondary considerations” of non-obviousness, which must all be considered.

28. I understand that, in determining the scope and content of the prior art, a reference is considered relevant prior art if it falls within the field of the inventor’s endeavor, or if it is reasonably pertinent to the particular problem that the inventor was trying to solve. A reference is reasonably pertinent if it logically would have commended itself to an inventor’s attention in considering his problem.

29. I understand that, to assess the differences between prior art and the claimed subject matter, the claimed invention must be considered as a whole.

30. I understand that there are several rationales for combining prior-art references. For instance, I understand that it is considered obvious to: combine prior-art elements according to known methods to yield predictable results; substitute one known element for another to obtain predictable results; use the prior-art elements in a predictable way according to their established functions; apply a known

technique to a known device (method or product) ready for improvement to yield predictable results; choose from a finite number of identified, predictable solutions, with a reasonable expectation of success; or if there is some teaching, suggestion, or motivation in the prior art that would have led a POSITA to modify a prior-art reference or combine prior-art teachings to arrive at the claimed invention. I understand, however, that a POSITA does not need to have the same motivations or reasons to combine the prior art as the inventors, and can arrive at the claimed invention for completely different reasons than the inventors.

31. I also understand that the prior art cannot be modified or combined using “hindsight.” I understand that hindsight refers to situations in which the patent-at-issue is used as a framework to pick and choose pieces from the prior art to arrive at the claims, or adopting rationales identified by the patent-at-issue that those in the art would not have recognized. Instead, I understand that the obviousness inquiry is evaluated from the perspective of a POSITA as of the critical date of the patent-at-issue, with all the prior art before them, to determine whether the POSITA would have independently arrived at the claimed invention without the benefit of the patent-at-issue for guidance.

32. I understand that “objective indicia” or “secondary considerations” of non-obviousness include whether: (1) there was a long-felt need for the claimed invention; (2) the claimed invention has achieved commercial success; (3) there was

copying of the claimed invention by others; (4) there were failed attempts by others to make the alleged invention; (5) there was praise of the invention in the field; and (6) there was skepticism the claimed invention could be achieved, among a few others.

33. Finally, I understand that, in an *inter partes* review proceeding, the Petitioner bears the burden of proving obviousness of a challenged patent claim by “a preponderance of the evidence.” I understand that the preponderance of the evidence standard requires that a reasonable factfinder could find a material fact is more probable than the nonexistence of that fact. I have applied the “preponderance of the evidence” standard throughout my declaration.

IV. LEVEL OF ORDINARY SKILL IN THE ART

34. I understand that patents and prior art references are analyzed from the point of view of a person of ordinary skill in the art (“POSITA”) at the time of the invention of the ’967 Patent. I understand that “the time the claimed invention was made” is also referred to as the “priority” or “critical” date, which, as discussed in further detail below, is May 21, 2008.

35. I understand that the level of ordinary skill of a POSITA at the time of the invention is based on the consideration of several factors such as the educational level of the inventor and persons working in the field, the types of problems

encountered in the field, prior art solutions to those problems, rapidity with which innovations are made, and the sophistication of technology.

36. Based on my background and experience, a POSITA as of May 21, 2008, would have had at least a bachelor's degree in electrical engineering or computer science and 2 to 3 years of work experience developing RFID tags and systems in the RFID industry. A POSITA potentially could have had a higher extent of education and a lower level of work experience or vice versa. The POSITA would have had a good understanding of the basic organization of and use of digital data, including binary communications protocols, binary numbers, and related mathematics, as well as a solid understanding of the Electronic Product Code ("EPC") RFID standards and commissioning RFID tags.

37. I have been informed that Adasa has asserted in its litigation against Avery Dennison Corp. that a POSITA for the '967 patent would have had the following level of skill:

[A]t least a bachelor's degree in electrical engineering, computer science, or computer engineering, or a related discipline, and at least five years of experience which could consist of, A, designing, developing, evaluating and/or using RFID and other AIDC technologies in inventory management, unique object identification, and/or security; or B, studying and conducting research related to RFID technologies and using RFID and other

AIDC technologies in inventory management, unique object identification, and/or security.

EX-1032, 707:3-15 (testimony of Adasa's expert, Daniel Engels).

38. I have considered Adasa's articulation of the level of knowledge of a POSITA. Although there are some differences between Adasa's and my articulation of the POSITA, such as the amount of work experience required, such differences are insignificant with respect to the invalidity analysis of the '967 patent. Even under Adasa's articulation, my opinions regarding the invalidity of the '967 patent presented herein are the same. The claims are all obvious in light of the prior art discussed below.

V. THE '967 PATENT

A. Specification

39. The '967 patent generally relates to radio frequency identification ("RFID") transponders, also referred to as "tags," and a system "for commissioning RFID transponders with unique object class instance numbers." EX-1001, Abstract.

40. The '967 patent acknowledges in its Background that RFID transponders "typically" included an integrated circuit ("IC"), control logic, memory and antenna mounted on a substrate, and that they stored unique identification information:

Radio-frequency identification (RFID) transponders, typically thin transceivers that include an integrated circuit chip having radio frequency circuits, control logic, memory and an antenna structure mounted on a supporting substrate, enable vast amounts of information to be encoded and stored and have unique identification.”

Id., 1:40-45.

41. The '967 patent further indicates that “[g]enerating a unique serial number is imperative, and is required for EPCglobal RFID tagging implementations.” *Id.*, 2:21-22. It contends that prior art “serialization requires a central issuing authority of numbers...to guarantee uniqueness and to avoid duplication of numbers.” *Id.*, 2:23-25. In such prior art systems, “[b]locks of numbers are distributed to remote locations globally...[and] the numbering space is usually partitioned according to some method, or each remote location receives each number one-by-one.” *Id.*, 2:25-29.

42. The '967 patent proposes partitioning a serial number hierarchically, so that its most significant bits correspond to a particular sector, which, as is discussed below, Adasa has likened to a “product line or operation of the brand owner” (EX-1008, 2), while the remaining bits of lesser significance in the serial number space correspond to serialized numbers for individual items within that sector. In particular, the '967 patent discloses subdividing “a serial number space into sectors

that are defined by a limited number of MSB's (Most Significant Bits) of the serial number field.” *Id.*, 8:11-15. The “serial number space” is “defined by the number of serial number bits that are used in a specific standard.” *Id.*, 8:16-21. As one example, the '967 patent explains that there are 38 bits in the serial number space of the EPCglobal Serialized Global Trade Item Number 96 bit EPC (“SGTIN-96”), and if one were to use the “upper 14 bits” of that serial number space for the sector the MSB, there would be 2^{14} (16,384) sectors available, and for the remaining 24 bits, there would be 2^{24} (16,777,216) serial numbers available within each sector. *Id.*, 8:21-26.

43. When Adasa described this aspect of the “inventions claimed” to the U.S. District Court of Oregon during claim construction, it indicated that a serial number space was partitioned into a most significant bits portion and a serial number portion of the lesser significant bits—the most significant bits (i.e., the bits that identify the sector) could correspond to each “product line” or “operation of the brand owner,” and that each of those could then generate the serialized numbers for the lesser bits, as follows:

This hardware-based solution utilizes a partitioned serial number space comprising a first portion of most significant bits and a second portion comprising serially assigned bits of lesser significance. '967 Patent at 8:4-15, 8:21-32, 33:20-23.... Through use of this partitioned

serial number structure, a brand owner can ensure uniqueness across its many operations through, for example, allocation of a block of serial numbers comprising a unique sequence of most significant bits to each product line or operation of the brand owner. Lower level assigning databases or encoders corresponding to each product line or operation can then freely generate and assign serial numbers comprising the assigned most significant bits combined with on-demand generated bits of lesser significance with no risk of inadvertently assigning a duplicate serial number. '967 Patent at 8:32-37....

EX-1008, 2 (emphasis added).

44. This concept of having a subdivided (partitioned) serial number space is reflected in the claims of the '967 patent. The claims of are all directed to RFID transponders or an IC for such transponders. *See* EX-1002 1:21 (independent claim 1 directed to “RFID transponders”), 2:1 (independent claim 13 directed to “RFID transponders”), 2:19-24 (independent claim 16 is directed to an “integrated circuit” with “radio frequency circuit,” “control logic” and “memory”). The claims all generally recite that the transponders/ICs have a “serial number space” that stores (“is encoded with”) a serial number; that the stored serial number comes from an allocated block of serial numbers, where the block was “assigned a limited number

of most significant bits”; and the serial number space also includes (“comprises”) those “most significant bits.” For example, the following recitations of claim 1 reflect this:

wherein the unique serial number space is encoded with one serial number instance from an allocated block of serial numbers, the allocated block being assigned a limited number of most significant bits,

wherein the unique serial number space comprises the limited number of most significant bits uniquely corresponding to the limited number of most significant bits of the allocated block and of remaining bits of lesser significance that together comprise the one serial number instance.

EX-1002, 1:30-39; *see also id.*, 2:11-18 (independent claim 13), 2:29-38 (independent *claim* 16).

45. I have also reviewed the Federal Circuit decision regarding the ’967 patent (EX-1012), and the Federal Circuit has described the ’967 patent similarly:

The ’967 patent relates, in part, to methods and systems for commissioning radio-frequency identification (RFID) transponders. ’967 patent at 3:27-32. RFID transponders, also known as RFID tags, are used, like barcodes, to identify and track objects by encoding data electronically in a compact label. *Id.* at 1:32-34. But

unlike traditional barcodes, RFID tags need not include external, machine-or-human-readable labels and can communicate the data they encode over a distance using radio-frequency transmission. *Id.* at 1:34-53, 6:28-59.

To facilitate identifying and tracking an object in the stream of commerce, RFID tags are encoded with information associated with the object through a process known as “commissioning.” *Id.* at 1:40–53. The encoded data may include various categories of information, “for example, data representing an object identifier, the date-code, batch, customer name, origin, destination, quantity,” etc. *Id.* at 1:45–50. Regardless of the specific categories included, to ensure accurate tracking, it is critical that the data uniquely identify the tagged object. *Id.* at 2:21–22, 2:48–50.

In the RFID industry, uniqueness is ensured by assigning RFID tags an Electronic Product Code (EPC or EPCglobal) in accordance with certain global formatting standards. An EPC is a serialized object number comprising object class information and a serial number that together uniquely identify the associated object. *See id.* at 9:7–15. For example, the EPC may be a Serialized Global Trade Item Number (SGTIN), which consists of a Global Trade Item Number identifying the brand and class of the item (i.e., object class information) followed

by a serial number uniquely identifying the tagged item within the brand and class. *Id.* Since objects from the same brand and class will share the same object class information, ensuring the uniqueness of the overall EPC amounts to ensuring uniqueness of the serial number.

Ensuring uniqueness, however, is not necessarily straightforward. *Id.* at 2:49–50. Serialization generally “requires a central issuing authority of numbers for manufacturers, products, and items to guarantee uniqueness and to avoid duplication of numbers.” *Id.* at 2:23–25. The issuing authority assigns blocks of numbers to remote locations, wherein each remote location receives the numbers one by one or where the numbering space is partitioned in some manner. *Id.* at 2:25–29. But, in either case, the encoded numbers must generally be reconciled by comparison to a central database “either one or several numbers at a time.” *Id.* at 2:30–32.

In the case of EPCglobal numbers, the central issuing authority is known as GS1. *Id.* at 7:61–65, 9:7–15. GS1 distributes blocks of numbers to member companies in a hierarchical manner, wherein each company is authorized to then “further allocate numbers from its upper level database to as many lower database levels as it deems necessary to distribute number authority throughout its enterprise.” *Id.* at 7:61–8:3. Using central databases to

distribute the allocated numbers has certain drawbacks. It generally requires encoders to maintain a continuous network connection with the database so that new serial numbers can be retrieved when an RFID tag is commissioned. *See id.* at 3:27–4:4. But a continuous connection is not always possible and, even when it is, may be plagued by network delays that slow down the commissioning process. *See id.* at 3:64–4:4. This in turn may delay or impair downstream activity, including manual steps in the commissioning or distribution process. *Id.*

The '967 patent seeks to “overcome[] these shortcomings” using systems and methods for commissioning RFID tags “on-demand” and “with no external authorizations or queries required on a transponder-by-transponder basis,” enabling commissioning to proceed without the need for continuous connectivity to a central database. *Id.* at 3:27–35, 3:64–67. In one embodiment, pre-authorized ranges of serial numbers for specific object classes are allocated to lower levels in the hierarchy, for example, individual encoders. *Id.* at 8:4–11. In this embodiment, the object class serial number space is subdivided into sectors defined by a series of fixed “Most Significant Bits” (MSBs), wherein the number of allocatable sectors is determined by the number of MSBs. *Id.* at 8:11–15. For

example, according to the SGTIN-96 standard, the serial number space consists of 38 bits which can encode 2^{38} distinct serial numbers. If the first 14 of these bits are designated as MSBs, then the serial number space is correspondingly subdivided into 2^{14} sectors or “blocks” which can be allocated to as many as 2^{14} different encoders. *See id.* at 8:21–29. The remaining 24 bits can then be used to encode a unique serial number space within a given block. *Id.* “Each allocated block of serial numbers represents authority for encoding objects of an object class that can either be used by an encoder for encoding transponders, or allocated to a lower level in the authority hierarchy.” *Id.* at 8:32–36.

EX-1012, 904-905.

B. Claims

46. The '967 patent has 20 claims, all of which are being challenged in this Inter-partes Review (“IPR”) petition. Claims 1, 13 and 16 are independent. Below, I have reproduced the Challenged Claims with labeled elements for ease of reference:

Element	Claim Limitations
Claim 1	
1[pre]	An RFID transponder comprising:
1[a]	a substrate;

1[b]	an antenna structure formed on the substrate; and
1[c]	an RFID integrated circuit chip which is electrically coupled to the antenna structure,
1[d]	wherein the RFID integrated circuit chip is encoded with a unique object number, the unique object number comprising an object class information space and a unique serial number space,
1[e]	wherein the unique serial number space is encoded with one serial number instance from an allocated block of serial numbers, the allocated block being assigned a limited number of most significant bits,
1[f]	wherein the unique serial number space comprises the limited number of most significant bits uniquely corresponding to the limited number of most significant bits of the allocated block and of remaining bits of lesser significance that together comprise the one serial number instance.
Claim 2	
2	The RFID transponder of claim 1, wherein the object class information space is encoded with information comprising a company prefix, an item reference, a partition value, and a filter value.
Claim 3	
3	The RFID transponder of claim 1, wherein the unique object number is a portion of a serialized global trade item number.
Claim 4	
4	The RFID transponder of claim 3, wherein the serialized global trade item number is an EPC SGTIN-96 encoding.
Claim 5	
5	The RFID transponder of claim 1, wherein the unique serial number space is at least 38 bits.

