

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re *Inter Partes* Review of:)
U.S. Patent No. 7,969,307)
Issued: Jun. 28, 2011)
Application No.: 10/530,901)
Filing Date: Jan. 24, 2005)

For: **Diagnostic Radio Frequency Identification Sensors And
Applications Thereof**

**DECLARATION OF MAJID SARRAFZADEH IN SUPPORT OF
PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 7,969,307**

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I. Introduction and Qualifications

1. I have been retained by Abbott Laboratories and Abbott Diabetes Care Inc. (“Petitioner”) to provide my opinion concerning the validity of U.S. Patent No. 7,969,307 (attached to the accompanying Petition as Ex. 1001 and henceforth referred to as “the ’307 patent”) in support of this Petition for *Inter Partes* Review.

2. I understand that Abbott Laboratories and Abbott Diabetes Care Inc. are petitioning for IPR of claims 1-3, 5, 9, and 10 of the ’307 patent and requests that the United States Patent and Trademark Office (“PTO”) cancel those claims.

3. I received Bachelor of Science, Master of Science, and Ph.D. degrees from the University of Illinois at Urbana-Champaign in Electrical and Computer Engineering in 1982, 1984, and 1987, respectively.

4. I am a Distinguished Professor and Levi Knight Endowed Chair for Innovation at the University of California Los Angeles (“UCLA”). I have been a professor in the Computer Science and Electrical Engineering Departments at UCLA since 2000. In 2008, I co-founded and became a director of the UCLA Wireless Health Institute. I currently teach core undergraduate courses in digital design and graduate courses in embedded systems and Wireless Health.

5. Prior to working at UCLA, I was a professor in the Department of Electrical and Computer Engineering at Northwestern University from 1987 to 2000, receiving tenure in 1993.

6. I am a Fellow of the Institute of Electrical and Electronics Engineers, Inc. (“IEEE”), which “is a distinction reserved for select IEEE members whose extraordinary accomplishments in any of the IEEE fields of interest are deemed fitting of this prestigious grade elevation.”

7. My areas of research interest include embedded medical systems, design and analysis of algorithms, and health analytics. My experience includes work as a system designer, circuit designer, and software designer. I have held positions as a design engineer at IBM and Motorola and a test engineer at Central Data Corporation. I was the main architect of an Electronic Design Automation (“EDA”) software tool for Monterey Design Systems, Inc. (“Monterey”). I co-founded and managed the technical team at Hierarchical Design, Inc. (“Hier Design”), an EDA company that specialized in reconfigurable Field-Programmable Gate Array (FPGA) systems. Hier Design was acquired by Xilinx in 2004. I cofounded Bruin Biometrics and WANDA Health.

8. I also the co-founded MediSens, which developed a Wearable Sensor Platform which is focused on addressing the unmet needs of incontinence management. This innovation received the public prize for innovation at Health Valley Event in 2018 and also won the Top 100 North America innovation award.

9. I co-invented a first-of-its kind wound-assessment scanner that detects bed sores before they start, which was FDA-approved in 2019 and was awarded one of Time Magazine's Best Inventions of 2020.

10. I also developed WearSens, a nutrition monitoring necklace, that has been highlighted by Popular Science, CBS News, People, New York Magazine, the New York Daily News, The Daily Mail (U.K.), Yahoo Lifestyle UK, and MTV News.

11. I was also elected as a fellow in the National Academy of Inventors. The fellow award states that I have "demonstrated a highly prolific spirit of innovation in creating or facilitating outstanding inventions that have made a tangible impact on the quality of life, economic development, and welfare of society."

12. I have published over 590 papers and have received a number of best paper and distinguished paper awards. I am a co-author of the book "Synthesis Techniques and Optimizations for Reconfigurable Systems" (2003 by Springer) and a co-author of papers such as:

- Gait Analysis Utilizing an IMU for Toe Walking Detection and Intervention, EAI HealthyIoT (2021) (Best Paper Award)

- A Robust Distributed Remote Health Monitoring System for Rural Area with Limited Internet Access, 11th International Conference on Body Area Networks, Turin, Italy (2016)
- Remote Patient Monitoring after Discharge of Hospitalized Heart Failure Patients: The Better Effectiveness after Transition - Heart Failure (BEAT-HF) Randomized Controlled Trial, 2016 Annual AcademyHealth Research Meeting, Boston, USA (2016) (Best Abstract Award)
- High Performance Multi-dimensional Signal Search With Applications in Remote Medical Monitoring, 2013 IEEE Body Sensor Network Conference, Cambridge, Massachusetts, USA (2013)
- *Dynamic Self-adaptive Remote Health Monitoring System for Diabetics*, 34th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, Hilton Bayfront Hotel in San Diego, California, USA (2012)
- *CustoMed: A Power Optimized Customizable and Mobile Medical Monitoring and Analysis System*, Proceedings of the ACM HCI Challenges in Health Assessment Workshop in conjunction with Computer Human Interaction (CHI) Portland, OR (2005)

13. A full list of titles of my papers, patent filings, and other research is included in my *Curriculum Vitae* (Ex. 1004), also including a more detailed summary of my background, experience, and awards.

II. Summary Of Materials Reviewed And Considered

14. All of the opinions contained in this Declaration are based on the documents I reviewed and my knowledge and professional judgment. In forming the opinions expressed in this Declaration, while drawing on my experience in the field of remote medical diagnostic monitoring, I reviewed the following documents:

Ex.	Description
1001	U.S. Patent No. 7,969,307 B2 (“’307 patent”)
1002	File History of U.S. Patent No. 7,969,307 B2 (“’307 FH”)
1005	U.S. Patent No. 7,148,803 B2 (“Bandy”)
1006	U.S. Utility Patent Application Transmittal for U.S. Patent No. 7,148,803 B2 (“As-Filed Bandy Application”)
1007	U.S. Patent Application Publication No. US 2002/0178126 A1 (“Beck”)
1008	RESERVED
1009	U.S. Patent No. 6,031,454 (“Lovejoy”)
1010	Assignment of U.S. Patent Application No. 10/761,362 from Peeters to Altivera L.L.C., executed Dec. 2, 2005
1011	Assignment of U.S. Patent Application No. 10/761,362 from Peeters to Altivera, LLC, executed Feb. 10, 2006

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Ex.	Description
1012	Assignment of U.S. Patent Application No. 10/761,362 from Bandy to Symbol Technologies, Inc., executed Feb. 11, 2006
1013	RESERVED
1014	Gentag’s Response to Abbott’s Initial Invalidity Contentions: Response to Exhibit 1 Regarding Invalidity Based on U.S. Patent No. 7,148,803 “Radio frequency identification (RFID) based sensor networks” (“Bandy”), <i>Gentag, Inc. v. Abbott Laboratories</i> , No. 1:23-cv-00310 (N.D. Ill. Aug. 15, 2023) (“Gentag Invalidity Resp.”)
1015	U.S. Patent No. 6,987,965 B2 (“Ng”)
1016	World Intellectual Property Organization, International Publication No. WO 02/058537 A2 (“Heller”)
1017	Third Report & Order, <i>In re Revision of the Comm’n’s Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Sys.</i> , CC Docket No. 94-102, 14 FCC Rcd. 17388, 1999 WL 795989 (FCC adopted Sept. 15, 1999; released Oct. 6, 1999), http://standards.tiaonline.org/gov_affairs/fcc_filings/documents/e911rando.pdf (“FCC Report”)
1018	U.S. Patent No. 6,002,344 (“Bandy-344”)
1019	U.S. Patent No. 7,797,367 B1 (“Gelvin”)
1020	U.S. Patent No. 6,416,471 B1 (“Kumar”)
1021	U.S. Patent No. 6,978,182 B2 (“Mazar”)
1022	U.S. Patent No. 6,720,887 B1 (“Zunti”)
1023	U.S. Patent Application Publication No. 2003/0229723 A1 (“Kangas”)
1024	U.S. Patent Application Publication No. 2002/0165443 A1 (“Mori”)
1025	RESERVED

Ex.	Description
1026	NEWTON’S TELECOM DICTIONARY (18th ed. 2002) (excerpted)
1027	U.S. Patent No. 7,446,646 B2 (“Huomo”)
1028	U.S. Patent No. 6,989,750 B2 (“Shanks”)

15. My opinions are additionally guided by my appreciation of how a person of ordinary skill in the art would have understood the claims of the ’307 patent at the time of the alleged invention, which I have been asked to assume is January 27, 2004.

III. Level of Ordinary Skill in the Art

16. I understand that certain issues relating to validity must be judged from the perspective of a person of ordinary skill in the art (“POSITA”). I was asked to apply the January 2004 timeframe for my analysis.

17. The ’307 patent “relates to radio frequency identification (RFID) tags, and more specifically to a system having RFID tags that include diagnostic sensors, wherein the RFID tag and sensor are accessible by a wireless device such as a modified cell phone with a multi-protocol reader capability.” ’307 patent at 1:15-20.

18. In the January 2004 timeframe, a POSITA would have had a bachelor’s degree in computer science, electrical engineering, biomedical

engineering (or a related or equivalent field), and two or more years of experience researching, developing, designing and/or evaluating systems of networked devices, such as, networked medical devices or networked embedded devices that communicate wirelessly through, for example, Radio Frequency Identification (RFID), Bluetooth, cellular, and/or similar protocols.

19. A person with less or different education but more relevant practical experience, or vice versa, may also meet this standard. A POSITA may be part of an interdisciplinary team with others having the relevant experience set forth above. The prior art also evidences the level of skill in the art.

20. In the January 2004 timeframe, I would have exceeded the level of skill of a POSITA and worked with others possessing at least the knowledge of a POSITA within that time period.

21. I understand that a POSITA is a hypothetical person who is assumed to be aware of all pertinent information that qualifies as prior art. In addition, a POSITA makes inferences and is a person of ordinary creativity.

22. I do not expect that my opinions would change under other reasonable descriptions of a POSITA.

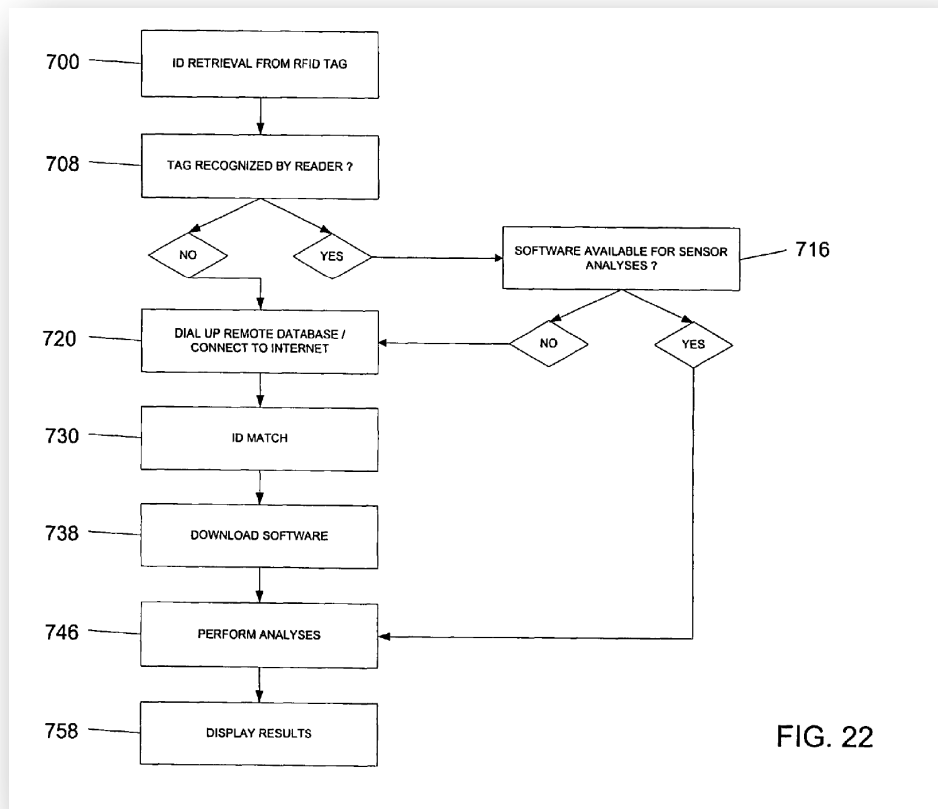
IV. The '307 Patent: Summary

A. Description

23. The '307 patent is titled “Diagnostic Radio Frequency Identification Sensors and Applications Thereof.” The patent describes various aspects of using a wireless device as a “universal reader” to collect data from a sensor. '307 patent at Abstract, 1:15-20, 2:28-31.