Claim 6	
6	The RFID transponder of claim 1, wherein the allocated block is defined by at least 3 most significant bits.
Claim 7	
7	The RFID transponder of claim 1, wherein the allocated block is one of a plurality of allocations intermittently received by an encoder.
Claim 8	
8	The RFID transponder of claim 1, wherein the RFID integrated circuit chip is comprised of silicon.
Claim 9	
9	The RFID transponder of claim 1, wherein the RFID integrated circuit chip is comprised of polymer.
Claim 10	
10	The RFID transponder of claim 1, wherein the substrate, antenna structure, and RFID integrated circuit chip are covered by a face stock material.
Claim 11	
11	The RFID transponder of claim 1, wherein the RFID integrated circuit chip is disposed on the substrate.
Claim 12	
12	The RFID transponder of claim 1, wherein the limited number of most significant bits that correspond to the allocated block further correspond to an encoder that encodes the RFID transponder.
Claim 13	
13[pre]	A RFID transponder comprising:

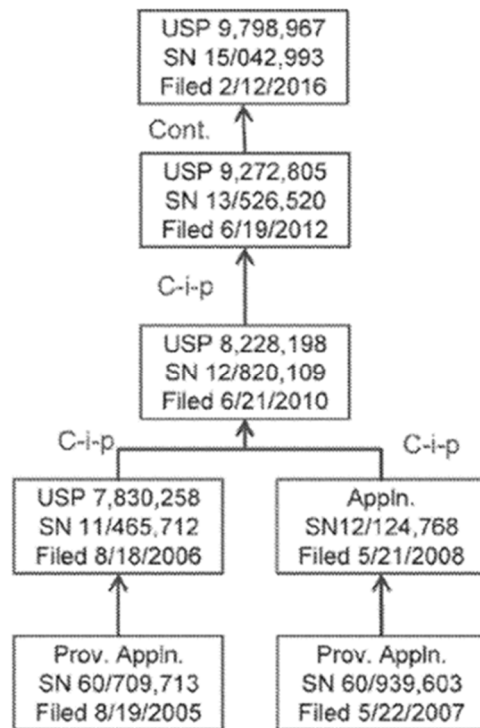
13[a]	a substrate;
13[b]	an antenna structure formed on the substrate; and
13[c]	an RFID integrated circuit chip which is electrically coupled to the antenna structure,
13[d]	wherein the RFID integrated circuit chip is encoded with a global trade item number including a unique object number, the unique object number comprising an object class information space including a block of at least 50 bits and a unique serial number space including a block of at least 38 bits,
13[e]	wherein the unique serial number space has one serial number instance from an allocated block of serial numbers, the allocated block being assigned a limited number of most significant bits, and
13[f]	wherein the unique serial number space comprises at least 3 most significant bits uniquely corresponding to the limited number of most significant bits of the allocated block.
Claim 14	
14	The RFID transponder of claim 13, wherein the unique serial number space further comprises remaining bits of lesser significance that together with the at least 3 most significant bits comprise the one serial number instance.
Claim 15	
15	The RFID transponder of claim 13, wherein the at least 3 most significant bits that correspond to the allocated block further correspond to an encoder that encodes the RFID transponder.
Claim 16	
16[pre]	An integrated circuit, comprising:
16[a]	a radio frequency circuit configured to backscatter a return link signal for processing by an RFID interrogator;

16[b]	control logic; and
16[c]	a memory,
16[d]	wherein the memory is configured with a unique object number space, the unique object number space comprising an object class information space and a unique serial number space,
16[e]	wherein the unique serial number space is encoded with one serial number instance from an allocated block of serial numbers, the allocated block being assigned a limited number of most significant bits, and
16[f]	wherein the unique serial number space comprises the limited number of most significant bits uniquely corresponding to the limited number of most significant bits of the allocated block and remaining bits of lesser significance that together comprise the one serial number instance.
Claim 17	
17	The integrated circuit of claim 16, wherein the object class information space is encoded with information comprising a company prefix, an item reference, a partition value, and a filter value.
Claim 18	
18	The integrated circuit of claim 16, wherein the unique object number is a portion of a serialized global trade item number.
Claim 19	
19	The integrated circuit of claim 18, wherein the serialized global trade item number is an EPC SGTIN-96 encoding.
Claim 20	

20	The integrated circuit of claim 16, wherein the limited number of most significant bits that correspond to the allocated block further correspond to an encoder that encodes the memory of the integrated circuit.
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C. Priority Date for the '967 Patent

47. I understand that the following is priority application chain for the '967 patent:



48. All the independent claims (and therefore all the claims) of the '967 patent recite “the allocated block [from the allocated block of serial numbers] being assigned a limited number of most significant bits.” *See supra* (limitations 1[e], 13[e] and 16[e]). The '967 patent discusses the concept, for example, in the

following terms: “A preferred method of providing pre-authorized blocks of object class serial numbers is to subdivide the entire object class serial number space into sectors that are defined by a limited number of MSB’s (Most Significant Bits) of the serial number field.” EX-1001, 8:11-15; *see also id.*, 8:23-26, 33:20-24.

49. I have been asked to analyze the specifications for the earliest applications in the chain that led to the ’967 patent to determine if they contain written description support for the above quoted limitation. Specifically, I have analyzed the specifications for Provisional Application No. 60/939,603, filed on May 22, 2007 (EX-1031, “’603 provisional”); Application No. 11/465,712, filed on August 18, 2006 (EX-1029, “’712 application”); and Provisional Application No. 60/709,713, filed on August 19, 2005 (EX-1030, “’713 provisional”).

50. I understand to satisfy the written description requirement, that a patent specification must indicate to a person of ordinary skill in the art that the inventor possessed the subject matter of the invention (commensurate with the full scope of the claims) at the time of the claimed priority date. I am further informed that the test for “possession” requires an objective inquiry into what is actually described within the four corners of the patent specification from the perspective of a person of ordinary skill in the art. I further understand that a disclosure that merely renders the claimed subject matter obvious does not satisfy the written description requirement.

51. I have reviewed the '603 provisional, '712 application, '733 provisional specifications and none disclose the concept of an assigning “a limited number of most significant bits” to an “allocated block of serial numbers” to a POSITA. None of these specifications includes the terms “most significant bits,” “MSB,” let alone “limited number of most significant bits,” and does not otherwise disclose the concept. *See, generally*, EX-1029, EX-1030 and EX-1031.

52. Thus, I conclude that the claims of the '967 patent cannot be entitled to earliest filing dates of the parent applications in 2005, 2006 and 2007, because they do not establish that the inventor possessed the full scope of the subject matter claimed by the '967 patent. Therefore, the '967 patent cannot have an earlier priority date than May 21, 2008, which is the filing date of Application No. 12/124,768.

VI. TECHNOLOGY BACKGROUND FOR THE '967 PATENT

53. A POSITA would have been well aware of RFID systems before the '967 patent including RFID tag commissioning.

54. RFID systems generally involved two primary components, RFID transponders, which are also referred to as “RFID tags” or simply “tags,” and RFID readers that communicate with tags using radio frequency (RF). There were two primary types of tags, passive and active. Passive tags do not have their own power sources and are powered by the radio waves transmitted by the reader, while active tags have their own power source. In general, a tag stored information, typically a

unique identifier, which could be transmitted to a reader in response to a request. For example, U.S. Patent 5,420,757 to Eberhardt (EX-1013) was filed in 1993 and described an RFID system as follows:

[A] radio frequency transponder of the type which generally includes a coil connected to an integrated circuit and which is responsive to a received radio frequency interrogating signal to produce a radio frequency identifying signal.

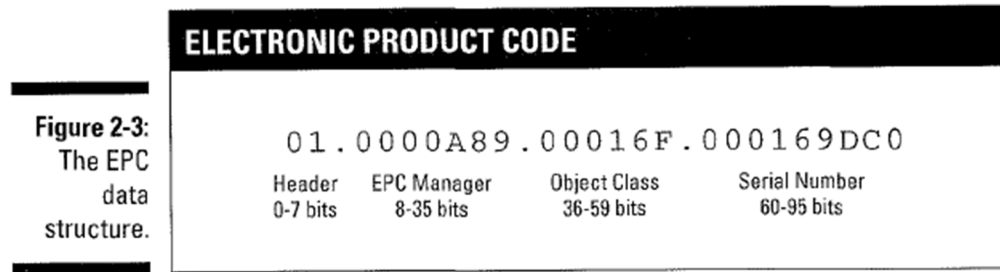
EX-1013, 1:15-22.

55. RFID systems were known to have many applications, such as for security access cards or object identification. *See, e.g., id.*, 1:26-31; *See, also* U.S. Patent 3,944,976 (“Electronic security apparatus”) to Rode (EX-1018) in 1976, and U.S. Patent 4,580,041 (“A compact passive RFID tags with unique electronic identifiers”) to Walton (EX-1019) in 1986.

56. One common application was for the purposes of inventory tracking, where a tag’s unique identifier was used to track products in a factory, retail, or other environment. As noted by the *Dummies* reference, Walmart had “spent millions of dollars since the late 1990s researching the efficacy of RFID systems to replace bar codes.” *Dummies*, 10. This was driven partly by the emergence of RFID retail supply chain solutions. *See, e.g.*, U.S. Patent 5,745,036 (“Electronic article security system for store which uses intelligent security tags and transaction data”) to Clare

(EX-1020) in 1998; U.S. Patent 5,963,134 (“Inventory system using articles with RFID tags”) to Bowers and Clare (EX-1021) in 1999; and U.S. Patent 6,025,780 (“RFID tags which are virtually activated and/or deactivated and apparatus and methods of using same in an electronic security system”) to Bowers and Clare (EX-1022) in 1999.

57. The EPC was a known standard identifier for use in RFID tags. The EPC was developed at the Massachusetts Institute of Technology Auto-ID Center in 2000 as an intended replacement for the Universal Product Code (“UPC”) barcode. *Dummies*, 10; *see also id.*, 44. The EPC was designed to be flexible. *Id.*, 45 (“The EPC was designed by the team at the MIT Auto-ID Center to be a simple and extensible code for efficient referencing to networked information: a worldwide license plate for every object ever made – an Internet of things was the vision.”). An EPC identifier is comprised of bits which are partitioned (i.e., subdivided) into several fixed-length fields, such that each field has certain bit length allocation. For example, the EPC described in *Dummies* is 96 bits long, and has partitions for a header, an “EPC manager” number, an “object class,” and “serial number”:



Dummies, 46-47. The “header” indicates that the data that follows is, in fact, an EPC, rather than some other type of identifier; the “EPC manager” is an identifier that identifies the company that manufactures the product identified by the object class; the “object class” is an identifier that identifies the class or type of product that the EPC corresponds to; and the “serial number” is a number that corresponds to a specific instance of the product identified by the object class. *See, e.g., id.*, 46-47.

58. The EPC is hierarchical in nature, and the combination of the EPC’s field bits are what creates its uniqueness. *See, e.g., id.* 238-239. In such a hierarchical numbering scheme, the higher order information essentially defines a sector for the lower order information that follows—the lower order information that follows is intended to be distinct within that sector. For example, the EPC manager number is unique to each manufacturer—it is assigned by a global issuing authority—and thus the lower order object class and serial number portions are within the sector defined by the manager number. Each EPC manager may then

specify one or more lower order object class identifiers, where each object class identifier uniquely corresponds to a product that the manufacturer makes. The term “unique” here means that it is unique within the EPC manager sector—not that it is globally unique. Then, the lower order serial numbers that follow the object class uniquely correspond to individual instances of the product. Again, in this context, “unique” means that the serial number is unique within the sector defined by the object class. The combination of object class and serial number alone can distinguish one instance of product from a different instance of that same product or another product by the same manufacturer. And, the combination of EPC manager, object class and serial number uniquely distinguishes a specific product instance from any other product, including those from another manufacturer.

59. For example, the EPC is described in a 2003 MIT White Paper (EX-1014) by David L. Brock from the MIT Auto-ID Center as follows:

2. ELECTRONIC PRODUCT CODE™

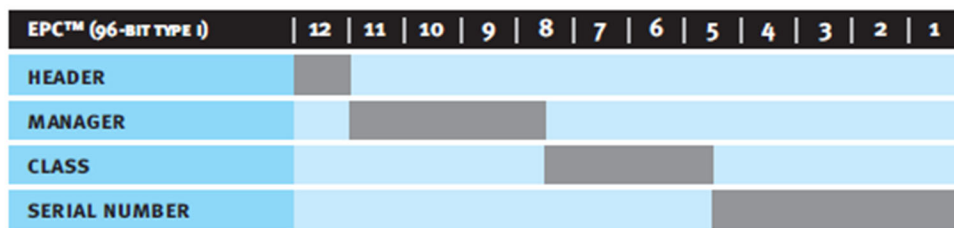
The Electronic Product Code™ (EPC™) is a numbering scheme that provides unique identification for physical objects, assemblies and systems. Information is not stored in the code, but serves only as a reference to on-line – or Internet-based – information [3].

The EPC™ is embodied in small number of sizes, though all have similar structure and format. The 96-bit EPC™ Type I code is divided into four, fixed length partitions, as shown in Table 1. The first partition is an 8-bit **EPC™ Header**, which defines the number, type and length of subsequent data partitions. The purpose of the header is to provide extensibility for future, unanticipated data requirements.

The second partition identifies the **EPC™ Domain Manager**; that is the company, or entity, responsible for maintaining the subsequent codes. In other words, it is the EPC™ manager's responsibility to maintain both object type codes and serial numbers in their domain. The EPC™ manager ensures reliable operation of the Object Name Service and maintains and publishes the on-line product documents. The EPC™ manager partition spans a 28-bit section, encoding a maximum of $2^{28} = 268,435,456$ companies.

The next partition, **EPC™ Object Class**, occupies the next 24-bits. When applied to retail products, the object class may be considered the skew or stock keeping unit (SKU). It may also be used for lot number or any other object-grouping scheme developed by the EPC™ manager. Since each organization is allowed more than 16 million object types, this partition could encode all the current UPC SKUs, as well as many other object classes. This is important as we expand beyond retail applications into general supply chain and manufacturing.

The final partition encodes a unique object identification number. For all objects of a similar type, the **EPC™ Serial Number** provides 36-bits, or $2^{36} = 68,719,476,736$, unique identifiers. Together with the product code, this provides each company with 1.1×10^{18} unique item numbers — currently beyond the range of all manufactured products.



EX-1014, 3-4.

60. The concept of partitioning a fixed-length number in a hierarchical manner to create unique identifiers was well-known to a POSITA before the '967 patent, as can be seen from the discussion of EPCs above. This concept was ubiquitous long before the '967 patent and serves as the basis for many other types of identifiers that have been in common, everyday use for decades, including for Social Security Numbers, Vehicle Identification Numbers, telephone numbers and many others. As described by the 2003 MIT White Paper , “nearly every coding system follows a similar pattern”:

There is a wide variety of identification codes and coding schemes in use today. From the familiar bar-code to telephone numbers, each code system serves to identify and, in many cases, describe the associated entity.

Nearly every coding system follows a similar pattern – a series of numbers of fixed or variable length that encodes characteristics of the identified entity. The entity may be physical, as in the case of the Universal Product Code (U.P.C.), or virtual, in the case of patent numbers.

The numbers are represented in a wide variety of formats – from standard base-ten human language symbols to printed spatial patterns to electronic digital storage. In all cases, the numbers are the same; it is only their method of storage that varies. Furthermore, it is relatively easy to translate from one representation to another.

Although there are a great variety of codes, nearly every one contains a minimum of amount of information. Most contain a country or regional designation (at times represented implicitly in the length and structure of the code), a responsible party (i.e. a manufacturer or originator of the identified entity) and the entity identifier. *Besides this basic information, most coding systems embed additional data, such as serial number,*

*packaging, transaction data and other information
pertinent to a target application.*

EX-1014, 4 (emphasis added).

61. For example, Social Security Numbers (“SSNs”) have been used in the US since the 1930s. See <https://www.ssa.gov/history/ssn/geocard.html>; see also EX-1014, 14. An SSN is a hierarchical 9-digit number that is partitioned into three sections: area number, group number, and serial number. Like the EPC, the higher order fields of the SSN define the sector for the lower order fields. The group number occupies the first three digits of the SSN, and thus occupy the highest order position within the SSN. The group number is the next two digits in the sequence after the area number. The final four digits that follow the group number are a serial number within that group. For example, as described in the 2003 MIT White Paper:

3.6. Social Security Number (SSN)

In 1935, the U.S. established a permanent national pension system, financed through contributions by both the employee and employer. As a means of identifying the beneficiaries, unique Social Security Numbers were issued. In the United States, these Social Security Numbers (SSN) also serve as a common means of personal identification — from driver's licenses, to voter registration, to medical records.

The Social Security Number is a simple 9-digit number, divided into three sections of three, two and four digits, as shown in Table 18 [14]. The SSN can therefore provide only a total of 1 billion unique identifiers. Certainly enough for the U.S. population, but insufficient if applied globally.

The first partition, the area number, is three digits and is issued geographically beginning in the northeast and moving to the south west. The “geographical code,” however, is loosely defined and was intended simply as a bookkeeping device for internal use and was never intended to convey accurate geographic information.

The second partition – the group number – is two digits ranging from 01 to 99 though not sequentially. The group numbers were allocated to odd numbers from 01 to 09 and even numbers after that. The group numbers are allocated to states. After all numbers in group 98 of a particular area are filled, then the even numbers from 02 to 08 and the odd numbers are issued.

The third partition is the serial number running consecutively from 0001 to 9999.

SSN		9		8		7		6		5		4		3		2		1
AREA NUMBER																		
GROUP NUMBER																		
SERIAL NUMBER																		

EX-1014, 14.

62. As another example, Vehicle Identification Numbers (“VINs”), which were defined in the 1950’s, follow a similar pattern:

3.4. Vehicle Identification Number (VIN)

Vehicle Identification Numbers (VIN) first appeared on American automobiles in 1954. The VIN was intended to identify the vehicle and provide a condensed description of the vehicle's characteristics. Early VIN numbers came in a variety of formats and configurations. The only way to interpret these numbers was through a VIN decoder.

In 1981, the U.S. National Highway Traffic Safety Administration (NHTSA) required all over-the-road vehicles to contain a standard, 17-character VIN, as shown in Table 14 [11]. In later years — in an effort to prevent theft — the Department of Transportation required VIN numbers to be marked on major components.

VIN	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
MANUFACTURER CODE																	
US MANUFACTURER CODE																	
MODEL CODE																	
U.S. MODEL CODE																	
MODEL YEAR																	
PRODUCTION PLANT																	
MODEL TYPE																	
BODY OR ENGINE TYPE																	
SEQUENTIAL ID NUMBER																	

Id., 12.

63. EPC Tag Data Standards Version 1.1 Rev.1.24 (April 1, 2004) (“TDS-2004”) (EX-1011) describes several ways to divide radio frequency identification tag numbers into various fields differently for different business purposes. Different data formats are described for IDs generally (GID), merchandise (SGTIN), shipping containers (SSCC), locations (SGLN), returnable assets (GRAI), and unique assets (GIAI). TDS-2004 notes that EPC numbering systems “to divide a code into the part *assigned to* the managing entity versus [...] the part that is *managed by* the managing entity (the remainder) ...” See, *TDS-2004*, 11 (emphasis added). That is,

the party commissioning the tag needs to keep their codes with their allotted numeric space to avoid confusion among users of tags of the same standard, but has freedom without the “remainder,” i.e., those bits available for serial numbers and other information. A portion of the more significant bits of the tag number are reserved, in part, for uniquely identifying the managing entity. The remainder is not. As illustrated by the differences among various EPC standards, e.g., GID, SGTIN, SSCC, SGLN, GRAI, and GIAI, the opportunity for and use of a great many variations was understood at the time.

64. A POSITA was thus very familiar with the concept of partitioning a fixed-length number in a hierarchical manner, whether decimal or binary (as in the case of an EPC), into multiple subdivisions, with each subdivision containing embedded information. As indicated by the 2003 MIT White Paper, “most coding systems embed additional data, such as serial number, packaging, transaction data and other information pertinent to a target application.” EX-1014, 4. Thus, a POSITA would have understood that when information was to be included in a hierarchical identifier, that information would occupy its own partition within that hierarchy. In the case of RFID tag identifiers, such as the EPC, it was known that those partitions would occupy fixed bit areas within the identifier, as discussed above. As discussed in U.S. Patent 7,425,888 to Powell (EX-1017), filed July 29, 2005, an RFID identifier can also include information, such as lot number, within its

hierarchy, and that information occupies its own identifiable portion of bits within the larger identifier:

Tag 102 is identified by a tag identification bit sequence. The tag identification bit sequence may be permanently stored or may be temporarily stored in memory in data storage section 206. In an embodiment, tag identification bit sequences are hierarchical. That is, for a tag population, a subset of the tag identification bit sequence is identical for all tags in a tag population. Thus, in such an embodiment, for a tag population 120, reader 104 does not need to negotiate the entire identification bit sequence to identify each tag in the tag population. For example, a tag identification sequence may consist of a manufacturer bit string, a lot number bit string, and tag ID bit string. In this example, all tags in a tag population 120 may have the same manufacturer bit string and a subset of all tags in tag population 120 will have the same lot number bit string. The tag ID bit string is then the uniqueness element for each tag in the tag population.

EX-1017, 4:25-40.

65. A POSITA would have also been familiar with the concept of preauthorizing ranges of serial numbers prior to the '967 patent. U.S. Patent 7,201,309 to Oakes (EX-1015), filed in 2004, described allocating blocks of EPC serial numbers to multiple sites:

While the allocation process described above results in the assignments of a single unique serial number to an item, the serial number allocation system 14 can alternately assign a block of serial numbers to a packaging site 12. When the serial number allocation system 14 provides a block of serial numbers to the packaging site 12, the packaging site 12 assigns the unique serial numbers to each item until each unique serial number in the block of serial numbers has been assigned. At this point, if additional numbers are needed, the packaging site 12 can query the serial number allocation system 14 to receive another block of serial numbers. This can be advantageous when a line is generating a large volume of the same type of product for the same manufacturer because this process reduces the amount of communication between the serial number allocation system 14 and the packaging site 12.

EX-1014, 4:11-26. And, as is discussed in more detail below in the overview of the prior art used in this Petition, Dummies and Traub also described preauthorizing ranges of serial numbers to commission RFID tags. *See, e.g., Dummies*, 240 (“A range of serial numbers for each product is allocated to each manufacturing facility.”); *Traub*, (“In one embodiment, the EPC server can create pools of EPC codes.”).

66. To this end, POSITAs knew that using a prefix that was intended to be prepended to identifiers could accomplish the same function as centrally assigning groups of unique identifiers. For example, RFID Essentials, published in 2006, described:

Information sharing

By definition, track and trace applications require information sharing. One of the key requirements when merging information is coordinated identification. If one producer claims this flat of strawberries should be called 12345 and another claims that a different flat of strawberries should be called 12345, how can the inconsistency be reconciled? What if one producer reuses numbers and sends a flat 12345 this week and another flat 12345 next week? In any track and trace system, each identity must be unique across all producers and for as long a period as the information must be maintained. This can be accomplished in several ways, but the simplest method is either to assign a prefix to each producer to put at the beginning of their identities or to assign blocks of identities to each producer from a central authority (which accomplishes the same thing). Whatever method is used must be universally enforced—otherwise, the integrity of the data in the system will be suspect.

EX-1016, 15 (highlighting added).

67. RFID tag commissioning was known to be typically combined with other labeling functions, such as visible indicia printing, bar code reading and/or bar code printing. *See, e.g., Dummies*, 238. A POSITA knew about computerized management of serial number label information. For human indicia, information like make, model, and serial number indicators may appear as separate parts of a label, where they are each marked separately as such. In an EPC, this information is combined. Despite this, all of the business rules, precautions, and techniques known previously for the production of product labels that include serial numbers

still apply to EPCs. Hence, a POSITA would have been aware of computer control of serialization going back at least as far as U.S. Patent 3,194,154 (“Punch card controlled web feeding and printing apparatus”) to Mckeag (EX-1023) in 1965. Hence, an engineer in the field of RFID tag printing would have understood what was needed to obtain and pre-position batch control information across multiple printers in one or more facilities to avoid duplication of serial numbers across broader operations of an entity.

68. For example, as described by the 2003 MIT White Paper , portions of EPC fields were used to track how and where they are used:

The object class may be considered the product skew or stock keeping unit (SKU). It may also be used for lot number, or any other object grouping scheme developed by the EPC manager. Since each manufacturer is allowed more than 16 million object types, this partition could encode all the current UPC SKUs, as well as many other object classes.

EX-1014, 5. Computers can manage and control print operations across networks of equipment to ensure proper uniqueness of serial numbers.

69. Management of EPCs is like management of any other unique identifier. For human legibility, we may group elements of the identifier separately, as with distinct make, model, version, lot, batch, and serial numbers. On currency,

we may distinguish between mint marks and serial numbers. And we humans may make model, version, lot, batch, and serial numbers hierarchical within themselves. But to machines, it is all the same. The separation of concatenated computer data, where sub-fields of binary data are run together for transmission purposes is arbitrary, and left to the discretion of the programmer, for how to fit those items of data back into the business rules of the human world. As of 2008, any POSITA would have known that, and be able to adapt data manipulations to the specific requirements of the engineering application at hand.

VII. CLAIM CONSTRUCTION OF THE '967 PATENT TERMS

70. I understand that the words of a claim are generally given their ordinary and customary meaning as understood by a POSITA in light of the patent specification and prosecution history.

71. I understand that the U.S. District Court for the District of Oregon issued a claim construction order construing various terms of the '967 patent claims in the case captioned *Adasa Inc. v. Avery Dennison Corp.*, 6:17-cv-01685 (D. Or. January 22, 2019), which I have reviewed. *See* EX-1007. The court indicated the following constructions, which I apply in this declaration:

- “object class information space” (claims 1, 2, 13, 16, 17) means “data field within the memory of the RFID integrated circuit chip for information identifying the class of an object, such as a company prefix, item reference code, partition value, and/or filter value.” *Id.* at 3.

- “unique serial number space” (claims 1, 5, 13, 14, 16) means “data field within the memory of the RFID integrated circuit for information identifying a unique serial number.” *Id.*
- “being assigned a limited number of most significant bits” (claims 1, 13, 16) means “includes a limited, predefined sequence of higher order bits at the leading end.” *Id.*
- “remaining bits of lesser significance” (claims 1, 14, 16) means “the remaining lower order bits at the trailing end.” *Id.*
- “is encoded with one serial number instance” (claims 1, 16) means “has stored within it one serial number instance.” *Id.* at 4.
- “an allocated block of serial numbers” (claims 1, 13, 16) means “a pre-authorized range of serial numbers.” *Id.* 4, 9.
- “uniquely corresponding” (claims 1, 13, 16) is construed as having its “plain and ordinary meaning as Plaintiff Adasa suggests.” *Id.* 9. I have reviewed the claim briefing to determine what Adasa suggested was the plain and ordinary meaning. In the briefing, Adasa stated that “Patentee added this term as a clarifying amendment to make clear that the serial number encoded within the claimed RFID transponder utilizes the same most significant bits of the allocated block.” *See* EX-1008 at 18.

72. For all other terms, I apply their plain and ordinary meanings.

VIII. THE CLAIMS OF THE '967 PATENT ARE OBVIOUS IN LIGHT OF PRIOR ART

73. The Challenged Claims of the '967 patent are obvious in view of the prior art discussed below.

A. Claims 1, 6-12, 16 and 20 are Obvious Based on RFID for Dummies combined with Traub (Ground 1)

74. As I explain below, it is my opinion that claims 1, 6-12, 16 and 20 are obvious in light of Dummies and Traub.

1. RFID for Dummies (“Dummies”) (EX-1009)

75. RFID for Dummies was published in 2005. Dummies discloses the well-known basic components of an RFID system, which includes a “transponder (more commonly just called a tag)” and a “transceiver (more commonly called a reader).” *Dummies*, 78; *see also id.*, 19-20. A tag has an integrated circuit (IC), which is also referred to as a chip, and memory that is programmed with an identifier. *See id.*, 79. (“A tag has a small computer chip (or memory area) that is programmed with information that uniquely identifies the tag.”).

76. Dummies discloses “[a] passive tag consists of three components that enable it to receive and transmit signals in its ultra-efficient way,”:

An integrated circuit or chip: This chip stores data and executes specific commands. Most of the passive tags today carry 96 bits of memory, although some can carry as little as 2 bits or as much as 1,000 bits. The chip

design determines whether the tag has read-only or read-write properties....

An antenna (or coupling element): The antenna's function is to absorb RF waves and then broadcast a signal back out. The antenna powers up the tag by collecting the energy from the RF field and exciting the onboard chip into action. This process is called coupling because the tag antenna must “couple” with the electromagnetic fields that the RFID reader emits. In more technical terms, coupling describes the extent to which power is transferred from one system component to another - in this case, from air to the antenna....

The substrate (or material that holds it all together): This is most often a Mylar or plastic film. Both the antenna and chip are attached to it.

Id., 89.