24. The '307 patent describes a diagnostics system including a “radio frequency identification (RFID) tag and sensor module” and an RFID reader, such as a cell phone, configured to communicate with the RFID tag and sensor module. '307 patent at 2:32-59. The specification also states that “the RFID reader is adapted to retrieve the electronic identification of a tag and sensor module and download software that enables reading and analyses of the tag and sensor from a database.” '307 patent at 2:53-56; *see also id.* at 12:42-49, 14:52-54, 16:54-56, 18:4-24, Fig. 22 (describing similar).

25. For example, according to the specification, Figure 22, reproduced below, “shows an identification (ID) and software retrieval method that enables any RFID reader to read/interrogate any RFID tag.” '307 patent at 4:46-48. “Once a given tag is activated, the reader device can retrieve the ID number of the tag as shown by function 700.” '307 patent 18:4-6.



26. “If the ID of the sensor tag is recognized then the reader device may or may not have the necessary software and processing ability to analyze said sensor as shown in 716.” ’307 patent at 18:11-13. The ’307 patent states “[i]f the software is available then the analysis can be completed immediately as shown in 746. However, if the software is not available then the device must first obtain it from a given remote database 400 via function 720.” ’307 patent at 18:14-18.

27. To download the necessary software, “the ID of the RFID sensor is matched to a given class of sensor (e.g. a glucose sensor) and the software and/or instructions for the analyses are downloaded into the reader 2 as shown in function

738.” ’307 patent at 18:20-23. After which, the device is “equipped to perform the analysis 746.” ’307 patent at 18:23-24.

28. The ’307 patent does not describe how to implement the “software and/or instructions” that supposedly enable the RFID reader (wireless device) to interpret the sensor data. ’307 patent at 18:22.

29. The ’307 patent states that its system can use “any type of sensor” made with “well known” techniques, any “common wireless devices such as cell phones,” and any generic remote database (e.g., a “computer” such as a server). *Id.* at 2:30-31, 4:58, 5:19, 7:60, 8:8-9, 16:46-63; *see, e.g., id.* at Figs. 20-21 (depicting generic sensor and computer components).

30. The sensors described in the ’307 patent are coupled with existing technology, such as an “RFID tag,” to transmit data to the wireless device. *See, e.g., id.* at 5:2-11, 6:46-7:13, 9:23-10:27, Figs. 1-4 (describing use of conventional RFID components).

31. The ’307 patent emphasizes that the “principles and operation of [an] RFID tag having a sensor input [are] described in detail in” one of the two primary references used in Ground 1 described below. *Id.* at 9:28-34 (referencing application that issued as U.S. Patent No. 7,148,803, “Bandy”).

B. Prosecution History

32. I have reviewed the file history of the '307 patent (Ex. 1002, "307 FH"). I understand that Gentag originally filed claims directed to a system including an RFID tag that communicates with an RFID reader. 307 FH at 474-482.

33. The Examiner rejected the claims numerous times during prosecution and Gentag responded by narrowing the claims. *See* 307 FH at 334-343, 237-245, 216-224, 173-184, 124-140, 42-58.

34. In the October 25, 2010 Non-Final Office Action, the Examiner rejected the then pending claims 65, 69, and 74¹ as unpatentable over two prior art references (Evanyk and Jeutter) (307 FH at 84-85), which the Examiner found disclosed all limitations of the pending claims, rendering them obvious.

35. In response, Gentag disputed only that that Evanyk and Jeutter disclosed one claim limitation—"wherein the remote device communicates the unique sensor ID and unique wireless ID to a remote server which uses this information to send the wireless device the information or software necessary to communicate with the unique sensor ID." 307 FH at 65 (conceding that Evanyk and Jeutter disclosed the remaining claim limitations, including a sensor element,

¹ Claims 65, 69, and 74 issued as claims 1, 5, and 10, respectively.

a unique identification ID number, a sensor interface having an analog to digital converter coupled to the at least one sensor, an antenna, an RF power and communication interface coupled to the RF power and communications interface and the sensor interface, a memory, wireless communications means, geolocation means and a unique ID). Gentag argued that Evanyk does not teach that limitation—distinguishing Evanyk as “merely recit[ing] that software may be located on receiver and that they may be ‘upgraded or updated.’” 307 FH at 65. Gentag argued that “upgrad[ing] and updat[ing] software” is different from the “claimed limitations wherein the remote server loads software onto the wireless device relative to a particular sensor id that was relayed to the server from the wireless device as claimed by the present invention.” 307 FH at 65.

36. The Examiner allowed the pending claims after Gentag accepted the Examiner’s proposed amendment, which made the following changes to the final limitation of claim 65 (issued claim 1):

wherein the remote server authenticates said unique sensor ID associated with said unique wireless device ID and communicates to said wireless device processed information relating to said sensor data ~~or to first download~~ and software related to the unique sensor ID, thereby allowing said wireless device to interpret said sensor anywhere worldwide.

307 FH at 34-36 (Examiner's Amendment); 307 FH at 51-52 (pending claim language before amendment).

37. In the Examiner's statement of reasons for allowance, the Examiner noted that claim 65 (issued claim 1), as amended, is allowable because of its final limitation. 307 FH at 34. The Examiner agreed "that Evanyk does not teach the claimed limitations wherein the remote server loads software onto the wireless device relative to a particular sensor ID that was relayed to the server from the wireless device as claimed by the present invention." 307 FH at 34-35.

V. Understanding of Legal Principles

A. Claim Construction

1. General Claim Construction Principles

38. I understand that claims are to be interpreted according to the meaning they would have to a person of ordinary skill in the art as of the patent's priority date, considering the claims in view of the specification, the file history, and relevant background knowledge in the field.

39. I understand that the relevant timeframe for assessing the '307 Patent for purposes of this declaration is just before January 27, 2004, which is the filing date of the provisional application to which the '307 patent claims priority. If I refer to the time of the alleged invention of the '307 Patent in this declaration, I am referring to this timeframe.

40. I further understand that “intrinsic evidence” refers to the specification, file history, and prior art references that are cited during prosecution. “Extrinsic evidence” consists of all evidence external to the patent and file history, including, for example, expert and inventor testimony, and dictionaries. I understand that while helpful, extrinsic evidence is typically less significant than intrinsic evidence in determining the meaning of claim language.

2. Means-Plus-Function Claims

41. I understand that claim limitations may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof. Such limitations are commonly referred to as “means-plus-function” limitations.

42. I understand that means-plus-function limitations are construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

43. In determining whether a claim term is a “means-plus-function” term, I understand the presence of the word “means” in the term creates a rebuttable presumption that it is a “means-plus-function” term. Conversely, the absence of the word “means” in the term creates a rebuttable presumption that it is not a “means-plus-function” term.

44. However, I also understand that the essential inquiry is not merely the presence or absence of the word “means” but whether the words of the claim are understood by persons of ordinary skill in the art to have a sufficiently definite meaning as the name for structure. That is, the absence of the word “means” from a particular term does not automatically prevent that term from being construed as a means-plus-function term. Rather, a term that does not recite “means” will be treated as a means-plus-function term if it is demonstrated the claim term fails to recite sufficiently definite structure or else recites function without reciting sufficient structure for performing that function. In addition, I understand that generic terms such as “mechanism,” “element,” “device,” and other nonce words that reflect nothing more than verbal constructs may be used in a manner equivalent to using the word “means” because they typically do not connote sufficiently definite structure and therefore may signal that the subject term is a means-plus-function term.

45. I further understand that the construction of a means-plus-function term involves two steps. One must first determine the function of the term. The function usually comes after the phrase that gives rise to means-plus-function treatment of the term, which as explained below, does not necessarily begin with the word “means.” And it is not proper to narrow or broaden the recited function, i.e., the function must include the limitations recited in the claim for that term.

After the function is determined, one must identify corresponding structure in the specification. I understand that a structure disclosed in the specification qualifies as corresponding structure if the specification or the file history clearly links or associates the structure to the function recited in the claim.

B. Obviousness

46. I understand that a prior art reference can render a patent claim obvious to one of ordinary skill in the art if the differences between the subject matter set forth in the patent claim and the prior art are such that the subject matter of the claim would have been obvious at the time the claimed invention was made. I understand that obviousness is a legal conclusion, but I am not offering a legal conclusion. I am testifying regarding the relevant facts that underlie the legal conclusion: the level of skill in the relevant art, the scope and content of the prior art, the differences between the prior art and the claims, and any secondary considerations.

47. I understand that when the claimed subject matter involves combining pre-existing elements to yield no more than one would expect from such an arrangement, the combination is obvious. I understand that in assessing whether a claim is obvious one must consider whether the claimed improvement is more than the predictable use of prior art elements according to their established functions. I understand that there need not be a precise teaching in the prior art directed to the

specific subject matter of a claim because one can take account of the inferences and creative steps that a person of skill in the art would employ. I understand that a person of ordinary skill is a person of ordinary creativity, not an automaton.

48. I understand that obviousness cannot be based on the hindsight combination of components from the prior art. I understand that in an obviousness analysis, neither the motivation nor the avowed purpose of the inventors controls the inquiry. Any need or problem known in the field at the time of the invention and addressed by the patent can provide a reason for combining elements. For example, I understand that it is important to consider whether there existed at the time of the invention a known problem for which there was an obvious solution encompassed by the patent's claims. I understand that known techniques can have obvious uses beyond their primary purposes, and that in many cases a person of ordinary skill can fit the teachings of multiple pieces of prior art together like pieces of a puzzle.

49. I understand that, when there is a reason to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. I understand that, if this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense, which bears on whether the claim would have been obvious.

50. I understand that to demonstrate that a means-plus-function limitation is present in the prior art one must prove that the relevant structure in the prior art performs the identical function recited in the claim and is identical or equivalent to the corresponding structure in the specification of the challenged patent.

51. I understand that structure is equivalent to corresponding structure for a means-plus-function term if the differences are insubstantial, that is if the assertedly equivalent structure performs the claimed function in substantially the same way to achieve substantially the same result as the corresponding structure described in the specification.

52. I understand that secondary considerations can include, for example, evidence of commercial success of the invention, evidence of a long-felt need that was solved by an invention, evidence that others copied an invention, or evidence that an invention achieved a surprising result. I understand that such evidence must have a nexus or causal relationship to the elements of a claim in order to be relevant.

53. I have been asked to consider the patentability of the Challenged Claims. I have been informed that for *inter partes* reviews, unpatentability must be shown under a preponderance of the evidence standard. I have been informed that to establish something by a preponderance of the evidence one needs to prove it is more likely true than not true.

VI. Claim Construction

54. I have been asked to offer opinions related to the construction of certain terms in the '307 patent. Specifically, I have been asked to provide opinions relating to the term “wherein the remote server authenticates said unique sensor ID associated with said unique wireless device ID and communicates to said wireless device processed information relating to said sensor data and software related to the unique sensor ID, thereby allowing said wireless device to interpret said sensor anywhere worldwide.”

55. I have also been asked to provide certain opinions related to the four terms that include the term “means.” I understand that when a claim term recites the word “means” there is a rebuttable presumption that term is a means-plus-function term. I understand that means-plus-function terms are limited to the structures disclosed in the specification of the '307 patent corresponding to the claimed function, or their equivalents. I have been asked to identify the recited function and the corresponding structure in the specification for performing that function for each of the terms:

- “multiple wireless communication means;”
- “geolocation means;”
- “GPS means for geolocating said system;” and
- “non-GPS means for geolocating said system.”

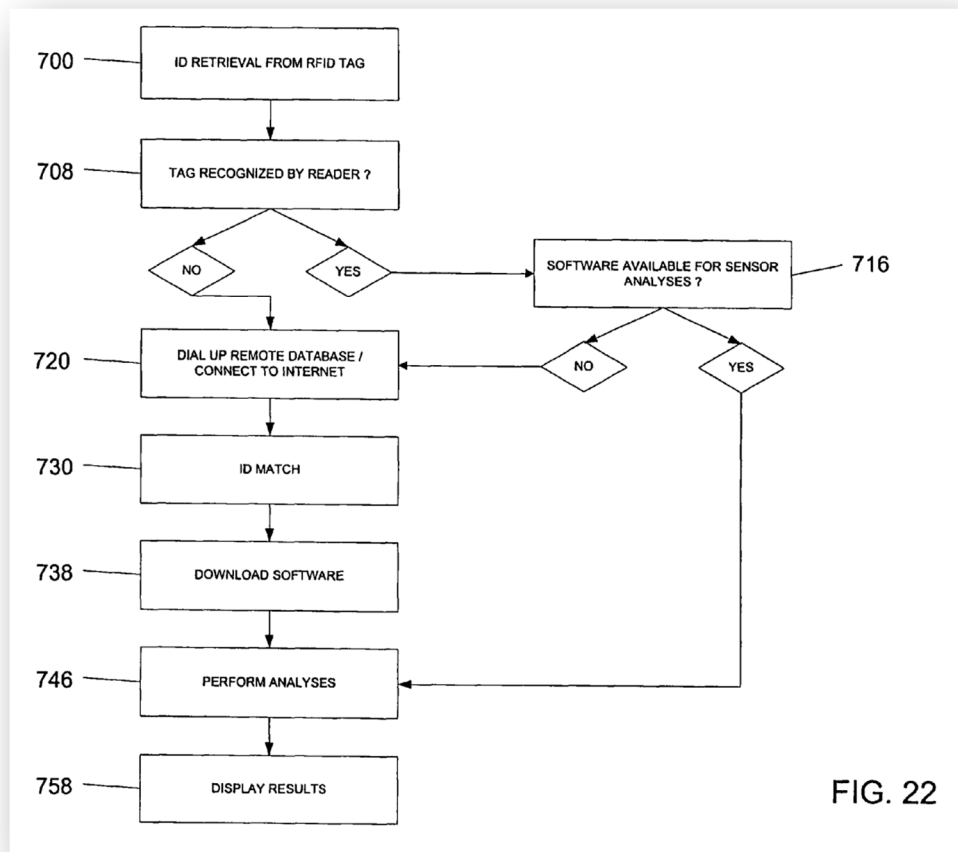
- A. **“wherein the remote server authenticates said unique sensor ID associated with said unique wireless device ID and communicates to said wireless device processed information relating to said sensor data and software related to the unique sensor ID, thereby allowing said wireless device to interpret said sensor anywhere worldwide”**

56. A POSITA would understand this limitation, in view of the specification and prosecution history, to mean “wherein the remote server authenticates a unique sensor ID associated with a unique wireless device ID and *in response to the authentication* communicates to the wireless device (1) processed information relating to the sensor data and (2) software related to the unique sensor ID necessary for the wireless device to interpret the sensor anywhere worldwide.”

57. To start, the language of the claim limitation itself requires that the remote server “communicates to said wireless device processed information relating to said sensor data and software related to the unique sensor ID” *in response to authentication* of said unique server ID associated with said unique wireless device ID. ’307 patent at claim 1. Because the “processed information relat[es] to said sensor data” and because the “software relate[s] to the unique sensor ID,” it follows that the remote server must first “*receive[] and authenticate[] said unique sensor ID* associated with said unique wireless device ID” before it can “communicate[] to the wireless device processed information relating to said sensor data and software related to the unique sensor ID.” Thus,

the claim limitation itself confirms that there is a cause-and-effect relationship between the remote server's authentication of the unique sensor ID and its communication to said wireless device software relating thereto. That is, authentication of the unique sensor ID is a condition precedent to the communication to said wireless device of software relating thereto. Moreover, the claim language "thereby allowing said wireless device to interpret said sensor anywhere worldwide" plainly requires a causal relationship between the authentication of the sensor and the interpretation of the sensor data by the wireless device. Without such download of "processed information" and "software," the wireless device cannot interpret said sensor. And the scope of the claim does not cover the situations where authentication of the sensor ID and communication of software relating thereto do not take place.

58. The specification of the '307 patent also supports this interpretation of the claim limitation. The specification explains that Fig. 22 "shows an identification (ID) and software retrieval method that enables any RFID reader to read/interrogate any RFID tag." '307 patent at 4:46-48. Referring to Fig. 22, the specification explains that the receipt of processed information and software from the remote server as taking place *in response to* authentication.



59. According to the specification, first “the reader device [] retrieve[s] the ID number of the tag shown by function 700.” ’307 patent at 18:4-6. Next, at function 708, the reader device determines whether it recognizes the ID of the of the tag. “[i]f the ID of the sensor tag is recognized then the reader device may or may not have the necessary software and processing ability to analyze said sensor as shown in 716.” ’307 patent at 18:10-13. The specification further states “[i]f the software is available [on the reader device] then the analysis can be completed immediately as shown in 746.” ’307 patent at 18:13-16. But “if the software is

not available then ***the device must first obtain it*** from a given remote database 400 via function 720. ***Subsequently***, the ID of the RFID sensor is matched to a given class of sensor (e.g., a glucose sensor) and the software and/or instructions for the analyses are downloaded into the reader 2 as shown in function 738.” ’307 Patent at 18:20-23 (emphasis added). Therefore, the remote server must first receive and authenticate the ID of the sensor before it can provide software for that sensor to the wireless device.

60. Relatedly, if authentication does not take place, or authentication is attempted and fails, and no software related to said sensor ID is communicated to the wireless device, then the wireless device cannot process the sensor data. The specification supports this interpretation because this claim requires authentication and download of software. The specification supports limiting the claim scope such that it does not cover the situations where authentication of the sensor ID and communication of software relating thereto do not take place, for example, for the reasons above or in the event that software related to the sensor is already available on the wireless device (following the two “yes” branches at functions 708 and 716), rendering authentication and download unnecessary)

61. I have also reviewed the prosecution history of the ’307 patent and found that it confirms my proposed interpretation of this term. During prosecution the examiner rejected claim 65, which issued as claim 1, over two prior art

references – Evanyk and Jeutter. 307 FH at 84-85; *see also* Section I.B, *supra*. In response to that rejection, the Applicant stated:

Most notably, the present invention in claim 65 actively recites limitation wherein ***the remote device communicates the unique sensor ID and unique wireless ID to a remote server which uses this information to send the wireless device the information or software necessary to communicate with the unique sensor ID.***

307 FH at 65 (January 25, 2011 Amendment and Response) (emphasis added).

The Applicant confirmed that the remote server “uses” the received unique sensor/wireless ID to send the necessary software, which means that the “necessary software” is sent “in response to” authentication of the unique sensor ID.

62. In addition, the Applicant distinguished “the present invention” from prior art systems that merely “recite that software may be located on receiver and that they may be ‘upgraded or updated.’” 307 FH at 65 (January 25, 2011 Amendment and Response).

63. Further, the prosecution history also supports limiting the scope of the claim such that authentication of the sensor ID and communication of software relating thereto is required. Notably, the application was allowed only after an Examiner’s amendment to this limitation, as shown below:

wherein the remote server authenticates said unique sensor ID associated with said unique wireless device ID and communicates to said wireless device processed information relating to said sensor

data ~~or to first download~~ and software related to the unique sensor ID, thereby allowing said wireless device to interpret said sensor anywhere worldwide.

307 FH at 34-36 (Examiner's Amendment); 307 FH at 51-52 (pending claim language before amendment. The Examiner's Amendment, to which the Applicant agreed, modified this limitation to change communication of software related to said unique sensor ID from being optional to being required (replacing "or to first download" with "and").

64. Accordingly, it is my opinion that this term should be construed as "wherein the remote server authenticates a unique sensor ID associated with a unique wireless device ID and *in response to the authentication* communicates to the wireless device (1) processed information relating to the sensor data and (2) software related to the unique sensor ID necessary for the wireless device to interpret the sensor anywhere worldwide," which requires a cause-and-effect relationship between the authentication of the unique sensor ID and the communication of software to the wireless device to enable the wireless device to interpret sensor data.

B. Means-Plus-Function Terms

I understand that because the below terms recite "means" there is a presumption that they are "means plus function" terms, and I have been asked to identify the functions and structures to perform those functions.

1. “multiple wireless communication means”

65. The claimed function for this limitation is “wireless communication.”

The corresponding structures for performing the claimed function of this term are: wireless devices (examples of which the ‘307 patent identifies include cellular phones and PDAs) and devices that include wireless link capabilities present in devices such as cell phones implementing wireless communication protocols such as Bluetooth, Internet, cellular network, RFID reader communication standard, or other existing wireless network.

66. The specification repeatedly identifies the structures that perform the “wireless communication” function as a “cell phone,” “modified cell phone,” or “any modified wireless device” with the remote access and wireless link capabilities present in devices such as a cell phone. *See, e.g.*, ’307 patent at 5:12-13 (“Fig. 1 is a block diagram of a modified wireless device typically a cellular phone 2), 4:58-60 (“common wireless devices such as cell phones can be modified to include the necessary logic and components to become RFID readers”), 5:19-27 (“any modified wireless device can be used. For example, in lieu of a modified cell phone an RFID reader can be used and may include the necessary data processing, remote access and wireless link capabilities present in devices such as a cell phone, [including] a modified wireless PDA, a modified wireless computer, a modified

cordless phone, a modified beeper or even a modified wireless watch [] combined with RFID technology and be used as readers.”).

67. The specification further explains that “[w]ireless device 2 can communicate to a proximal cellphone tower or receiver 380 via wireless link 510 or indirectly by other existing or emerging wireless communication means such as Bluetooth. Cell phone tower 380 is linked to the Internet 390 or the wireless networks via soft or hard links 520 and to at least one remote computer 400 via soft or hard link 540.” ’307 patent at 17:24-30. The specification also describes that its wireless device, a modified cell phone, can also incorporate “multi-protocol RFID reader and communication standards such as Gen-2.” ’307 patent at 2:20-21. The specification goes on to explain that “[t]he reader capabilities of a modified personal wireless device may also include other reader protocols such as Bluetooth, Zigbee or IEEE 1073 and read virtually any type of active or passive sensors.” ’307 patent at 2:24-28.

68. Accordingly, the corresponding structures for performing the “wireless communication” function are wireless devices (examples of which the ’307 patent identifies include cellular phones and PDAs) and devices that include wireless link capabilities present in devices such as cell phones implementing wireless communication protocols such as Bluetooth, Internet, cellular network, RFID reader communication standard, or other existing wireless network.