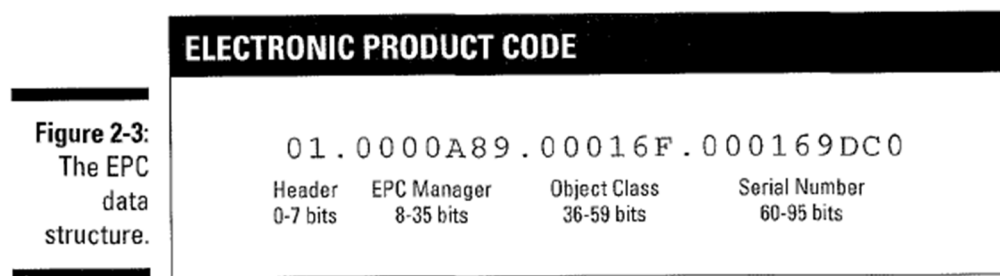
77. Dummies discloses that an RFID tag communicates with a reader using “backscatter”:

The type of communication that allows this exchange to happen is called backscatter. The reader sends out an electromagnetic wave at one specific frequency. That wave hits the RFID tag, and the tag then "scatters back" a wave at a different frequency with the chip's information encoded in those backscatter waves.

Id., 20.

78. Dummies discloses that RFID tags may store an EPC. *Id.*, 10 (“The EPC is the individual number associated with an RFID tag or chip.”).

79. Dummies discloses that the EPC was developed by “MIT’s Auto-ID Center in 2000. “Depending on the total data-carrying capacity of a tag, an EPC number can be from 32 to 256 bits long.” Dummies discloses that the EPC number has multiple “partitions,” which are shown in Figure 2-3”:



Id., 46. According to Dummies, the “Header...tells the RFID reader what type of number follows,” because the EPC is desitend to carry other information “instead of a complete EPC structure.” *Id.* The “next partition is the EPC Manager Number, which identifies the company or company entity.” “Next is the object class, similar to a stock-keeping unit, or SKU.” *Id.* And, “[l]astly (and most importantly) is a serial number, which is the specific instance of the object class being tagged... it identifies the item with the specific tag as *that* item (not just a type of item).” *Id.*, 47.

80. The EPC is encoded in a tag's memory using "an RFID label printer" or "reader" to write the data to the tag. *Id.*, 238. "Whether you use an RFID label printer or write to the tags directly through the readers, the technical aspect of sending a specific RF signal out the antenna with a write command is always the same." *Id.*

81. Dummies discloses that an EPC, like "[a]ll numbering schemes," relies on a "numbering hierarchy." *Id.*, 238. "The general identifier EPC comprises three numbers whose combination uniquely identifies an item. Those three numbers are the manufacturer number, the product number, and the serial number." *Id.*, 239. The EPCGlobal organization "assigns a unique manufacturer number (also called an EPC Manager Number) to each of its member organizations." Each member organization, i.e., manufacturer, "is free to assign a product number (also called an Object Class) to each of that member's products." and "to assign a unique serial number to item manufactured by that member." *Id.*

82. Dummies discloses that "[b]ecause all products of the same type receive the same product number, the serial numbers must be maintained in order to enable unique item identification." *Id.*, 239. In cases where a product is manufactured on a single product line in a single location, then "assigning unique serial numbers to every item manufactured is straightforward" and a "central numbering allocation authority may be used." *Id.* "Difficulties arise when multiple

lines, potentially at multiple locations, are used to manufacture the same product.”

Id.

When multiple manufacturing lines are used to manufacture the same product, a centralized numbering authority is more difficult to manage. The centralized authority must be consulted every time an item is produced, requiring that it be accessible over the network whenever production runs are in process.

Id. “An always-accessible central number authority isn’t practical for many companies.” *Id.*

83. In these situations, Dummies suggests that “companies can use an intelligent hierarchy imposed on the serial number allocation to decentralize and make feasible the allocation of unique serial numbers across all manufacturing lines.” *Id.* Dummies provides a “simple example of a decentralized, hierarchical approach to allocating serial numbers” that “allocates” ranges of serial numbers to each manufacturing facility, suggesting to subdivide the serial number into a “facility number, line number and subserial number”:

A range of serial numbers for each product is allocated to each manufacturing facility. Within a facility, a range of numbers from those allocated to the facility is allocated to each line producing a particular product. In this way, the serial number is effectively subdivided into a facility

number, line number, and subserial number, in which the allocation hierarchy is maintained between facility number and line number.

Id., 240.

2. U.S. Patent 8,373,545 (“Traub”) (EX-1010)

84. U.S. Patent 8,373,545 to Traub is entitled “EPC provisioning system using business rules.” Traub discloses RFID systems and that have tags that “can include a unique electronic product code (EPC).” *Traub*, 1:25-26; *id.*, 1:30-38 (“The EPC includes sections that indicate the product and manufacturer of a given item as well as a section to uniquely identify an object.”).

85. Traub discloses a system that assigns blocks of EPCs (referred to as “blocks” or “pools”) to each of multiple different sites for a manufacturer using “business rules.” *See, e.g., id.*, Abstract (“The EPC server can use business rules to determine the EPC codes for the multiple client sites”); *see also id.* 1:67, 3:48-50, 4:2-4, 4:12-19, Figs. 4a, 4B. Figure 4A illustrates “[a]n EPC provisioning system 400” with “EPC server 402 adapted to dynamically provide EPC code blocks 404 and 406 for one product to multiple client sites” (3:66-4:2):

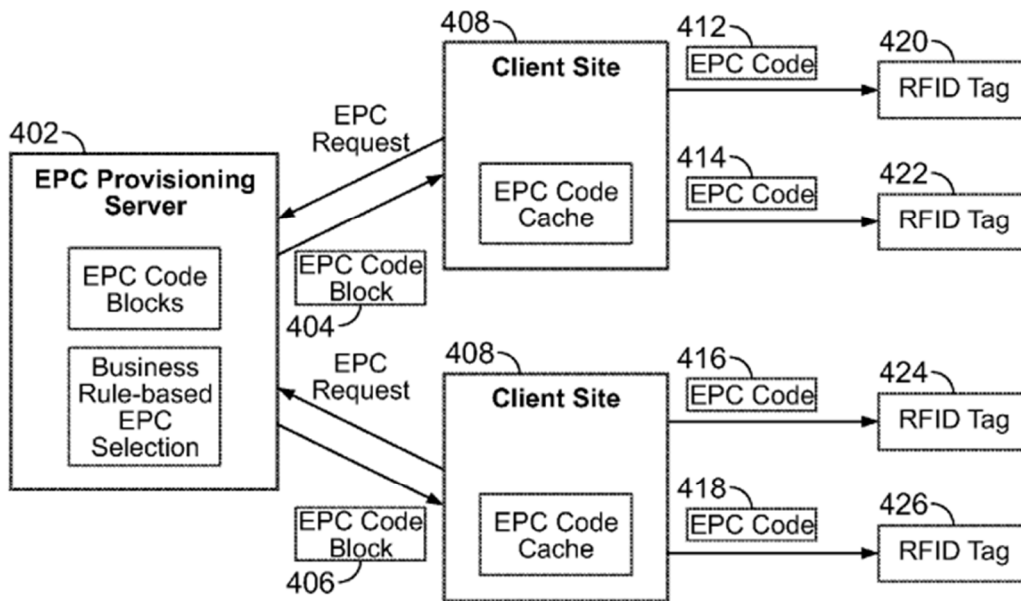


FIG. 4A

Id., Fig. 4A.

86. As part of using business rules to create an EPC block for each client site, Traub discloses encoding business information directly into the EPCs:

[T]he EPC server can create pools of EPC codes. The EPC codes can be created based on business policies that can be used to indicate business information in the EPC code. The RFID edge servers can obtain EPC codes from the pool, store these EPC codes into a local cache and then use these EPC codes in the construction of RFID tags, such as with an RFID tag printer.

Id., 3:40-47. The business information that is encoded into the EPC can “indicate business information such as lot number and/or location.” *Id.*, 3:49-52; *see also id.*, 4:7-9 (“The EPC code blocks can be assigned to [sic] as to indicate lot number. The EPC code blocks can be assigned so as to indicate location.”).

87. Traub discloses that the EPC is comprised of bits: “EPCs currently can have either a 64- or 96-bit code numbering scheme.” *Id.*, 1:28-30. Traub discloses that the portion of the EPC that contains the serial number is partitioned to include the business information at the beginning of the serial number. For example, I have highlighted Traub’s Figure 4B, below, to illustrate where this business information is encoded, i.e., in the leading bits of the serial number, with the serial number highlighted in yellow, the location information in orange and lot information in green:

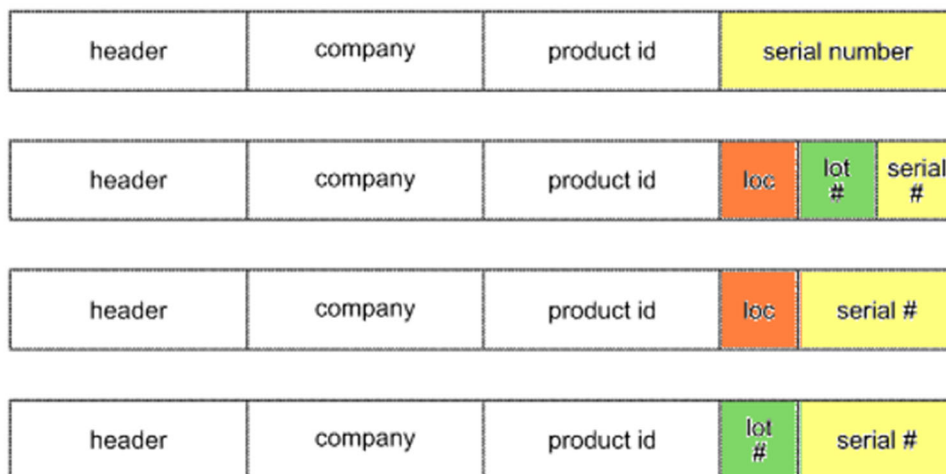


FIG. 4B

Traub, Fig. 4B (highlighting added).

3. Motivation to Combine Dummies and Traub

88. A POSITA would have been motivated to combine the teachings of Traub with Dummies.

89. Dummies and Traub are in the same technical field. As I discuss above, Dummies and Traub both relate to RFID technology. Moreover, both references use the parlance of the EPC standard to describe techniques for manipulating unique RFID tag identifiers. *See Dummies*, 10 (“The EPC is the individual number associated with an RFID tag or chip.”); *Traub*, 1:25-26 (“The RFID tag can include a unique electronic product code (EPC)”).

90. Dummies and Traub also relate to and describe systems for allocating ranges of unique RFID identifiers to entitles managing the commissioning of tags on multiple production lines and/or at multiple locations. Dummies describes a system for “allocating unique numbers across many lines and locations” as a range of serial numbers. *Dummies*, 239. Traub describes “using an EPC server 402 to dynamically provide EPC code blocks 404 and 406 for one product to multiple client sites.” *Traub*, 3:34-36.

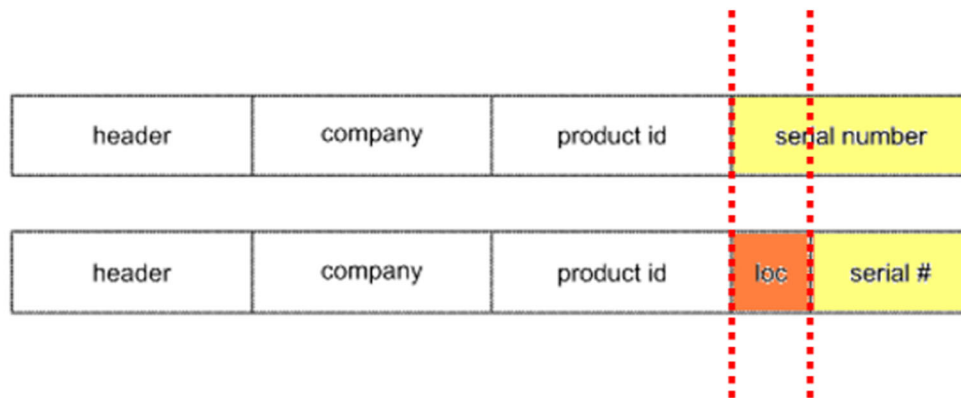
91. Dummies discloses that each tag manufacturer is responsible for assigning unique identifiers to each of its products, where these identifiers include a shared product number (i.e., object class) and a unique value (i.e., serial number).

Dummies addresses the challenges of managing unique serialized numbers for a given product where that product may be crated or processed at multiple manufacturing facilities. *See Dummies*, 239. To this end, Dummies suggests “a simple example” solution that is “a decentralized, hierarchical approach to allocating serial numbers.” *Id.*, 240. The example includes allocating a “range of serial numbers for each product...to each manufacturing facility” where “the serial number is effectively subdivided into a facility number, line number, and subserial number, in which the allocation hierarchy is maintained between facility number and line number.” *Id.*, 240.

92. A POSITA would have understood that there are many ways to apply this advice in view of different business requirements. The POSITA would investigate how others may have approached the challenge. Thus, a POSITA would have been motivated to look to other sources for solutions, such as the one taught by Traub.

93. Traub teaches a solution that uses “business rules” to allocate blocks of EPCs to multiple facilities that manufacture the same product. *See Traub*, 3:40-47. A POSITA would have recognized Traub’s business rules approach met Dummies’ criteria of providing a “a decentralized, hierarchical approach to allocating serial numbers.” Traub’s solution is “decentralized”—it uses “edge servers” located at multiple “client sites” to assign EPCs to the tags. *Traub*, 3:48-49 (“the client

sites...can be, or can include, RFID edge servers”). A POSITA also would have recognized that Traub’s approach is “hierarchical.” Traub discloses encoding business information, such as location directly into the beginning of the EPC serial number, as shown below when consider Figure 4B of Traub:



Id., Fig. 4B (excerpted and highlighting and dotted line added).

94. Subdividing/partitioning the serial number in this manner reflects its hierarchical nature. As a POSITA would know, and Dummies acknowledges, an EPC is hierarchical. *Dummies*, 238-239. A POSITA would also recognize that encoding business information, such as location, into the beginning of a serial number indicates that the serialized number that follows pertains specifically to that location, i.e., it is hierarchical. As discussed in the Technology Background above, a POSITA would have been familiar with the ubiquitous concept of partitioning and organizing unique identifiers hierarchically.

95. A POSITA would have had more than a reasonable expectation of success in applying the teachings of Traub to address the EPC allocation suggested in *Dummies*. Both *Dummies* and Traub use EPCs in RFID tags, which is an identification code that was well-known to and understood by a POSITA, and Traub discloses a simple technique to encode business information into the serial number portion (i.e., space) of the known EPC by merely partitioning the leading bits of the serial number space to indicate the location. Designing and implementing such a solution was well within the engineering skillset of a POSITA.