69. My opinions regarding the prior art discussed in the grounds below do not change even if this term were not construed as a means-plus-function term.

2. “geolocation means”

70. The claimed function for this limitation is “geolocation.” A POSITA would understand “geolocation” as used in the ’307 patent to have its plain and ordinary meaning, which is “determining the geographic position of an object.” This is consistent with the definition of “geolocation technology” as “[a] technology used to determine the geographic coordinates of a radio-equipped mobile device, e.g., a cellular handset.” Ex. 1026 [Newton’s Telecom Dictionary]; *see also, id.* “Position Determination Technology.”

71. The corresponding structures for performing the claimed function of this term are: (1) geolocating by GPS and (2) geolocating without GPS, and the structures identified in the ’307 patent for geolocating by GPS and geolocating without GPS described in Sections I.B.3 and I.B.4, below.

72. The specification states that “the wireless devices or the sensors can also be geolocated anywhere by a global positioning system (GPS) and/or non-GPS triangulation means.” ’307 patent at 3:33-35. The specification also teaches that “[t]he microprocessor and RFID reader within wireless device 2 enable processing functions 500, which include reading, analysis, and geolocation by a global positioning system (GPS) or a non-GPS means. The reading, analysis and

geolocation by GPS or non-GPS means is described in U.S. Patent No. 6,031,454 ('454 patent') that is included herein by reference in its entirety." '307 patent at 17:18-24.

73. Thus, the corresponding structure for performing the "geolocation" function are (1) geolocating by GPS and (2) geolocating without GPS, and the structures identified in the '307 patent for geolocating by GPS and geolocating without GPS described in Sections I.B.3 and I.B.4, below.

3. "GPS means for geolocating said system"

74. The claimed function for this limitation is "geolocating said system by GPS." The corresponding structures for performing the claimed function of this term are: wireless reader/device (such as a cell phone or PDA) and GPS methods or processing logic for determining a geographic position of an object.²

75. As discussed above, the specification discloses that "the wireless devices or the sensors can also be geolocated anywhere by a global positioning system (GPS) and/or non-GPS triangulation means." '307 patent at 3:33-35. The specification also teaches that "[t]he microprocessor and RFID reader within wireless device 2 enable processing functions 500, which include reading, analysis,

² The '307 patent incorporates by reference U.S. Patent No. 6,031,454 for disclosure relating to "the reading, analysis, and geolocation by GPS or non-GPS means." '307 patent at 17:21-24.

and geolocation by a global positioning system (GPS) or a non-GPS means. The reading, analysis and geolocation by GPS or non-GPS means is described in U.S. Patent No. 6,031,454 [‘the ’454 patent’ or ‘Lovejoy’] that is included herein by reference in its entirety.” ’307 patent at 17:18-24.

76. The ’454 patent, which the ’370 patent incorporates by reference and identifies as describing the means for geolocating by GPS, explains that “GPS [] performs elaborate signal processing in the local unit,” and “[i]n situations where line-of-sight to 4 GPS satellites can be guaranteed and greater size and weight are acceptable, GPS can be utilized for geolocating. With GPS locating, reduced cost in the locating infrastructure is realized.” Lovejoy at 8:59-9:33.

77. Accordingly, a POSITA would understand that the corresponding structure for the “geolocating said system by GPS” function are wireless reader/device (such as a cell phone or PDA) and GPS methods for determining a geographic position of an object. Examples of such GPS methods include those performed by cellular phones that provide location through the use of the Global Positioning System.

4. “non-GPS geolocation means for geolocating said system”

78. The claimed function for this limitation is “geolocating said system without GPS.” The corresponding structures for performing the claimed function of this term are: wireless reader/device (such as a cell phone or PDA) and non-GPS

triangulation methods or processing logic for determining a geographic position of an object.

79. The specification states that “the wireless devices or the sensors can also be geolocated anywhere by a global positioning system (GPS) and/or non-GPS triangulation means.” ’307 patent at 3:33-35. The specification further states that “[t]he microprocessor and RFID reader within wireless device 2 enable processing functions 500, which include reading, analysis, and geolocation by a global positioning system (GPS) or a non-GPS means. The reading, analysis and geolocation by GPS or non-GPS means is described in U.S. Patent No. 6,031,454 that is included herein by reference in its entirety.” ’307 patent at 17:18-24.

80. The ’454 patent, which the ’370 patent incorporates by reference and identifies as describing non-GPS geolocation means, identifies the corresponding structure for performing the recited function as: an interrogator system, for example, (1) “VHF or UHF” or “[o]ther portions of the RF spectrum ... including frequencies in the X and ISM bands.” (’454 patent at 9:19-24); (2) one or more interrogator and receiver antennas, radar auxiliary receivers (’454 patent at 9:57-65); and (3) triangulation algorithm (’454 patent at 10:10-11).

81. In the context of a cellular phone, the cell towers with which the cellular phone communicates act as interrogators. Determining location by

triangulation can be achieved by measuring the time it takes a signal to travel between a number of cell towers and the cellular phone.

82. Accordingly, a POSITA would understand that the corresponding structure for the “geolocating said system without GPS” function in the ’307 patent to be non-GPS triangulation methods wireless reader/device (such as a cell phone or PDA) and non-GPS triangulation methods or processing logic for determining a geographic position of an object, including the structures described above for implementing such methods.

VII. Technology Overview

83. The ’307 patent is directed to remote sensor monitoring systems using RFID-based sensor networks. The monitoring systems described in the ’307 patent include (1) at least one sensor; (2) wireless communication circuitry integrated with the at least one sensor, for example, radio frequency identification (RFID) tag; and (3) wireless devices such as cellular phones that are configured to communicate with the at least one sensor.

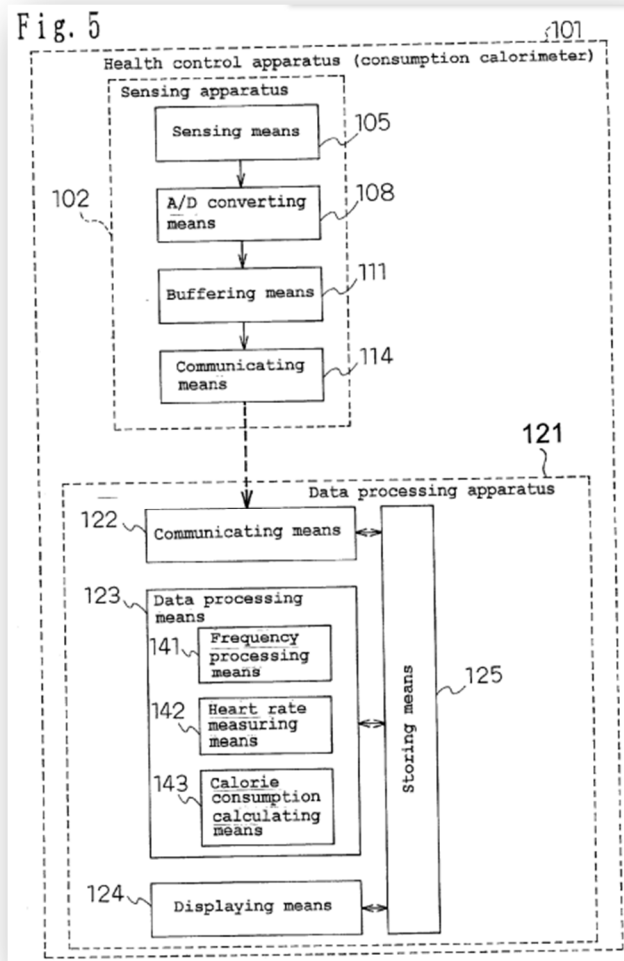
84. This technology was well-developed before the January 2004 asserted priority date of the ’307 patent. Below, I discuss basic concepts behind such remote sensor monitoring systems.

A. Sensors

85. Remote monitoring systems include at least one sensor (and often a network of sensors) configured to measure, for example, characteristics of the environment, including vital signs or other physiological parameters of an individual. Such systems were described in numerous prior art references including, for example, Mori (Ex. 1024) at [0249] (“Each sensing means 105-107 detects (senses the vital signs of a user.”) and Zunti (Ex. 1022) at 4:30-40 (Typical sensors such as Burdick EKG patient cables and sensing pads could be used for biomedical applications. A sensor Scientific Model CB08-502T has been found suitable for temperature measuring applications. A Matsushita Model WM-063X microphone may be used for acoustical noise measurement applications. Virtually any sensor may be adapted for use in the inventive system by using appropriate circuitry in sensor interface module 140.”). For example, Mori explains that when detecting heart rate, “[t]he sensing means of the sensing apparatus is composed of a pulse wave sensor for detecting the pulse wave.” Mori at [0263]. To detect heart activity, “electrodes are used to detect heart signals from the patient and convert them into a multiple-lead ECG evaluation.” Ng (Ex. 1015) at 1:27-29.

86. In addition to circuitry or means for detecting environmental parameters, remote monitoring systems also include additional circuitry for processing, storing, and/or communicating the collected signals. *See, e.g.*, Mori at

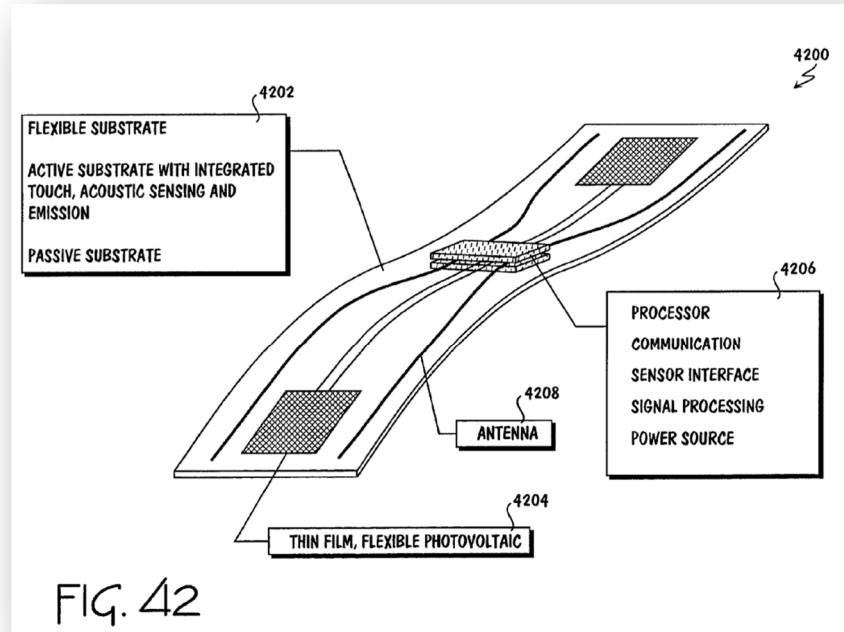
[0242] (“Each sensing apparatus 102-104 comprises: each sensing means 105-107 of detecting (sensing) vital signs; each A/D converting means 108-110 of converting the detected an analog signal into a digital signal; each buffering means 111-113 of temporarily storing the vital data which is digital-converted vital signs, and each communicating means 114-116.”), Fig. 5 (reproduced below); Zunti at 4:46-62 (“Sensor interface module 140 contains Signal conditioning circuitry 143 which is sensor-specific and designed to perform a combination of operations such as buffering, amplifying, attenuating, filtering, integrating, differentiating and level converting. Signal conditioning may be provided using any combination of electrical, electronic, mechanical, optical or other devices.”).



Mori at Fig. 5.

87. Moreover, sensors can be packaged into systems in which sensor elements and associated circuitry can be integrated into substrates. *See* Gelvin (Ex. 1019) at 43:28-30, 45:20-28 (“The substrate 4202, in this case the piezoelectric polymer PVF, operates as an acoustic sensor and source. Thin film, flexible photovoltaic devices 4204 are also incorporated into the substrate 4202 to provide an energy source and an optical presence detection sensor. Furthermore, an antenna

4208 can be incorporated into the substrate or carried on the substrate.”), Fig. 42 (reproduced below).



Gelvin at Fig. 42.

B. RFID Circuitry

88. Prior art systems also included sensors equipped to wirelessly communicate via radio frequency (RF) communication. Mazar (Ex. 1021) at 8:8-18 (“A variety of communication methods and protocols may be used to facilitate communication between devices 102, 104, and 106, ITU 108, communication system 110, host 112, and remote peripheral device 109. ..., while wireless communications may include cellular, satellite, radio frequency (RF), Infrared, etc.”); Beck at [0039] (“The communications interface 136 may alternatively, or

in addition, include wireless technologies such as RF and/or IR transmitter/receivers to establish the physical communications link 140 between the client computing device 120 and the medical device 130.”).

89. Additionally, sensors commonly employ inductive coupling and/or RFID tag technology for communication and identification. *See* Gelvin at 43:6-9 (“Between WINS NG technology on the one hand and passive radio frequency identification (RFID) tags on the other, there are a range of applications that require some combination of sensing, signal processing, and networking in compact and low-cost systems”); Bandy-344 at 5:44-53 (“[T]ag 102 also contains one or more sensors. Data collected by the sensors is routed to counter/ shift register 312 each time tag 102 transmits. The sensor data is appended to the tag transmission and recorded by tag reader 104.”).

90. Indeed, well before the priority date of the ’307 patent, U.S. Patent No. 6,002,344 (“Bandy-344) (Ex. 1018), entitled “System and method for electronic inventory,” issued on December 14, 1999. Bandy-344 lists William R. Bandy, Michael R. Arneson, and Robert A. Williams as inventors. Notably, William R. Bandy is also an inventor of the Bandy reference upon which Ground 1 is based.

91. Bandy-344 discloses a remote monitoring system that includes RFID tags that contain one or more sensors. Bandy-344 at 5:44-45. Bandy-344 explains

that “[d]ata collected by the sensors ... is appended to the tag transmission and recorded by tag reader 104.” Bandy-344 at 5:46-48. Bandy-344 explains that the sensors contained in the RFID tags can include “a gas sensor that detects the presence of chemicals associated with drugs or precursor chemicals of explosives, such as methane.” Bandy-344 at 5:48-50.

92. Bandy-344’s disclosed system includes a computer that “performs high level processing functions not provided by tag reader generic circuitry,” and which may be physically separate from the tag reader and connected by hard-wired or wireless connection. Bandy-344 at 5:59-6:3.

C. Wireless Devices Such as Cellular Phones

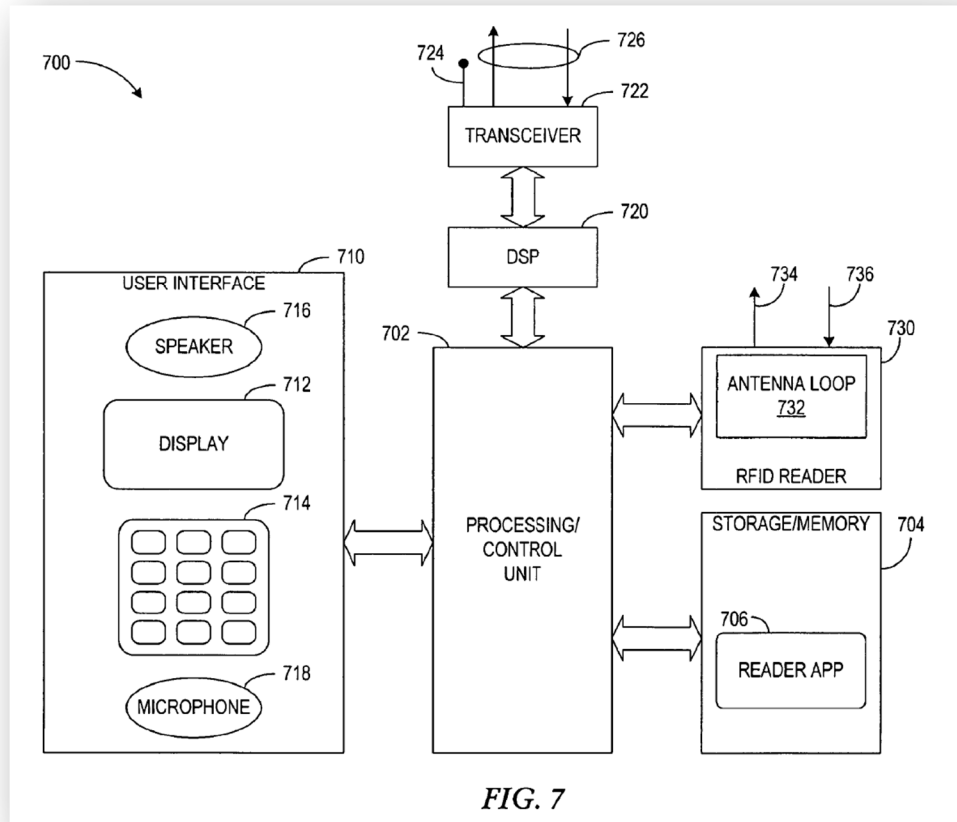
93. Sensors of remote sensor monitoring systems can be configured to communicate with wireless devices such as mobile and/or cellular phones. For example, Mazar discloses such a system where sensors communicate with wireless devices. *See* Mazar at 8:8-18 (“A variety of communication methods and protocols may be used to facilitate communication between devices 102, 104, and 106, ITU 108, communication system 110, host 112, and remote peripheral device 109. For example, wired and wireless communications methods may be used. Wired communication methods may include, for example and without limitation, traditional copper-line communications such as DSL, broadband technologies such as ISDN and cable modems, and fiber-optics, while wireless communications may

include cellular, satellite, radio frequency (RF), Infrared, etc.”); Kangas (Ex. 1023) at [0007] (“[T]here is a great variety of possible accessory devices that could be connected to mobile phones, for instance digital cameras, heart rate monitors, etc.”).

94. In addition, the prior art disclosed systems including sensors that communicated with cell phones that, in turn, are configured to communicate over networks with remote servers/databases. Beck at [0028] (“The network interface 125 of the exemplary client computing device 120 generally operably couples the exemplary client computing device 120 to the network 150 such that the client computing device 120 may communicate with the server computing device 110 via the network 150.”); Bandy at 6:9-12 (“Sensor network processor 190 receives sensor data over network 180, and processes the data. Furthermore, in an embodiment, processor 190 transmits the processed data back over the network 180 to the reader 140.”).

95. As another example, U.S. Patent No. 7,446,646 (“Huomo”) (Ex. 1027), entitled “System and method for supporting multiple reader-tag configurations using multi-mode radio frequency tag,” which was filed on June 30, 2003, and is assigned to Nokia Corporation, discloses the provision of “RFID readers [] in mobile terminals such as mobile phones, Personal Digital Assistants (PDAs), or other mobile devices.” Uomo at 2:28-31. With reference to Fig. 7,

Huomo discloses a mobile terminal computing system capable of carrying out reader operations. Huomo at 4:65-67.



Huomo, Fig. 7. Huomo explains that “[t]he processing unit 702 controls the basic functions of the mobile terminal as dictated by programs available in the program storage/memory,” including “functions associated with the RFID reading aspects of the present invention.” Huomo at 17:7-11. Huomo explains that the “[a]pplication modules associated with the present invention may also be transmitted to the mobile computing arrangement 700 via data signals, such as

being downloaded electronically via a network, such as the Internet and intermediary wireless networks.” Huomo 17:19-24.

96. In addition, cellular phones available before the priority date of the ’307 patent included geolocation capability. By the late 1990s, government agencies such as the Federal Communications Commission in the United States were pushing to make automatic location identification (ALI) technology standard in all cellular devices. FCC Report (Ex. 1017) at 4 (“When the Commission adopted its Phase II rules in 1996, it was believed that location information could only be effectively provided by technologies based in or overlaid on carrier networks, using approaches such as triangulation of the handset’s signal. Since that time, advancements in location technologies that employ new or upgraded handsets have demonstrated important progress.”); *see also id.* at 5-7, 15, 21, 48-50 (requiring carriers to begin selling location-capable handsets no later than March 1, 2001, and provide network-based location (triangulation) coverage by October 1, 2001).

VIII. Overview of the Prior Art

97. I have been informed that the documents described in this section constitute prior art to the ’307 patent. I am not a lawyer and do not purport to be an expert in whether a document constitutes prior art.

A. Overview of Bandy (Ex. 1005)

98. U.S. Patent No. 7,148,803 (“Bandy”) was filed on Jan. 22, 2004, and issued on December 12, 2006. Bandy names two inventors, William R. Bandy and John P. Peeters.

99. I am informed and understand that Bandy is prior art to the ’307 patent.

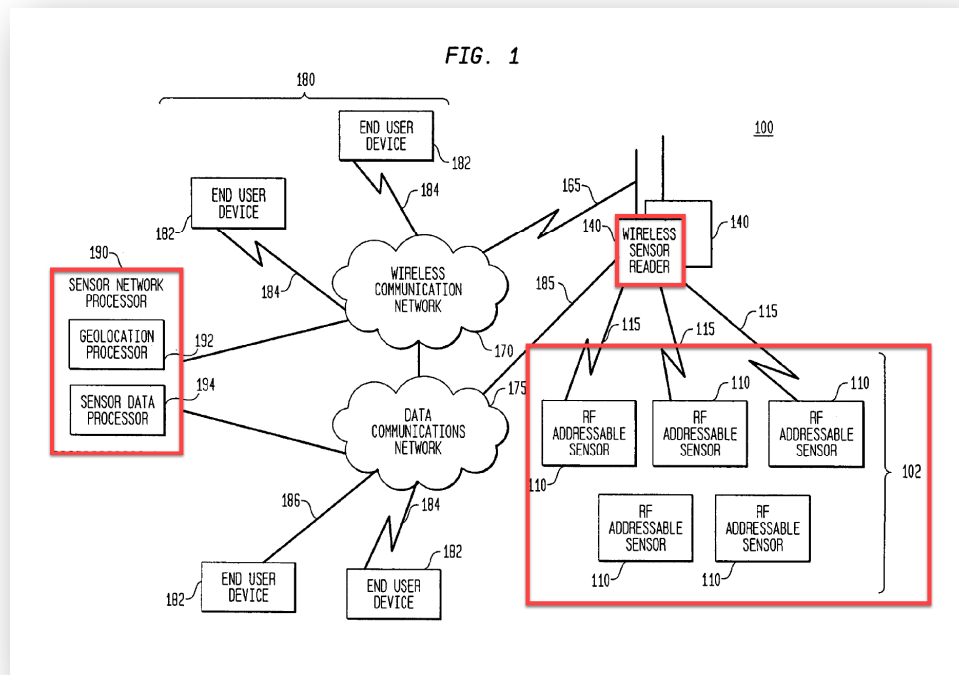
100. Bandy is titled “Radio Frequency Identification (“RFID”) Based Sensor Networks.” Bandy describes an “RF addressable sensor network architecture” that “includes one or more RF addressable sensors, one or more wireless sensor readers coupled to a communications network, and one or more end user devices coupled to the communications network.” Bandy at Abstract.