96. Thus, a POSITA would have been motivated to combine *Dummies* and Traub and would have had a reasonable expectation of success in doing so.

4. Independent Claim 1

97. Claim 1 is obvious in light of *Dummies* and Traub for the reasons I explain below.

a. 1[pre]: An RFID transponder comprising:

98. *Dummies* discloses “an RFID transponder.” *Dummies* discloses an RFID tag which is an “RFID transponder.” For example, *Dummies* states that “[a]n RFID system is composed of three components: a programmable transponder or tag, a reader (with an antenna), and a host.” *Dummies*, 37. *Dummies* further indicates “[a]n RFID tag is a classic example of a transponder.” *Id.*, 372 (emphasis added).

b. 1[a]: a substrate;

99. Dummies discloses “a substrate.” For example, Dummies discloses that an RFID transponder includes a substrate:

A passive tag consists of three components that enable it to receive and transmit signals in its ultra-efficient way:

- ✓ **An integrated circuit or chip:** This chip stores data and executes specific commands. Most of the passive tags today carry 96 bits of memory, although some can carry as little as 2 bits or as much as 1,000 bits. The chip design determines whether the tag has read-only or read-write properties. Three or four manufacturers, including Phillips, Texas Instruments, Fairchild, and ST Micro, are the primary makers of these chips. Most tag manufacturers purchase their IC chips from these primary sources, so you have little chance of getting a cost advantage in chip purchase.
- ✓ **An antenna (or coupling element):** The antenna's function is to absorb RF waves and then broadcast a signal back out. The antenna powers up the tag by collecting the energy from the RF field and exciting the onboard chip into action. This process is called *coupling* because the tag antenna must “couple” with the electromagnetic fields that the RFID reader emits. In more technical terms, coupling describes the extent to which power is transferred from one system component to another — in this case, from air to the antenna.

The size of the antenna is critical to the performance of the tag because the antenna's size usually determines a tag's read range. Simply put, a bigger antenna can collect more energy and therefore broadcast more energy back out. You can usually determine the size of a tag's antenna by looking at the tag: the bigger the tag, the bigger the antenna. You might see antennas (and therefore tags) that are the size of a dime and others that are the size of a business envelope.

Another characteristic of antennas that enable them to send and receive signals is the antenna's shape: Low-frequency (LF) and high-frequency (HF) antennas tend to be coils because these frequencies are predominantly magnetic in nature. Ultra-high-frequency (UHF) designs tend to look like radio or old-style television antennas because UHF frequencies are more purely electric in nature.

Later in this chapter, I explain how tag antennas work and how different engineering designs can improve antenna performance in various RFID applications.
- ✓ **The substrate (or material that holds it all together):** This is most often a Mylar or plastic film. Both the antenna and chip are attached to it.

Id., 89 (highlighting added).

c. **1[b]: an antenna structure formed on the substrate;
and**

100. Dummies discloses “an antenna structure formed on the substrate.” For example, Dummies discloses an RFID transponder includes an antenna and that it is attached to a substrate:

A passive tag consists of three components that enable it to receive and transmit signals in its ultra-efficient way:

- ✓ **An integrated circuit or chip:** This chip stores data and executes specific commands. Most of the passive tags today carry 96 bits of memory, although some can carry as little as 2 bits or as much as 1,000 bits. The chip design determines whether the tag has read-only or read-write properties. Three or four manufacturers, including Phillips, Texas Instruments, Fairchild, and ST Micro, are the primary makers of these chips. Most tag manufacturers purchase their IC chips from these primary sources, so you have little chance of getting a cost advantage in chip purchase.
- ✓ **An antenna (or coupling element):** The antenna's function is to absorb RF waves and then broadcast a signal back out. The antenna powers up the tag by collecting the energy from the RF field and exciting the onboard chip into action. This process is called *coupling* because the tag antenna must “couple” with the electromagnetic fields that the RFID reader emits. In more technical terms, coupling describes the extent to which power is transferred from one system component to another — in this case, from air to the antenna.

The size of the antenna is critical to the performance of the tag because the antenna's size usually determines a tag's read range. Simply put, a bigger antenna can collect more energy and therefore broadcast more energy back out. You can usually determine the size of a tag's antenna by looking at the tag: the bigger the tag, the bigger the antenna. You might see antennas (and therefore tags) that are the size of a dime and others that are the size of a business envelope.

Another characteristic of antennas that enable them to send and receive signals is the antenna's shape: Low-frequency (LF) and high-frequency (HF) antennas tend to be coils because these frequencies are predominantly magnetic in nature. Ultra-high-frequency (UHF) designs tend to look like radio or old-style television antennas because UHF frequencies are more purely electric in nature.

Later in this chapter, I explain how tag antennas work and how different engineering designs can improve antenna performance in various RFID applications.
- ✓ **The substrate (or material that holds it all together):** This is most often a Mylar or plastic film. Both the antenna and chip are attached to it.

Id., 89 (highlighting added).

101. A POSITA would have understood that antennas in RFID tags are typically formed on a tag's substrate. For example, Dummies discloses an example tag with a folded dipole antenna that has an "antenna substrate."

✓ **Rafsec Folded Dipole CCT tag:** The Rafsec tag is unique because it is a folded dipole. The current for the antenna is strongest at the midpoint of the antenna; accordingly, the strongest radiation occurs at the center of the antenna substrate, along the upper strip. This offers good long-distance read range. **Dimensions:** 4.0 x 0.5 inches

Id., 95 (highlighting added)

d. **1[c]: an RFID integrated circuit chip which is electrically coupled to the antenna structure,**

102. Dummies discloses "an RFID integrated circuit chip which is electrically coupled to the antenna structure." For example, Dummies discloses an RFID transponder includes an integrated circuit and an antenna that powers it:

A passive tag consists of three components that enable it to receive and transmit signals in its ultra-efficient way:

- ✓ **An integrated circuit or chip:** This chip stores data and executes specific commands. Most of the passive tags today carry 96 bits of memory, although some can carry as little as 2 bits or as much as 1,000 bits. The chip design determines whether the tag has read-only or read-write properties. Three or four manufacturers, including Phillips, Texas Instruments, Fairchild, and ST Micro, are the primary makers of these chips. Most tag manufacturers purchase their IC chips from these primary sources, so you have little chance of getting a cost advantage in chip purchase.
- ✓ **An antenna (or coupling element):** The antenna's function is to absorb RF waves and then broadcast a signal back out. The antenna powers up the tag by collecting the energy from the RF field and exciting the onboard chip into action. This process is called *coupling* because the tag antenna must "couple" with the electromagnetic fields that the RFID reader emits. In more technical terms, coupling describes the extent to which power is transferred from one system component to another — in this case, from air to the antenna.

The size of the antenna is critical to the performance of the tag because the antenna's size usually determines a tag's read range. Simply put, a bigger antenna can collect more energy and therefore broadcast more energy back out. You can usually determine the size of a tag's antenna by looking at the tag: the bigger the tag, the bigger the antenna. You might see antennas (and therefore tags) that are the size of a dime and others that are the size of a business envelope.

Another characteristic of antennas that enable them to send and receive signals is the antenna's shape: Low-frequency (LF) and high-frequency (HF) antennas tend to be coils because these frequencies are predominantly magnetic in nature. Ultra-high-frequency (UHF) designs tend to look like radio or old-style television antennas because UHF frequencies are more purely electric in nature.

Later in this chapter, I explain how tag antennas work and how different engineering designs can improve antenna performance in various RFID applications.
- ✓ **The substrate (or material that holds it all together):** This is most often a Mylar or plastic film. Both the antenna and chip are attached to it.

Id., 89 (highlighting added). Because the “integrated circuit or chip” is part of an RFID tag, Dummies discloses “an RFID integrated circuit chip.” As can be seen, Dummies explains that the “antenna powers up the tag by collecting the energy from the RF field and exciting the onboard chip into action.” *Id.* For an antenna to power up the tag and excite the integrated circuit chip “into action,” a POSITA would have understood that it must be “electrically coupled” to the chip, otherwise the antenna could not transfer power to the chip.

- e. **1[d]: wherein the RFID integrated circuit chip is encoded with a unique object number, the unique object number comprising an object class information space and a unique serial number space,**

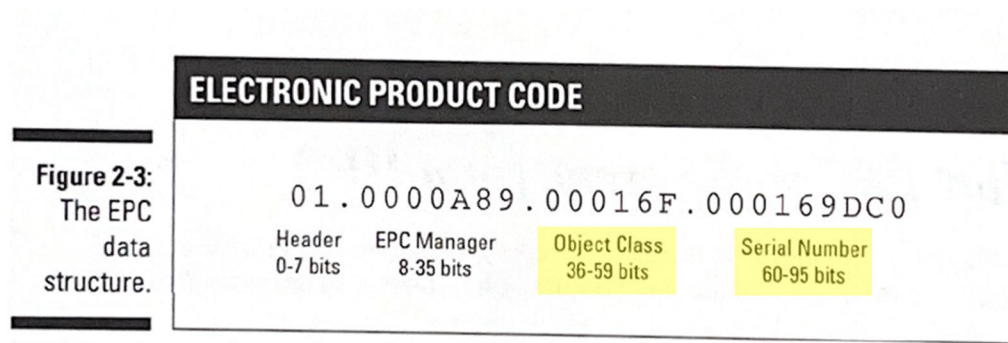
103. Dummies discloses “the RFID integrated circuit chip is encoded with a unique object number, the unique object number comprising an object class information space and a unique serial number space.”

104. First, Dummies discloses the claimed “the RFID integrated circuit chip is encoded with a unique object number.” For example, Dummies discloses that the RFID transponder has an integrated circuit with memory for storing an electronic product code (“EPC”): “[t]he tag has a small computer chip (or memory area) that is programmed with information that uniquely identifies the tag.” *Dummies*, 79; *see also id.*, 51-52 (describing “four distinct memory banks” including one that stores the “EPC data”).

105. An EPC is a unique number for identifying a tag or object it is attached to: “The EPC is the individual number associated with an RFID tag or chip.” *Id.*, 10; *see also id.*, (“A tag’s embedded EPC number is unique to that tag.”); *id.*, 45 (“The electronic product code...uniquely identifies objects.”).

106. Dummies also discloses the claimed “unique object number comprising an object class information space and a unique serial number space.” For example, Dummies discloses that an EPC data structure has a portion of bits for object class,

i.e., it is “an object class information space,” and a portion of bits for a serial number, i.e., it is “a unique serial number space”:



Id., 46 (highlighting added). As disclosed by Dummies, the “object class” consists of 36-59 bits for that information, and the “serial number” consists of 60-95 bits for that information.

107. The court in Oregon construed the term “object class information space” to mean a “data field within the memory of the RFID integrated circuit chip for information identifying the class of an object, such as a company prefix, item reference code, partition value, and/or filter value.” As noted above, Dummies explains that the EPC, which includes the “object class” bits, is stored in memory of an RFID transponder. Dummies discloses that the “object class” is “similar to a stock-keeping unit or SKU.” As would have been known to a POSITA, a SKU is a code that identifies a particular kind of product. *See, e.g., TDS-2004*, 12 (“a GTIN identifies a particular class of object, such as a particular kind of product or SKU”).

108. The court construed “unique serial number space” to mean a “data field within the memory of the RFID integrated circuit for information identifying a unique serial number.” As noted above, *Dummies* explains that the EPC, which includes the “serial number” bits, is stored in memory of an RFID transponder. *Dummies* further discloses that the “serial number...is the specific instance of the object class being tagged.” *Dummies*, 47. A serial number that is particular to a “specific instance” of a product is understood to be unique, otherwise it would not be specific to that instance.

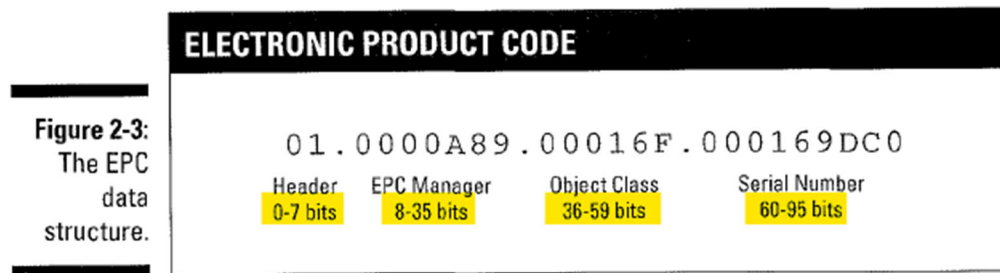
- f. 1[e]: wherein the unique serial number space is encoded with one serial number instance from an allocated block of serial numbers, the allocated block being assigned a limited number of most significant bits,**

109. This limitation is taught by *Dummies* in further combination with Traub.

110. First, *Dummies* discloses a “unique serial number space is encoded with one serial number instance.” The term “is encoded with one serial number instance” was construed to mean “has stored within it one serial number instance.” And, as discussed above with respect to limitation 1[d], *Dummies* discloses that an RFID transponder includes memory storing one EPC and that the EPC has a serial number. *See Dummies*, 10 (“A tag’s embedded EPC number is unique to that tag.”); *id.* 46-47.

111. Second, *Dummies* also discloses the EPC serial number that is stored in the RFID transponder may come “from an allocated block of serial numbers.” To this end, *Dummies* describes a “decentralized, hierarchical approach to allocating serial numbers.” *Dummies*, 239. In that approach, “[a] range of serial numbers for each product is allocated to each manufacturing facility,” and thus the serial number written to the RFID transponder comes from this allocated range of serial number. *See Dummies*, 239-240. The term “an allocated block of serial numbers” was construed to mean “a pre-authorized range of serial numbers.” Because the range of serial numbers is “allocated,” i.e., distributed, to the multiple different manufacturing facility locations, a POSITA would have understood that the range is “pre-authorized,” otherwise they could not be assigned to the different locations.

112. Next, the combination of *Dummies* and *Traub* teaches “the allocated block being assigned a limited number of most significant bits.” As previously noted, the court in *Oregon* construed the term “being assigned a limited number of most significant bits” to mean “includes a limited, predefined sequence of higher order bits at the leading end.” *Dummies* discloses that an EPC’s serial number, like the rest of the EPC that is stored on the RFID transponder, is comprised of bits:



See, e.g., id., 46 (highlighting added); *see also id.*, 47 (“an EPC number can be from 32 to 256 bits long”).