101. Bandy teaches that its RF-addressable sensor includes “one or more sensor elements, one or more antennas for communicating with the wireless sensor reader, an RF power and communications interface, an RFID control module, and a sensor interface.” Bandy at Abstract.

102. In addition, Bandy describes a wireless sensor reader, which “is implemented in a wireless device such as a phone or PDA.” Bandy at 2:28-29 “[T]he wireless sensor reader includes one or more antennas, a user interface, a controller, a network communications module, and an RF addressable sensor logic module,” which “controls communication with the RF addressable sensors.”

Bandy at 2:21-28. Bandy explains that “the RF addressable sensor logic module is integrated into the device either by design or by downloading the sensor logic into a programmable processor located on the device.” Bandy at 2:28-36.

103. Figure 1 of Bandy, which I have annotated below, shows RF addressable sensor network 100, which “includes a population of RF addressable sensors 102, one or more wireless addressable sensor readers 140, and a communications network 180.” Bandy at 4:36-39. The RF addressable sensors 110 of the population of RF addressable sensors 102 “integrate RFID tag functionality and sensor functionality.” Bandy at 5:1-5. Signals are exchanged between wireless sensor reader 140 and RF sensors 110 “according to one or more protocols,” which include RF transmissions. Bandy at 5:19-22. For example, wireless sensor reader 140 “includes logic to interrogate the population of RF addressable sensors 102 and logic to read sensor data and RFID tag data transmitted by the RF addressable sensors 110.” Bandy at 5:6-9.



104. Wireless sensor reader 140 also communicates with sensor network processor 190 over network 180. *See* Bandy at 6:9-12. “Sensor network processor 190 receives sensor data over network 180, and processes the data. Furthermore, in an embodiment, processor 190 transmits the processed data back over the network 180 to the reader 140.” Bandy at 6:9-12.

105. Bandy explains that “some or all of the necessary information to handle and analyze the sensor is retrieved from processor 190.” Bandy at 10:29-32. Additionally, “[s]oftware may also be downloaded directly and transparently into cell phone or reader 140 to ‘train’ the wireless device to recognize and analyze that given type of RFID-sensor.” Bandy at 10:33-36. Bandy explains that “only

the ID of the RFID-sensor is necessary” to download “the necessary processing and analysis information [] from a remote location.” Bandy at 10:37-41.

B. Overview of Beck (Ex. 1007)

106. U.S. Publ. No. 2002/0178126 to Beck et al. (“Beck”) was published on November 28, 2002, before the priority date of the ’307 patent. I am informed and understand that Beck is prior art to the ’307 patent.

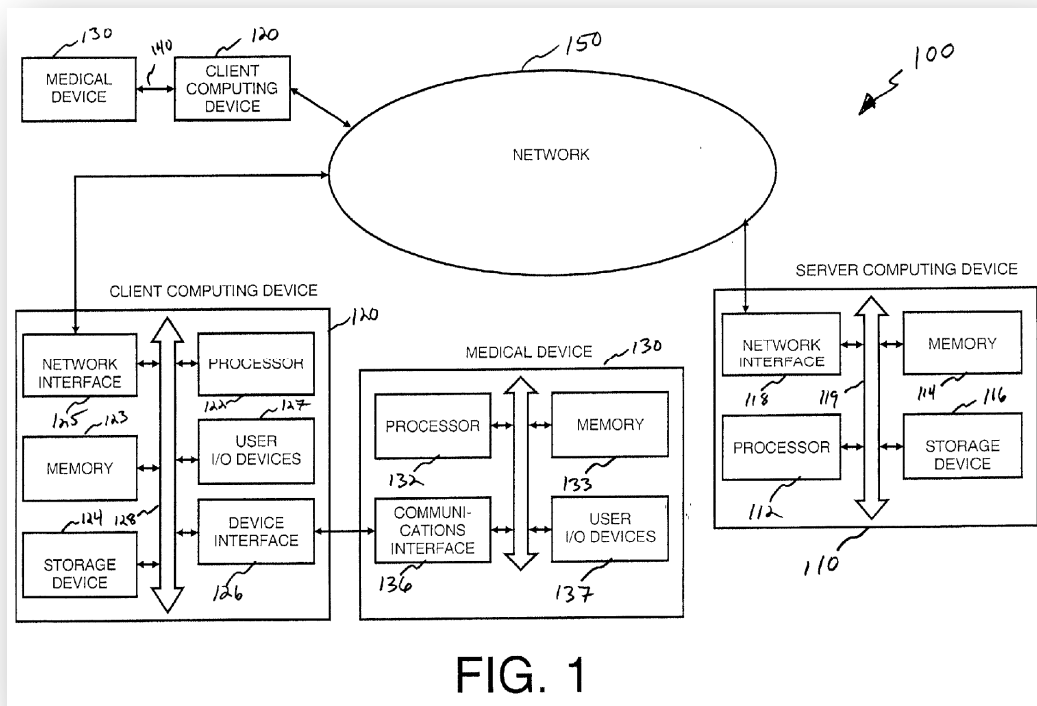
107. Beck is titled “Remote Medical Device Access.” Beck discloses “[s]ystems, client computing devices, server computing devices, and methods [] for accessing medical devices, providing remote access to medical devices and/or remotely accessing medical devices.” Beck at Abstract.

108. Beck describes system 100 with reference to Fig. 1, reproduced below. Beck explains that “system 100 includes a server computing device 110, a client computing device 120, a medical device 130 operable couple to the client computing device 120 via a communications link 140, and a network 150 which operably couples the client computing device to the server computing device.” Beck at [0014]. Beck explains that system 100 “provides the server computing device 110 remote access to the medical devices 130 via the client computing devices 120 and the network 150.” Beck at [0014]. The system also “automatically or semi-automatically configures the client computing devices 120 for communication with medical devices 130.” Beck at [0014].

109. For example, Beck's system can provide remote monitoring of medical sensors such as glucose meters. Beck at [0034], Abstract. Beck explains:

[t]he medical device 130 of the system 100 is generally operable to monitor one or more biological/physiological conditions and communicate with the client computing device 120 via the physical communications link 140 established between the client computing device 120 and the medical device 130. In an exemplary embodiment, the medical device 130 includes a glucose meter such as the glucose meters manufactured by Roche Diagnostics Corporation which are generally operable to measure blood glucose levels of blood applied to test strips. While the medical device 130 of the exemplary embodiment includes a glucose meter, the medical device 130 could be implemented to monitor and/or analyze other biological/physiological parameters or conditions such as body fluids or bodily functions (e.g. blood, urine, saliva), bodily signals (e.g. electrocardio-signals, brain waves, blood pressure waves), and/or other bodily stimuli (e.g. respiration) to obtain measurements of blood pressure, blood gases, blood coagulation, electrolytes, cardiovascular activity, drug levels, respiration rate, stress, etc.

Beck at [0034].



110. Medical device 130 can communicate with client computing device 120 via “RF and/or IR transmitter/receivers.” Beck at [0030], [0039]. Beck also teaches that client computing device 120 can be implemented as a “handheld computing device[] (e.g. PalmPilots) and Internet enabled cellular phone[.]” Beck at [0027].

111. Client computing device 120 “performs various operations in regard to communicating with the medical device 130 on behalf of the client computing device 120 and/or the server computing device 110,” and can “clear stored measurement data, retrieve stored measurement data, update calibration or other

parameters used to obtain measurement data, perform a test to obtain measurement data, or other tasks.” Beck at [0074].

112. Server computing device 110 provides client computing device 120 with software protocol component updates that correspond to the medical device 130 in communication with the client computing device 120. Beck at [0069].

C. Overview of Heller (Ex. 1016)

113. International Publication Number WO 02/058537 to Heller (“Heller”) was filed on December 28, 2001, and published on August 1, 2002. I am informed and understand that Heller is prior art to the ’307 patent.

114. Heller is titled “Analyte monitoring device and methods of use.” Heller discloses a sensor for “continuous and/or automatic *in vivo* monitoring of the level of an analyte,” such as glucose. Heller at 2:9-10, 3:27-31. Heller teaches that the disposable sensor control unit for the analyte monitoring device can include “adhesive for adhering to the skin.” Heller at 4:3-9. Heller further teaches that the on-skin sensor control unit can be disposable. Heller 50:18-19 (“One embodiment of the on-skin sensor control unit 44 is a disposable unit complete with a battery for operating the unit.”). In addition, Heller discloses that the on-skin sensor control unit can be placed on an adhesive patch, which affixes the sensor proximate to the skin of the user. Heller at 54:29-32 (“[the] on-skin sensor

control unit 44 is provided on an adhesive patch 204 with an optional cover 206 to protect and/or confine the housing 45 of the on-skin sensor control unit.”).

115. Further, Heller discloses the use of reference sensors that can be used to modify sensor measurements dependent on the reference value. For example, Heller teaches that “sensor current (or any other sensor characteristic, for that matter) varies directly with analyte level” and that “at a given temperature, a particular sensor current-analyte level profile portrays the relationship between sensor current and analyte level.” Heller at 67:20-23. Such profiles are known to vary with temperature. Heller at 67:25-26. To address such variance, Heller discloses “temperature probe 66[, which] can be configured to reside at the surface of the skin.” Heller at 66:20-21. “The output from the sensor circuit 97 and optional temperature probe circuit is coupled into a measurement circuit 96 that obtains signals from the sensor circuit 97 and optional temperature probe circuit 99 and, at least in some embodiments, provides output data in a form that, for example can be read by digital circuits.” Heller at 66:30-67:1. A processing circuit can then “modify the signals from the sensor circuit 97 using calibration data and/or output from the temperature probe circuit 99.” Heller at 67:3-11. For example, the processing circuit can be designed to account for the sensor current-analyte level relationship to temperature by using temperature information to adjust a known profile for a given temperature in a known manner. Heller at 67:32-

68:3. Heller further discloses converting analog data, for example, from various sensors to digital format. *See* Heller at 66:30-67:1; *see also* Heller at 104-105 (claim 39) (“collecting an analog signal representing a level of analyte in a bodily fluid; converting the analog signal into a digital signal representing a level of analyte in a bodily fluid.”). Conversion is necessary because “the sensor control unit 44 often includes digital and/or analog components.” Heller at 62:3-4.

D. Overview of Lovejoy (Ex. 1009)

116. U.S. Patent No. 6,031,454 to Lovejoy et al. (“Lovejoy”) issued on February 29, 2000, before the priority date of the ’307 patent. I am informed and understand that Lovejoy is prior art to the ’307 patent.

117. Lovejoy is titled “Worker-Specific Exposure Monitor and Method for Surveillance of Workers.” Lovejoy describes “[a] person-specific monitor that provides sensor information regarding hazards to which the person is exposed and means to geolocate the person at the time of the exposure.” Lovejoy at Abstract.

118. Lovejoy teaches that its disclosed personal monitor includes “geolocating capabilities (GPS or the radar-responsive tags).” Lovejoy at 4:32-37. Lovejoy explains that “[i]n situations where line-of-sight to 4 GPS satellites can be guaranteed and greater size and weight are acceptable, GPS can be utilized for geolocating. With GPS locating, reduced cost in the locating infrastructure is realized.” Lovejoy at 8:59-9:33. With reference to Fig. 4, Lovejoy further

explains that for non-GPS radar-responsive tag geolocation, the system can include “an interrogator antenna 400 and two receiver antennae 410, 420.” Lovejoy at 9:57-59. “[T]he interrogator 400 sends out a locating pulse which interacts with the radar-responsive tag in monitor 10. The tag then re-radiates with its unique signal which is then received by the various antennae for geolocation of the monitor. Time-of-arrival with a triangulation algorithm is preferably used for tag position determination.” Lovejoy at 9:57-10:33. Lovejoy also teaches that non-GPS geolocation can be performed with an interrogator system using VHF or UHF. Lovejoy at 9:19-20.

IX. Summary of Opinions

119. As further detailed below, my opinion is that the prior art teaches or renders obvious every element of claims 1-3, 5, 9, and 10 of the '307 patent, as arranged in the claims as follows:

1. Bandy teaches or renders obvious claims 1, 2, 5, 9, and 10.
2. Bandy in combination with Heller renders obvious claim 3.
3. Beck in combination with Heller and Lovejoy renders obvious claims 1-3, 5, 9, and 10.

X. Ground 1: Claims 1-2, 5, 9, and 10 are unpatentable over Bandy

120. I explain below, on an element-by-element basis, how every element of Claims 1-2, 5, 9, and 10 of the '307 patent is either disclosed in or obvious over the Bandy.

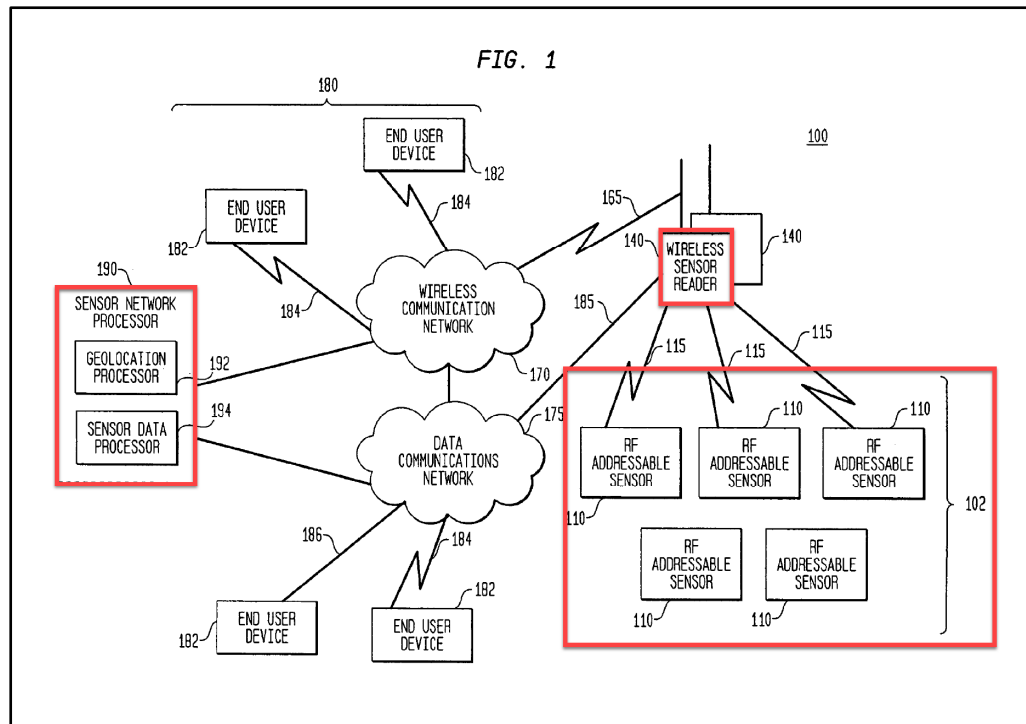
A. Independent Claim 1 is Obvious in view of Bandy

1. Element [1pre]: Preamble

121. The preamble to claim 1 recites “[a] radio frequency (RF) addressable diagnostic sensor unit.” For the purposes of my analysis, Counsel instructed me to assume this preamble is limiting. Bandy discloses or renders obvious this limitation.

122. For example, Bandy discloses an “RF addressable sensor network 100 for monitoring, detecting, and geolocating RF addressable sensors.” Bandy at 4:33-35. Bandy states that “[n]etwork 100 includes a population of RF addressable sensors 102.” Bandy at 4:36-37.

123. Bandy’s Figure 1, annotated below, shows the RF addressable sensor network, which includes the RF addressable sensors.



124. Bandy also explains that the RF addressable sensors may include one or more types of sensors elements, including:

gas sensor elements that detect the presence of chemicals, such as those associated with drugs or precursor or trace chemicals of explosives such as Pentaerythritol Tetranitrate (PETN) and Hexahydro-1,3,5-triazine (RDX); temperature sensor elements that generate information indicating ambient temperature; accelerometers that generate information indicating movement or vibration; optical sensor elements that detect the presence (or absence) of light; pressure sensor elements that detect various types of mechanical pressures; tamper sensor elements that detect efforts to destroy or remove the sensor from affixed items; electromagnetic field sensor elements, radiation sensor elements; and biochemical sensor elements.

Bandy at 7:34-49. Bandy further states that this list is not exhaustive and other types of sensor elements would be apparent to a POSITA. Bandy at 7:49-52.

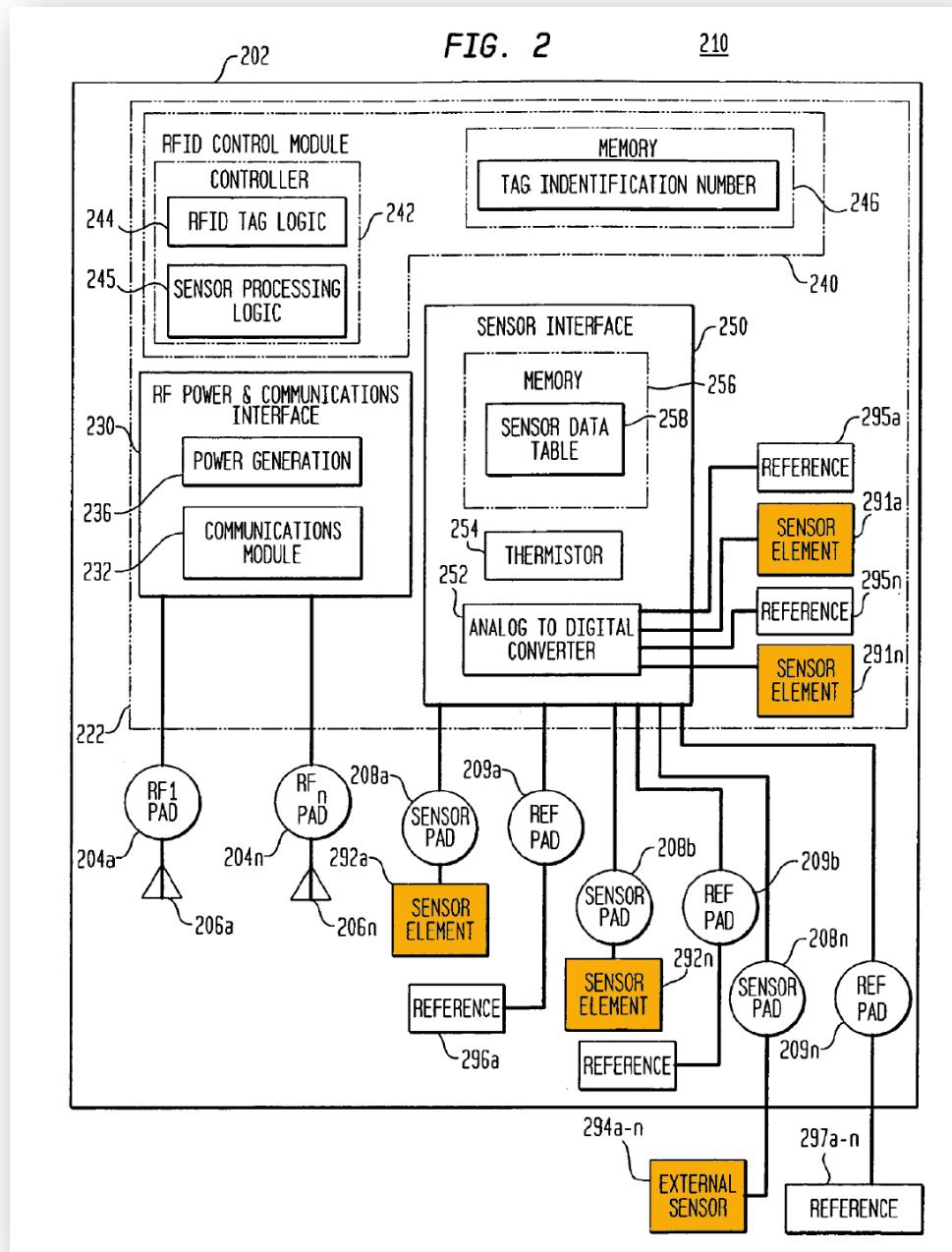
125. In addition, Bandy states “[t]he present invention can also be used for remote diagnostics monitoring, according to an example embodiment,” shown in Fig. 11. Bandy at 19:56-57. According to Bandy, Fig. 11 discloses a “remote individual-specific monitoring network 1100,” that includes at least one addressable sensor with “sensor elements for monitoring temperature, chemical composition, biological composition, or a combination of the above for an individual.” Bandy at 19:64-67.

126. Accordingly, in light of the foregoing disclosures, a POSITA would understand that Bandy discloses this limitation.

2. Element [1a]: Sensor Element

127. Element [1a] recites “at least one sensor element.” Bandy discloses this limitation.

128. Bandy discloses an “RF addressable sensor [that] includes one or more sensor elements.” Bandy at Abstract. For example, Figure 2 of Bandy, annotated below, is a block diagram of an RF addressable sensor, which “includes RFID tag functionality integrated with sensor functionality.” Bandy at 6:51-54. As shown, “RF addressable sensor 210 also includes a plurality of sensor elements 291a-291n, 292a-292n, and 294a-294n.” Bandy at 6:55-60.



129. Bandy includes additional disclosure of sensor elements. For example, Bandy states:

FIG. 8 depicts a sensor network 800 for monitoring geographical area 820. Sensor network 800 includes a plurality of RF addressable

sensors 810a, 810b, and 810c, etc. (collectively ***sensor elements 810***), one or more wireless sensor readers 840, and access points for communications network 880.

Bandy at 17:17-22 (emphasis added), Fig. 8.

130. Further, with reference to Fig. 10 showing an embodiment of application of a sensor network for the remote monitoring of shipping containers, Bandy states that “[t]he RF addressable sensors 1010 include chemical sensor elements, radiological sensor elements, biological sensor elements or any combination of the above.” Bandy at 18:34-36, Fig. 10.

131. In addition, with reference to Fig. 11, Bandy discloses a remote diagnostics monitoring system that includes at least one addressable sensor with “sensor elements for monitoring temperature, chemical composition, biological composition, or a combination of the above for an individual.” Bandy at 19:64-67.

132. As another example, Bandy explains that that the “smart card or badge 1103 is affixed to a person (or animal) such that the sensor elements of the RF addressable sensor are proximate to the surface of the skin.” Bandy at 20:3-6.