113. A POSITA would have understood that multi-digit binary numbers have a “sequence of higher order bits at the leading end,” which are commonly referred to as “most significant bits.” In general, a multi-digit binary number is comprised of an ordered sequence of 1s and 0s. For example, the typical order that bits in a binary number are interpreted is from left to right, with the most significant bit, which is the bit that has the highest order, being the leftmost bit, and the least significant bit, the bit with the lowest order, being the rightmost bit. A bit’s significance decreases as you move from left to right. I have shown this on the example binary number below, which is 1100111 (in decimal this number is 103):

1 1 0 0 1 1 1

↑ ↑

most least
significant significant

114. This concept should be generally familiar to even laypersons, because commonly used numbering systems, such as base 10 decimal numbers, include this same concept. For example, multi-digit decimal numbers have the most significant digit on the left and the least significant digit on the right:



115. Thus, the multi-bit serial number disclosed by Dummies' EPC would be understood by a POSITA as having most significant bits, which are a "sequence of higher order bits at the leading end." Dummies discloses the serial number is located at bit locations 60-95 in the EPC. *Dummies*, 46 (Figure 2-3). A POSITA would have understood that the bit at bit position 60 would be the leading end of the binary serial number, i.e., the most significant bit, with the bits decreasing in significance through the bit at position 95, which would be the least significant bit.

116. To the extent, however, that Dummies does not expressly disclose that the most significant bits in the serial number are "a limited, predefined sequence," as the term has been construed, Traub teaches this aspect of the claim.

117. The Traub patent discloses assigning pre-authorized ranges of serial numbers for EPCs that have a limited, predefined sequence of higher order bits at

the leading end of the serial number. For example, Traub discloses creating “blocks” or “pools” of EPCs with “business information” encoded into the EPC serial numbers:

[T]he EPC server can *create pools of EPC codes*. The *EPC codes can be created based on business policies that* can be used to *indicate business information in the EPC code*. The RFID edge servers can obtain EPC codes from the pool, store these EPC codes into a local cache and then *use these EPC codes in the construction of RFID tags*, such as with an RFID tag printer.

Id., 3:40-47 (emphasis added);

An EPC provisioning system 400 comprising an EPC server 402 adapted to *dynamically provide EPC code blocks* 404 and 406 for one product to multiple client sites. The EPC server 402 *can use business rules to determine the EPC codes for the multiple client sites* 408 and 410.”

Id., 3:66-4:4 (emphasis added); *see also id.* Fig. 4B.

118. The business information that is encoded into the EPC could, for example, include a “lot number” for the product and/or the “location” where the product was manufactured: “The EPC code blocks can be assigned so as to indicate business information such as lot number and/or location.” *Id.*, 3:49-52; *see also id.*,

4:7-9 (“The EPC code blocks can be assigned to as to indicate lot number. The EPC code blocks can be assigned so as to indicate location.”). Such business information is analogous to the types of information, which include “product line” or an “operation of the brand owner,” that Adasa indicated to the Court during claim construction as having corresponding MSBs in the serial. *See* EX-1008, 2 (“Through use of this partitioned serial number structure, a brand owner can ensure uniqueness across its many operations through, for example, allocation of a block of serial numbers comprising a unique sequence of most significant bits to each product line or operation of the brand owner.”).

119. Traub further discloses its business information is a “limited, predefined sequence of higher order bits at the leading end” of serial number, as the limitation has been construed. Figure 4B of Traub shows the portion of the EPC that corresponds to the serial number space has been further partitioned to include business information at the leading bits:

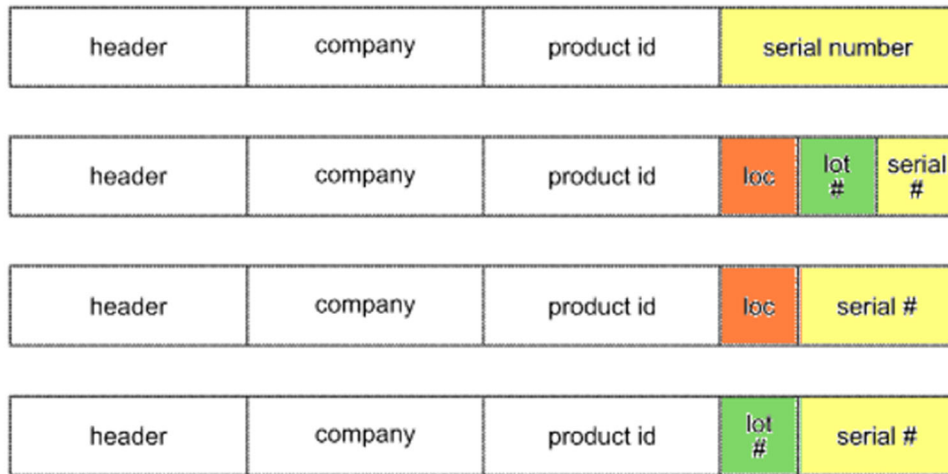
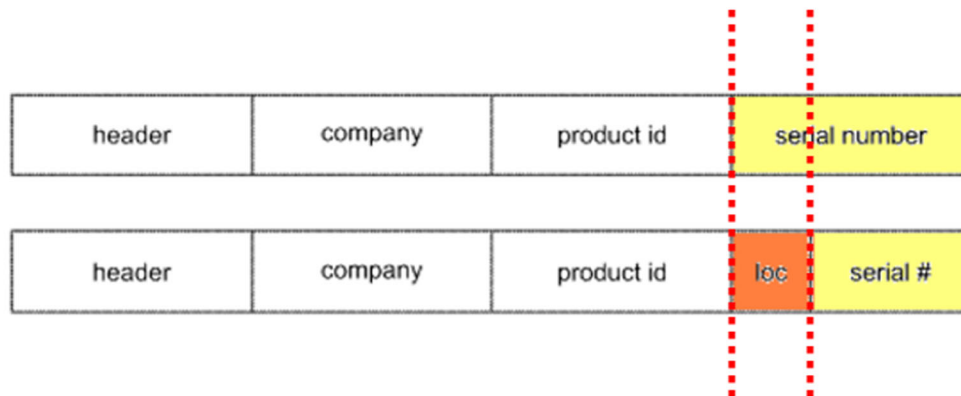


FIG. 4B

Traub, Fig. 4B (highlighting added).

120. First, a POSITA would have recognized that this figure 4B illustrates different possible formats of an EPC. For example, Traub describes Figure 4B as being part of “a dynamic EPC providing system.” *Traub*, 1:67. Traub also indicates that the format of an EPC “uniquely identif[ies] an object,” and includes a “Header,” “Manager Number, which identifies the company,” and “Object Class, similar to a stock keeping unit or (SKU)” (*id.* 1:28-38), all of which are present in Figure 4B. These are recognizable components of an EPC that the POSITA would have been well aware of. For example, Dummies describes EPCs as including a “Header,” “EPC Manager Number, which identifies the company,” and “object class, similar to a stock keeping unit, or SKU” and a “serial number” (*Dummies*, 46-47), all of which are also illustrated in Figure 4B of Traub.

121. A POSITA would have also recognized that Traub's Figure 4B discloses that the business information is encoded into and occupies the higher order bits position at the leading end of the serial number space of the EPC. For example, by comparing the embodiments illustrated in Figure 4B, it is apparent that the serial number space within the EPC has been further subdivided to create space to store the business information at the leading end the serial number's space:



Traub, Fig. 4B (excerpted and modified with highlighting and dotted line). As can be seen from above, the location information (“loc”) is positioned within the space that is otherwise occupied by the serial number, and is located at the beginning of that serial number space. A POSITA would recognize this positioning to be the higher order bits of the serial number space. This is so because, as acknowledged by Dummies, an EPC is a hierarchical number, where the leftmost information illustrated in the EPC above (e.g., header, company, object class/product id) is of

higher order and the right most information (e.g., serial number), which is of lower order. Moreover, as discussed above in the Technology Background for the '967 Patent, a POSITA was very familiar with the composition of hierarchical identifiers, like the EPC, and that the various partitions within such identifiers have defined, fixed-length portions. *Supra*, VI. Thus, a POSITA would have recognized that Traub's Figure 4B disclosed a serial number portion of the EPC as being subdivided to include a partition for the business information. At the very least, it would have been obvious to a POSITA based on the POSITA's understanding and knowledge of how fixed-length, hierarchical identifiers like EPCs are formatted. For example, POSITAs were well-aware that if information, such as a location or lot number, needed to be encoded in a hierarchical identifier, that information would be subdivided into its own fixed portion of bits within the identifier, which is the typical design of hierarchical identifiers. *See, id.; see also e.g.*, Powell, 4:29-40 ("a tag identification sequence may consist of ...a lot number bit string"). For illustrative purposes, if a user of Traub's disclosed EPC embodiment that includes the location field needed to support up to eight manufacturer locations, then the "loc" information portion partitioned at the leading end of the serial number space would need to be at least three bits long, because three bits are required to represent eight values (e.g., 000, 001, 010, 011, 100, 101, 110, 111), and the remaining bits would be for the serialized number.

122. In addition, A POSITA would have understood that encoding the business information as the leading bits of the serial number space defines the block/pool of available serial numbers corresponding to that business information. This is due to the hierarchical nature of an EPC. Traub discloses an “EPC server [that] can create pools of EPC codes,” and that such codes “can be created based on business policies that can be used to indicate business information in the EPC code.” *Traub*, 3:40-47. As shown above, Figure 4B of Traub illustrates the business information used to create the pool has been partitioned into the leading bits of the serial number space, followed by the serial number bits. Due to the hierarchical nature of EPCs, the range of possible available serial numbers that follow that business information are *all* the values that can be represented by those remaining serial number bits. For example, if there are 20 bits remaining for the serial number after the business information encoded in the serial number, then the range of available serial numbers is 00000000000000000000 to 11111111111111111111. In decimal, this range corresponds to 0 to 1,048,575, which means there are 1,048,576 unique serial numbers available, counting 0.

123. A POSITA would also have understood that the business information encoded into the leading bits of Traub’s EPC serial number are “limited.” For example, as previously discussed, fields within hierarchical identifiers are known to occupy fixed portions, i.e., limited portions, of the overall hierarchical identifier. In

addition, there are necessarily a limited number of locations or lots, and there must be sufficient space left over in the serial number space to contain the “serial #” value that follows the business information.

124. A POSITA would have also understood that Traub’s business information is “predefined,” because Traub’s pools of EPCs are generated based on the business information that is encoded into the serial number. *See Traub*, 3:40-47 (“EPC codes can be created based on business policies that can be used to indicate business information in the EPC code”). Thus, the value must have been defined before it was encoded into the leading end of the serial number space.

125. As I have discussed above in the Motivation to Combine section, it would have been obvious to combine Traub with Dummies.

- g. 1[f]: wherein the unique serial number space comprises the limited number of most significant bits uniquely corresponding to the limited number of most significant bits of the allocated block and of remaining bits of lesser significance that together comprise the one serial number instance.**

126. The combination of Dummies with Traub teaches “wherein the unique serial number space comprises the limited number of most significant bits uniquely corresponding to the limited number of most significant bits of the allocated block and of remaining bits of lesser significance that together comprise the one serial number instance.”

127. As discussed above for limitation 1[e], Dummies and Traub teaches the claimed “unique serial number space.” Also, as discussed above for limitation 1[e], the “unique serial number space” stores “one serial number instance from an allocated block of serial numbers, the allocated block being assigned a limited number of most significant bits.”

128. Traub also discloses the claimed “limited number of most significant bits uniquely corresponding to the limited number of most significant bits of the allocated block” are included in the serial number space. Traub’s Figure 4B illustrates an EPC, which is stored on the transponder, as including business information, such as location and lot number, in the leading bits of the serial number of the EPC. *See Traub*, Fig. 4B. This also satisfies the construction of the term “uniquely corresponding.” As previously discussed, “uniquely corresponding” was construed as having its “plain and ordinary meaning as...Adasa suggests.” EX-1007, 9. During claim construction, Adasa indicated that it “added this term as a clarifying amendment to make clear that the serial number encoded within the claimed RFID transponder utilizes the same most significant bits of the allocated block.” As just discussed, Traub’s EPC includes the business information, e.g., location, in its serial number, and the EPC is stored on the transponder.

129. Finally, Traub also discloses the claimed “most significant bits” and “remaining bits of lesser significance...together comprise the one serial number

instance.” As previously discussed, Traub teaches that a pool of EPCs can be defined based on business information, and that such information is included in the most significant bits portion of the serial number space, followed by a serialized number is the lesser significant portion of the serial number, as I have illustrated below:

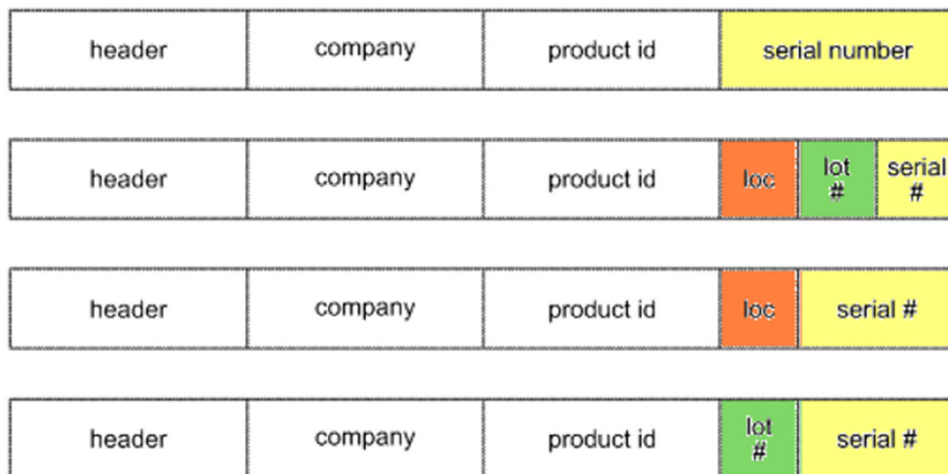


FIG. 4B

Traub, Fig. 4B (highlighting added).

130. A POSITA would have understood that this business information and the serialized number together form a single instance of a serial number of the EPC for a number of reasons. First, a POSITA would have recognized that the business information and serialized data occupy the same space that is intended for the serial number of the EPC, such as illustrated in Figure 4B of Traub, and are thus together considered a serial number instance. Second, because of the hierarchical nature of

such numbers, a POSITA would have understood that taken together, the business information and serial number form a single unique instance corresponding to a particular product indicated by the “object class”/“product id”. As explained by Dummies, in an EPC, the hierarchy, along with the serial number, creates the uniqueness:

The general identifier EPC comprises three numbers whose combination uniquely identifies an item. Those three numbers are the manufacturer number, the product number, and the serial number.

Id., 239. Thus, a POSITA would have understood that Traub’s business information and serialized number together form a serial number instance for a product.

131. As I have discussed above in the Motivation to Combine section, it would have been obvious to combine Traub with Dummies.

5. Dependent Claim 6: The RFID transponder of claim 1, wherein the allocated block is defined by at least 3 most significant bits.

132. As discussed above, claim 1 is invalid in light of Dummies and Traub. As is also discussed above for limitation 1[e], Dummies and Traub teaches “allocated blocks” with “most significant bits.” *See, e.g., Traub*, Fig. 4B.

133. As discussed above, Traub discloses partitioning a serial number in an EPC to encode business information in its leading bits. Traub does not appear to expressly disclose how many bits the business information occupies in the serial

number. The number of bits to encode this information is somewhat arbitrary, however, and the needed amount would have been obvious to a POSITA based on ordinary design considerations, such as the number of locations and/or lots needing to be supported, and applying simple bit mathematics that were well understood by the POSITA. For example, as previously discussed, Traub discloses that there may be “multiple” locations and/or lots. *See Traub*, 4:12-15 (“EPC code blocks for multiple client sites”). Traub also discloses encoding information representative of the location directly into the serial number. In order to represent more than four unique locations as a binary value, a POSITA would have known that it would require at least three bits to do so. It is well-known that one bit can only represent two values (e.g., 0, 1), and two bits can represent up to four values (e.g., 00, 01, 10, 11), and three bits can represent up to eight values (e.g., 000, 001, 010, 011, 100, 101, 110, 111). Thus, a POSITA would have known how to determine the appropriate number of bits to reserve for its location business information based on the number of multiple manufacturing locations that needed to be supported for any given implementation. It therefore would have been obvious that the “the allocated block is defined by at least 3 most significant bits,” such as to support any number of locations that exceeds four.

6. Dependent Claim 7: The RFID transponder of claim 1, wherein the allocated block is one of a plurality of allocations intermittently received by an encoder.

134. As discussed above, claim 1 is invalid in light of Dummies and Traub. Dummies further discloses claims 7's "wherein the allocated block is one of a plurality of allocations intermittently received by an encoder."

135. Dummies discloses "encoders" in the form of RFID "printers" that "encode" tags with an EPC. *Dummies*, 238 ("The [RFID label printer] module broadcasts a special command with a discrete number (usually an EPC number) through the transmit (Tx) antenna, and that number is 'written' onto the tag.") Dummies also discloses that the blocks of EPCs are intermittently sent to, and therefore intermittently receive by, the encoders. In particular, criticizes using an "always reachable" centralized authority "every time an item is produced." and proposes assigning multiple blocks (i.e., a plurality of blocks) of serial numbers from the central authority to multiple different facilities. *Id.*, 239 ("A range of serial numbers for each product is allocated to each manufacturing facility."). Because this assignment avoids the use for an "always reachable" centralized authority, a POSITA would have understood that the assignment is not continuous, i.e., it is "intermittently received."

136. Alternatively, Traub also discloses that the "allocated block is one of a plurality of allocations intermittently received by an encoder." First, Traub discloses

a “plurality of allocations” because it discloses providing “EPC code blocks for multiple client sites and providing the EPC code blocks to the multiple client sites.”

Traub, 4:12-15; *see also id.*, 3:34-4:11. Second, Traub discloses that the allocations are “intermittently received by an encoder”:

The RFID edge servers can obtain EPC codes from the pool, store these EPC codes into a local cache and then use these EPC codes in the construction of RFID tags, such as with an RFID tag printer. Unused RFID tags can be returned from the cache to the pool.

Id., 3:43-47. Because the codes are obtained and stored in a local cache of an edge server for use in constructing the tags, a POSITA would have understood that the blocks are intermittently received as needed by those edge servers, i.e., they are not continuously received.

7. Dependent Claim 8: The RFID transponder of claim 1, wherein the RFID integrated circuit chip is comprised of silicon.

137. As discussed above, claim 1 is invalid in light of Dummies and Traub. Dummies further discloses the RFID integrated circuit chip is comprised of silicon. Dummies discloses that chips may be created from silicon blocks: “Die: The silicon block onto which circuits are etched to create a chip.” *Id.*, 366.

8. Dependent Claim 9: The RFID transponder of claim 1, wherein the RFID integrated circuit chip is comprised of polymer.

138. As discussed above, claim 1 is invalid in light of *Dummies* and Traub. *Dummies* further discloses “the RFID integrated circuit chip is comprised of polymer.” For example, *Dummies* discloses the substrate for the chip is “mylar or plastic film.” *Id.*, 89 (“The substrate (or material that holds it all together): This is most often a mylar or plastic film. Both the antenna and chip are attached to it.”). A chip is typically considered to include the substrate on which it is formed. “Mylar” and “plastic” are polymers.

9. Dependent Claim 10: The RFID transponder of claim 1, wherein the substrate, antenna structure, and RFID integrated circuit chip are covered by a face stock material.

139. As discussed above, claim 1 is invalid in light of *Dummies* and Traub. *Dummies* further discloses “the substrate, antenna structure, and RFID integrated circuit chip are covered by a face stock material.” *Dummies* discloses “tags,” which include a chip, antenna and substrate (*Dummies*, 89), may be covered by a face stock material.

140. “Face stock” is the top layer of a label. It is typically made from paper. *Dummies* discloses RFID tags in the form of “labels” that can be applied to a surface. *Dummies*, 113 (“One way for manufacturers to curb theft and counterfeiting is to apply tamper-proof RFID labels to these drugs.”); *id.*, 238 (“Most of the

deployments I have set up so far encode tags with an RFID label printer.”). The label may have “backing paper” and a “face”:

1. Place the label face down on a flat surface with the backing paper face up; the face of the label is therefore down on the table or flat surface.
2. Peel the backing paper away from the label while keeping the label flat on the surface.
3. Without bending or twisting the label, lift it from the flat surface....
4. Position the label over the correct location on the object and smoothly apply it to the surface.

Id., 240-241.

141. A POSITA would have understood that a label that includes an RFID tag, would include the tag’s chip, antenna, and substrate under the top layer of the label’s face stock material—Dummies acknowledges this when it describes applying tags as “labels” to an object without “damage[ing] the connections between the chip and the antenna,” and without cracking the “connecting material.” *Id.* 242 (“Care must always be taken so as not to bend or twist the tags. Bending or twisting a paper tag places stress on the connections between the chip and the antenna. This stress may crack the connecting material, often a conducting glue, or it may break the connection completely.”).

10. Dependent Claim 11: The RFID transponder of claim 1, wherein the RFID integrated circuit chip is disposed on the substrate.

142. As discussed above, claim 1 is invalid in light of Dummies and Traub. Dummies further discloses “the RFID integrated circuit chip is disposed on the substrate.” Dummies discloses that “[b]oth the antenna and chip are attached to [the substrate],” and thus discloses that the integrated circuit chip is disposed on the substrate. Dummies, 89.

143. Dummies also describes the “flip chip” process for attaching a chip to a substrate, where “the chip is ‘flipped’ onto the antenna inlay with a special adhesive.” *Id.*, 241. Dummies further describes this process as applying to the substrate: “Another area for innovation and cost savings is the substrate that holds tags together.... Historically, chips have been attached by using a flip-chip (flipping a chip into place and gluing it to an antenna) assembly process.” *Id.*, 90. A POSITA would have understood that “flipping” a chip onto an antenna substrate as disposing the chip onto the substrate.

11. Dependent Claim 12: The RFID transponder of claim 1, wherein the limited number of most significant bits that correspond to the allocated block further correspond to an encoder that encodes the RFID transponder.

144. As discussed above, claim 1 is invalid in light of Dummies and Traub. Traub further teaches “the limited number of most significant bits that correspond to the allocated block further correspond to an encoder that encodes the RFID

transponder.” As discussed above with respect to limitation 1[e], Traub discloses encoding location information into the leading bits, i.e., the most significant bits, of the EPC’s serial number space. *See, e.g., Traub*, Fig. 4B. Traub also discloses that the multiple locations include an “edge server” that has a corresponding “RFID tag printer” (i.e., an “encoder”):

The RFID edge servers can obtain EPC codes from the pool, store these EPC codes into a local cache and then use these EPC codes in the construction of RFID tags, such as with an RFID tag printer.

Id., 3:43-47. Thus, the location encoded in the EPC also correspond to an encoder (or encoders) at those locations.

12. Independent Claim 16

145. Independent claim 16 is obvious in light of Dummies and Traub for the reasons I explain below.

a. 16[pre]: An integrated circuit, comprising:

146. Dummies discloses “an integrated circuit.” Dummies discloses one of the components of an RFID tag is “[a]n integrated circuit or chip”:

A passive tag consists of three components that enable it to receive and transmit signals in its ultra-efficient way:

✓ **An integrated circuit or chip:** This chip stores data and executes specific commands. Most of the passive tags today carry 96 bits of memory, although some can carry as little as 2 bits or as much as 1,000 bits. The chip design determines whether the tag has read-only or read-write properties. Three or four manufacturers, including Phillips, Texas Instruments, Fairchild, and ST Micro, are the primary makers of these chips. Most tag manufacturers purchase their IC chips from these primary sources, so you have little chance of getting a cost advantage in chip purchase.

Dummies, 89 (emphasis added).

- b. 16[a]: a radio frequency circuit configured to backscatter a return link signal for processing by an RFID interrogator;**

147. Dummies discloses “a radio frequency circuit configured to backscatter a return link signal for processing by an RFID interrogator.” Dummies discloses that an RFID integrated circuit has circuitry for communicating with a reader using backscatter:

The IC, or simply the chip, is responsible for converting RF energy into usable electrical power, storing and retrieving data, and modulating the *backscatter signal* (the signal that the tag sends back to the reader).

Dummies, 92 (emphasis added); *see also, id.*, 79 (“A passive RFID transponder does not contain its own power source; rather, it absorbs energy propagated from a reader...to supply all the power it needs to wake up its chip and communicate with a reader by sending back (backscattering) the information contained in its memory to a receiving antenna.”); *id.* 20. “Interrogator” is a synonym for “reader.” Thus, Dummies discloses a “radio frequency circuit configured backscatter a return link signal [to] an RFID interrogator.”

148. Dummies further discloses that the reader processes the backscattered signal to turn the signal into digital information:

The reader not only generates the signal that goes out through the antenna into space, but also listens for a response from the tag. The RFID reader is like a high-tech Morse code machine, but instead of the dots and dashes the Lone Ranger might have listened in on, the *RFID reader* transmits and *receives analog waves and then turns them into a string of zeros and ones, bits of digital information.*

Dummies, 20 (emphasis added); *see also, e.g., id.* 97 (describing readers as having a “DSP [digital signal processor] and main processors”). Thus, *Dummies* also discloses that the backscatter return link signal is “for processing by an RFID interrogator.”

c. 16[b]: control logic; and

149. *Dummies* discloses “control logic.” For example, *Dummies* discloses: “The chip also has the logic to tell itself what to do when it is in front of a reader.” *Dummies*, 20.

150. *Dummies* also discloses the “chip stores data and executes specific commands” (*Dummies*, 89) such as “read,” “write,” and “kill” (*id.*, 209). A POSITA would have understood that an IC that executes commands requires underlying logic, whether programmed logic or hardcoded, that controls the IC to perform the commands, and thus has “control logic.”

d. 16[c]: a memory,

151. Dummies discloses “a memory”:

A passive tag consists of three components that enable it to receive and transmit signals in its ultra-efficient way:

✓ **An integrated circuit or chip:** This chip stores data and executes specific commands. Most of the passive tags today carry 96 bits of memory, although some can carry as little as 2 bits or as much as 1,000 bits. The chip design determines whether the tag has read-only or read-write properties. Three or four manufacturers, including Phillips, Texas Instruments, Fairchild, and ST Micro, are the primary makers of these chips. Most tag manufacturers purchase their IC chips from these primary sources, so you have little chance of getting a cost advantage in chip purchase.

Dummies, 89 (emphasis added); *see also, id.*, 79 (“The tag has a small computer chip (or memory area) that is programmed with information that uniquely identifies the tag.”).

e. 16[d]: wherein the memory is configured with a unique object number space, the unique object number space comprising an object class information space and a unique serial number space,

152. This limitation is substantively the same as limitation 1[d] discussed above. Thus, this limitation is disclosed by Dummies for those same reasons discussed above.

- f. 16[e]: wherein the unique serial number space is encoded with one serial number instance from an allocated block of serial numbers, the allocated block being assigned a limited number of most significant bits, and**

153. This limitation is substantively the same as limitation 1[e] discussed above. Thus this limitation is taught by the combination of Dummies and Traub for those same reasons discussed above.

- g. 16[f]: wherein the unique serial number space comprises the limited number of most significant bits uniquely corresponding to the limited number of most significant bits of the allocated block and remaining bits of lesser significance that together comprise the one serial number instance.**

154. This limitation is substantively to the same as limitation 1[f] discussed above. Thus, this limitation is taught by the combination of Dummies and Traub for those same reasons discussed above.

- 13. Dependent Claim 20: The integrated circuit of claim 16, wherein the limited number of most significant bits that correspond to the allocated block further correspond to an encoder that encodes the memory of the integrated circuit.**

155. This claim language is substantively the same as dependent claim 12 discussed above. Thus, this limitation is disclosed by Traub for those same reasons discussed above.

B. Claims 2-5, 13-15, and 17-19, are Obvious Based on RFID for Dummies Combined with Traub and TDS-2004 (Ground 2)

156. As I explain below, it is my opinion that claims 2-5, 13-15, and 17-19 are obvious in light of Dummies in combination with Traub and TDS-2004.

157. I have previously provided a summary of Dummies and Traub above (*supra* VIII.A.1 and VIII.A.2). Below I provide a summary of the relevant disclosure of the TDS-2004 reference and explain why a POSITA would be motivated to combine it with the teachings of Dummies and Traub, followed by my analysis of claims 2-5, 13-15, and 17-19.

1. EPC Tag Data Standards Version 1.1 Rev.1.24 (April 1, 2004) (“TDS-2004”) (EX-1011)

158. TDS-2004 is an “EPC Tag Data Standard” that discloses the SGTIN-96 format for EPCs. *TDS-2004*, 3, 23. SGTIN stands for “serialized global trade identification number.” It is a combination of a global trade identification number (“GTIN”) that has been “augmented with a serial number.” *TDS-2004*, 12. “SGTIN-96” refers to the 96 bit version of the SGTIN. *Id.* at 20.

159. TDS-2004 discloses that the SGTIN-96 has the following fields, which include filter value, partition, company prefix and item reference:

3.4.2 SGTIN-96

In addition to a Header, the SGTIN-96 is composed of five fields: the *Filter Value*, *Partition*, *Company Prefix*, *Item Reference*, and *Serial Number*, as shown in Table 6.

	Header	Filter Value	Partition	Company Prefix	Item Reference	Serial Number
SGTIN-96	8	3	3	20-40	24-4	38
	0011 0000 (Binary value)	8 (Decimal capacity)	8 (Decimal capacity)	999,999 – 999,999,9 99,999 (Decimal capacity*)	9,999,999 – 9 (Decimal capacity*)	274,877,906 ,943 (Decimal capacity)

*Capacity of Company Prefix and Item Reference fields vary according to the contents of the Partition field.

Table 6. The EPC SGTIN-96 bit allocation, header, and decimal capacity.

Id., 23-24.

2. Motivation to Combine Dummies, Traub and TDS-2004

160. As I discussed above, a POSITA would have been motivated to combine the teachings of Traub with Dummies. A POSITA would have been further motivated to combine TDS-2004 with Dummies and Traub because Dummies and Traub both involve the use of EPCs in RFID tags and systems, as previously discussed, and TDS-2004 proposes standardized formats for an EPC:

This document defines the EPC Tag Data Standards.

These standards define completely that portion of EPC tag data that is standardized, including how that data is encoded on the EPC tag itself (i.e. the EPC Tag

Encodings), as well as how it is encoded for use in the information systems layers of the EPC Systems Network (i.e. the EPC URI or Uniform Resource Identifier Encodings).

TDS-2004, 3.

161. The purpose of a standard is to instruct artisans to conform to the standard, and in some cases, it may be required:

As you make decisions about your RFID system, two factors that come into play are where you are going to incorporate the RFID network and with whom you'll have to interoperate. Different regions or countries have different standards, and ISO and EPCglobal have different requirements incorporated into their open standards.

Dummies, 50; *see also id.*, 53 (“EPCglobal also has several highly involved working groups, which bring end users together to help figure out the best way to adopt RFID, from data standards to preparing analysis on return on investment (ROI).”).

3. Dependent Claim 2: The RFID transponder of claim 1, wherein the object class information space is encoded with information comprising a company prefix, an item reference, a partition value, and a filter value.

162. Claim 2 depends from claim 1. As discussed above, independent claim 1 is invalid in light of *Dummies* and *Traub*. *Supra*, VIII.A.4. *TDS-2004* discloses claim 2’s “wherein the object class information space is encoded with information comprising a company prefix, an item reference, a partition value, and a filter value.”

163. *TDS-2004* discloses a standardized form for an EPC, which includes the use of “global trade identification number” (“GTIN”) “augmented with a serial

number,” which are together referred to as a serialized global trade identification number (“SGTIN”). *TDS-2004*, 12. “The managing entity is responsible for assigning [the SGTIN] uniquely to individual **object classes**.” *Id.* (emphasis added). As indicated by *TDS-2004*, the “**Object Class** is used by an EPC managing entity to identify a class or ‘type’ of thing.” *Id.*, 11 (emphasis added). A 96-bit SGTIN, referred to as “SGTIN-96” (*id.* at 20), has fields “Filter Value, Partition, Company Prefix, [and] an Item Reference, as shown in Table 6 of *TDS-2004* below:

3.4.2 SGTIN-96

In addition to a Header, the SGTIN-96 is composed of five fields: the *Filter Value*, *Partition*, *Company Prefix*, *Item Reference*, and *Serial Number*, as shown in Table 6.

	Header	Filter Value	Partition	Company Prefix	Item Reference	Serial Number
SGTIN-96	8	3	3	20-40	24-4	38
	0011 0000 (Binary value)	8 (Decimal capacity)	8 (Decimal capacity)	999,999 – 999,999,9 99,999 (Decimal capacity*)	9,999,999 – 9 (Decimal capacity*)	274,877,906 ,943 (Decimal capacity)

*Capacity of Company Prefix and Item Reference fields vary according to the contents of the Partition field.

Table 6. The EPC SGTIN-96 bit allocation, header, and decimal capacity.

Id., 23-24. The ’967 patent also admits that this type of SGTIN information was known. In particular, the ’967 patent admits that this type of information was defined by the global GS1 organization: “GS1 defines EPCglobal SGTIN number fields as having a company prefix, an item reference, a partition value, and a filter value that comprise the object class information.” EX-1001, 9:7-13.

164. As discussed above, it would have been obvious to a POSITA to combine TDS-2004 with Dummies and Traub. *Supra*, VIII.B.2.

4. Dependent Claim 3: The RFID transponder of claim 1, wherein the unique object number is a portion of a serialized global trade item number.

165. Claim 3 depends from claim 1. As discussed above, independent claim 1 is invalid in light of Dummies and Traub. *Supra*, VIII.A.4. TDS-2004 further discloses claim 3's "wherein the unique object number is a portion of a serialized global trade item number." As discussed above, TDS-2004 discloses SGTIN-96, which is a "serialized global trade item number." *TDS-2004*, 12, 20.

166. As discussed above, it would have been obvious to a POSITA to combine TDS-2004 with Dummies and Traub. *Supra*, VIII.B.2.

5. Dependent Claim 4: The RFID transponder of claim 3, wherein the serialized global trade item number is an EPC SGTIN-96 encoding.

167. Claim 4 depends from claim 3. As I discussed immediately above, claim 3 is obvious in light of the combination of Dummies, Traub and TDS-2004. As also discussed, TDS-2004 further discloses encoding EPCs using "SGTIN-96":

The EPC encoding scheme for SGTIN permits the direct embedding of EAN.UCC System standard GTIN and Serial Number codes on EPC tags....Two encoding schemes are specified, SGTIN-64 (64 bits) and SGTIN-96 (96 bits).

TDS-2004, 20.

6. Dependent Claim 5: The RFID transponder of claim 1, wherein the unique serial number space is at least 38 bits.

168. Claim 5 depends from claim 1. As discussed above, independent claim 1 is invalid in light of Dummies and Traub. *Supra*, VIII.A.4. TDS-2004 discloses claim 5’s “wherein the unique serial number space is at least 38 bits.”

169. As disclosed by TDS-2004, the serial number for “SGTIN-96” is 38 bits:

	Header	Filter Value	Partition	Company Prefix	Item Reference	Serial Number
SGTIN-96	8 bits	3 bits	3 bits	24 bits	20 bits	38 bits
	0011 0000 (Binary value)	7 (Decimal value)	5 (Decimal value)	0614141 (Decimal value)	100734 (Decimal value)	2 (Decimal value)

TDS-2004, 75 (highlighting added). The ’967 patent admits that SGTIN-96 has at least 38 bits in the serial number space. EX-1001, 8:21-23 (“Again using the SGTIN-96 as an example, there are a total of 38 bits used to define the entire serial number space”).

170. As discussed above, it would have been obvious to a POSITA to combine TDS-2004 with Dummies and Traub. *Supra*, VIII.B.2.

7. Independent Claim 13

171. Independent claim 13 is obvious in light of the combination of Dummies, Traub and TDS-2004 for the reasons I explain below.

a. 13[pre]: An RFID transponder comprising:

172. This limitation is substantively the same as limitation 1[pre] discussed above. *Supra*, VIII.A.4.a. Thus, this limitation is disclosed by Dummies for those same reasons discussed above.

b. 13[a]: a substrate;

173. This limitation is substantively the same as limitation 1[a] discussed above. *Supra*, VIII.A.4.b. Thus, this limitation is disclosed by Dummies for those same reasons discussed above.

**c. 13[b]: an antenna structure formed on the substrate;
and**

174. This limitation is substantively the same as limitation 1[b] discussed above. *Supra*, VIII.A.4.c. Thus, this limitation is disclosed by Dummies for those same reasons discussed above.

**d. 13[c]: an RFID integrated circuit chip which is
electrically coupled to the antenna structure,**

175. This limitation is substantively the same as limitation 1[c] discussed above. *Supra*, VIII.A.4.d. Thus, this limitation is disclosed by Dummies for those same reasons discussed above.

- e. **13[d]: wherein the RFID integrated circuit chip is encoded with a global trade item number including a unique object number, the unique object number comprising an object class information space including a block of at least 50 bits and a unique serial number space including a block of at least 38 bits,**

176. This limitation is taught by Dummies and TDS-2004. As I discussed above with respect to limitation 1[d], Dummies discloses an “RFID integrated circuit chip” “encoded with” a “unique object number,” where the unique object number includes “an object class information space and a unique serial number space.” In particular, Dummies discloses the use of EPC identifiers. *Supra*, VIII.A.4.e. Dummies also discloses the use of a “global trade identification number.” *Dummies*, 368 (“GTIN: Global Trade Identification Number”).

177. TDS-2004 discloses that an EPC can be a global trade item number with object class information space including “a block of at least 50 bits” and a serial number space with “a block of at least 38 bits.” As previously discussed, TDS-2004 discloses the SGTIN-96 format, which the ’967 patent admits includes “object class information.” *See* EX-1001, 9:7-13 (““GS1 defines EPCglobal SGTIN number fields as having a company prefix, an item reference, a partition value, and a filter value *that comprise the object class information.*”) (emphasis added). TDS-2004 indicates that the object class information of the SGTIN is 50 bits total (“Filter Value” (3 bits) + “Partition” (3 bits) + “Company Prefix” (24 bits) + “Item

Reference” (20 bits) = 50), which is highlighted in red below; and that the serial number is 38 bits, which is highlighted in yellow below:

	Header	Filter Value	Partition	Company Prefix	Item Reference	Serial Number
SGTIN-96	8 bits	3 bits	3 bits	24 bits	20 bits	38 bits
	0011 0000 (Binary value)	7 (Decimal value)	5 (Decimal value)	0614141 (Decimal value)	100734 (Decimal value)	2 (Decimal value)

TDS-2004, 75 (highlighting added).

178. As discussed above, it would have been obvious to combine *TDS-2004* with Dummies and Traub. *Supra*, VIII.B.2.

- f. 13[e]: wherein the unique serial number space has one serial number instance from an allocated block of serial numbers, the allocated block being assigned a limited number of most significant bits, and**

179. This limitation is substantively the same as limitation 1[e] discussed above. *Supra*, VIII.A.4.f. Thus, this limitation is taught by Dummies and Traub for those same reasons discussed above.

- g. 13[f]: wherein the unique serial number space comprises at least 3 most significant bits uniquely corresponding to the limited number of most significant bits of the allocated block.**

180. This limitation is substantively the same as claim 6 discussed above.

Supra, VIII.A.5. Thus, this limitation is obvious for those same reasons discussed above.

- 8. Dependent Claim 14: The RFID transponder of claim 13, wherein the unique serial number space further comprises remaining bits of lesser significance that together with the at least 3 most significant bits comprise the one serial number instance.**

181. Claim 14 depends from claim 13. As I discussed immediately above, independent claim 13 is obvious in light of Dummies, Traub and TDS-2004. Dummies and Traub further teach claim 14's "wherein the unique serial number space further comprises remaining bits of lesser significance that together with the at least 3 most significant bits comprise the one serial number instance."

182. As I discussed above for limitation 1[f], Dummies and Traub teach a "unique serial number space" that "comprises remaining bits of lesser significance" and "that together with the...most significant bits comprise the one serial number instance." *Supra*, VIII.A.4.g.

183. In addition, as I also discussed above for claim 6, Dummies and Traub teach that the most significant bits are "at least 3...bits." *Supra*, VIII.A.5.

- 9. Dependent Claim 15: The RFID transponder of claim 13, wherein the at least 3 most significant bits that correspond to the allocated block further correspond to an encoder that encodes the RFID transponder.**

184. Claim 15 depends from claim 13. As I discussed above, independent claim 13 is obvious in light of Dummies, Traub and TDS-2004. Claim 15's "wherein the at least 3 most significant bits that correspond to the allocated block further correspond to an encoder that encodes the RFID transponder" is also obvious. As I discussed above for claim 6, Dummies and Traub teach that the most significant bits are "at least 3...bits." *Supra*, VIII.A.5. And, as I discussed above for claim 12, Traub that the most significant bits "correspond to an encoder that encodes the RFID transponder." *Supra*, VIII.A.11

- 10. Dependent 17: The integrated circuit of claim 16, wherein the object class information space is encoded with information comprising a company prefix, an item reference, a partition value, and a filter value.**

185. Claim 17 depends from claim 16. As I discussed above, independent claim 16 is obvious in light of Dummies and Traub. *Supra*, VIII.A.12. Claim 17 is substantively to the same as claim 2 discussed above. *Supra*, VIII.B.3. Thus, this limitation is disclosed for the same reasons discussed above.

11. Dependent 18: The integrated circuit of claim 16, wherein the unique object number is a portion of a serialized global trade item number.

186. Claim 18 depends from claim 16. As I discussed above, independent claim 16 is obvious in light of Dummies and Traub. *Supra*, VIII.A.12. Claim 18 is substantively to the same as claim 3 discussed above. *Supra*, VIII.B.4. Thus, this limitation is disclosed for the same reasons discussed above regarding claim 3.

12. Dependent 19: The integrated circuit of claim 18, wherein the serialized global trade item number is an EPC SGTIN-96 encoding.

187. Claim 18 depends from claim 16. As I discussed above, independent claim 16 is obvious in light of Dummies and Traub. *Supra*, VIII.A.12. Claim 19 is substantively the same as claim 4 discussed above. *Supra*, VIII.B.5. Thus, this limitation is disclosed by the prior art for the same reasons discussed above.

IX. SECONDARY CONSIDERATIONS

188. I am not currently aware of any secondary considerations of nonobviousness that would outweigh the showing of obviousness that I have discussed above.

189. As previously discussed, I understand that “objective indicia” or “secondary considerations” of non-obviousness include whether: (1) there was a long-felt need for the claimed invention; (2) the claimed invention has achieved commercial success; (3) there was copying of the claimed invention by others; (4)

there were failed attempts by others to make the alleged invention; (5) there was praise of the invention in the field; and (6) there was skepticism the claimed invention could be achieved, among a few others.

190. I have been informed that during the trial against Avery Dennison, ADASA contended that Walmart instructed suppliers “to allocate most significant bits in the serial number space,” and ADASA argued that this was a secondary consideration. EX-1027, 1417:23-25. I do not know whether ADASA contended that this was evidence of copying, commercial success or some other indicia, and I do not have access to the underlying exhibits and, thus, am unable to analyze them to determine whether there is any possible nexus to the claims of the ’967 patent.

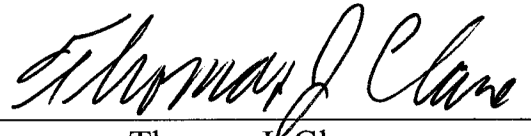
191. However, I understand that even in cases where secondary considerations exists, they are only relevant in close cases and are otherwise irrelevant in the face of a strong showing of obviousness, such as presented here where the claimed invention represents no more than the predictable use of prior art elements according to their well-established functions.

192. Thus, the secondary considerations of which I am currently aware, to the extent there are any, do not outweigh the showing of obviousness that I present above.

193. I hereby declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true, and that these statements were made with knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001.

* * *

Date: 2024-09-13


Thomas J. Clare