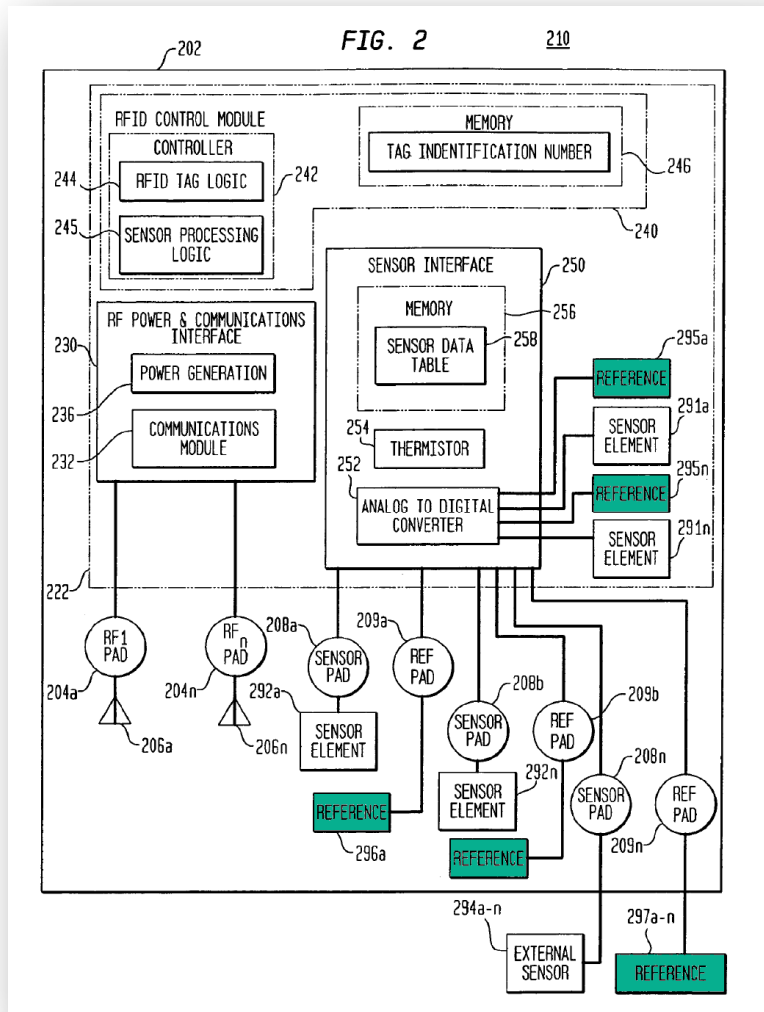
133. Finally, in the related district court litigation, in response to Abbott’s Initial Invalidity Contentions, Gentag admitted that Bandy discloses this limitation. Ex. 1014 (Gentag’s Resp. to Abbott Invalidity Chart for Bandy (“Gentag Invalidity Resp.”)) at 2-11.

3. Element [1b]: Reference Sensor Element

134. Limitation [1b] recites: “at least one reference sensor element.”

Bandy discloses this limitation.

135. For example, Bandy states that “RF addressable sensor 210 optionally includes a plurality of reference elements 295a–295n, 296a–296n, and 297a–297n” (Bandy at 8:59–9:7) which are annotated in Figure 2, below:



136. Bandy explains that reference elements, like sensor elements, “may be included in integrated circuit 222, on substrate 202, external to substrate 202, or in any combination of the above.” Bandy at 8:62-65. In Fig. 2, reference elements 295 are included in integrated circuit 222, reference elements 296 are included on substrate 202, and reference elements 297 are external to substrate 202. Bandy at 8:65-9:1.

137. Bandy further explains that “[r]eference elements allow for the cross validation of sensor data and establish baselines. This is important for chemical measurements, for biological sensors, and for any sensor situation where there are two or more variables and at least one of the variables is dependent or proportional to the other.” Bandy at 9:8-13; *see also* Bandy at 9:14-22.

138. Finally, in the related district court litigation, in response to Abbott’s Initial Invalidity Contentions, Gentag admitted that Bandy discloses this limitation. Ex. 1014 (Gentag Invalidity Resp to Bandy.) at 12-13.

4. Element [1c]: Unique ID Number

139. Element [1c] recites “a unique identification ID number.” Bandy discloses this limitation.

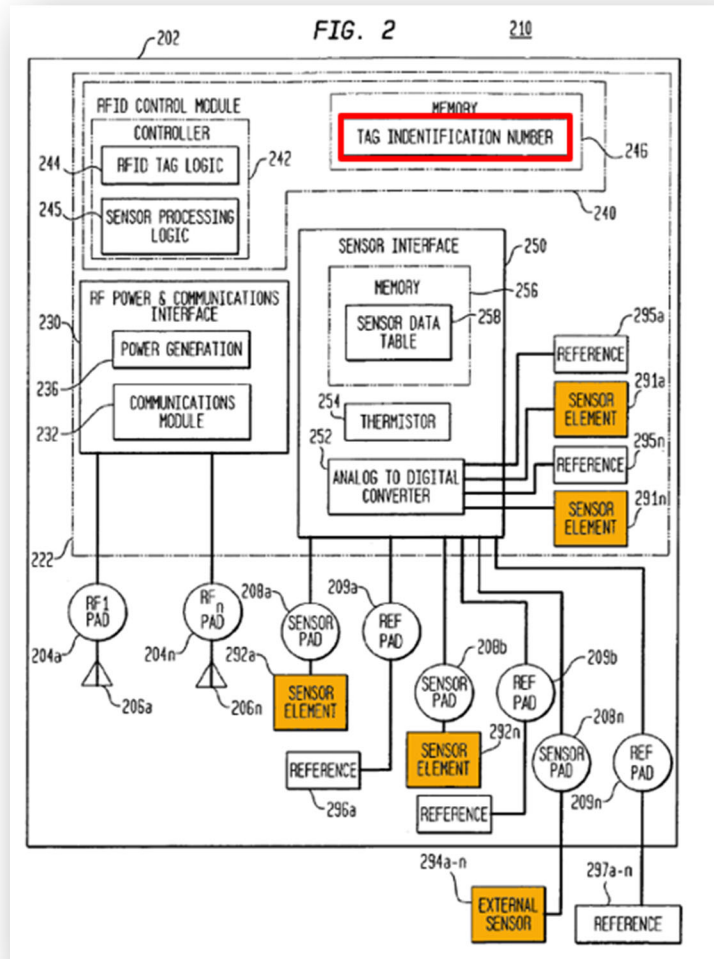
140. Bandy describes that “memory 256 stores a sensor data table. The sensor data table 258 is configured to store data related to all or a subset of elements supported by the RF addressable sensor 210. For example, the sensor data table

may store a ***sensor element identification number***, a preferred read time, spacing interval between reads, and/or sensor element specific data.” Bandy at 10:6-13 (emphasis added). The sensor element identification number, also referred to as the ID of the RFID sensor, uniquely corresponds to a given sensor element in RF addressable sensor such that the set of sensor element identification numbers of RF addressable sensor 210 would also be unique to the given sensor.

141. Bandy also discloses that the RF addressable sensors of its system include a unique tag identification number. For example, Bandy states “when a sensor 110 having a data table 258 is activated by wireless sensor reader 140, the sensor 110 identifies itself (e.g., by providing its identification number).” Bandy at 10:19-21.

142. Additionally, Bandy discloses that “[m]emory 246 stores the tag identification number for the RF addressable sensor. In an embodiment of the present invention, the tag identification number indicates the type of sensor elements included in the RF addressable sensor 210.” Bandy at 11:11-29. Additionally, Bandy teaches that “[m]emory 246 may be separate or integrated with memory 256.” *Id.* Here, the tag identification number serves at least two purposes: (i) it identifies the RF addressable sensor 110/210 and (ii) it indicates the type of sensor elements included in the RF addressable sensor. As depicted in Fig.

2, an RF addressable sensor 210 can have a plurality of sensor elements. See Bandy at 6:55-60.



143. Bandy explains that the tag identification number (e.g., 246) is unique. According to Bandy:

a user may obtain (e.g., purchase) a batch of RF addressable sensors. The user may store the tag identification numbers associated with each RF addressable sensor in the wireless sensor reader prior to

initiating a read of the sensors. The reader can then isolate only those specific RF addressable sensors stored in the wireless sensor reader.

Bandy at 15:1-6. Thus, because the tag identification number is used to isolate certain RF addressable sensors to be read, a POSITA would understand that it is a unique identification number.

144. Indeed, Bandy expressly confirms that understanding. Bandy states that “details on methods for isolating a specific tag” are included in then-pending U.S. Application No. 10/072,984 (“the ’984 application”) titled “Radio Frequency Identification Architecture,” which is incorporated into Bandy by reference in its entirety. *See* Bandy 15:10-13, 5:30-35.

145. The ’984 application was filed on February 12, 2002, and issued as U.S. Patent No. 6,989,750 (“the ’750 patent”) on January 24, 2006. The ’750 patent explains:

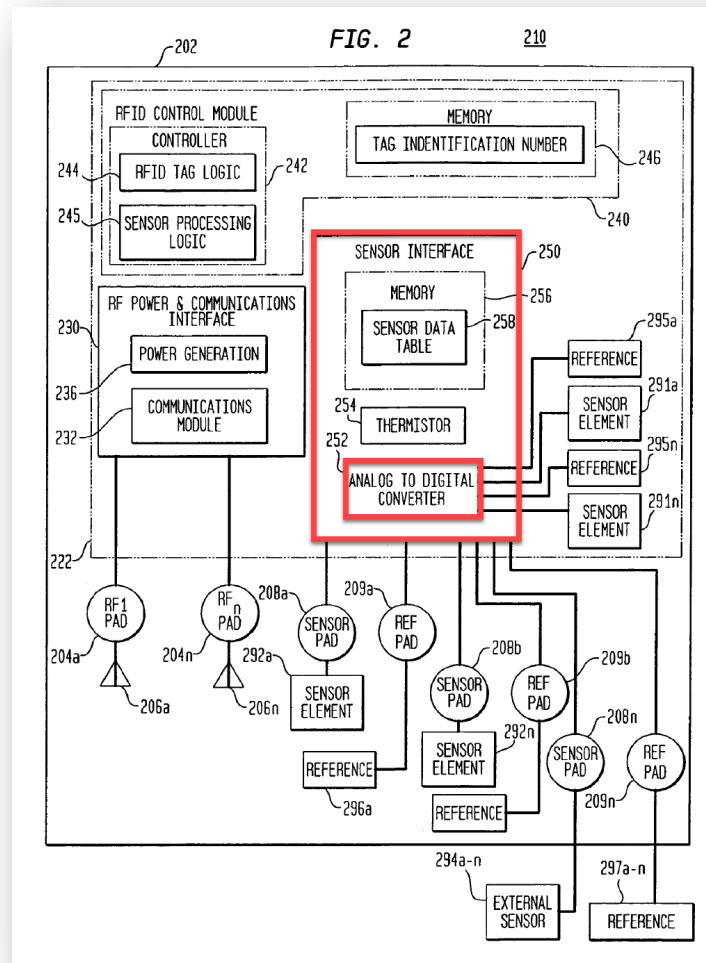
In a preferred embodiment, the approach that reader network 104 uses to isolate and determine that a particular tag 102 exists is detailed in FIG. 14A. The process involves two stages. In the first stage, *the full identification number of a particular chosen tag* 102 is sent out. Because *this identification number is unique*, all other tags 102 that are within the communications range of reader network 104 are implicitly directed to enter into the mute state 1212.

Ex. 1028 ('750 patent) at 30:46-54 (emphasis added). Accordingly, because Bandy incorporates by reference the disclosure of the '750 patent, Bandy expressly discloses that the tag identification number of its RF addressable sensors is unique.

5. Element [1d]: Sensor Interface with an A/D Converter

146. Element [1d] recites “a sensor interface having an analog to digital converter coupled to the at least one sensor and reference sensor element.” Bandy discloses this limitation.

147. With reference to Figure 2 (annotated below), Bandy discloses that “[s]ensor interface 250 includes a digitizer or *an analog to digital converter (ADC) 252*” that “can be *coupled directly to sensor elements* implemented in integrated circuit 222 and *is coupled to other sensor elements* 292 and 294 via sensor pads 208.” Bandy at 9:26-32 (emphasis added), Fig. 2. Figure 2 shows that the analog to digital converter 252 is coupled to sensor elements 291 and reference sensor elements 295.



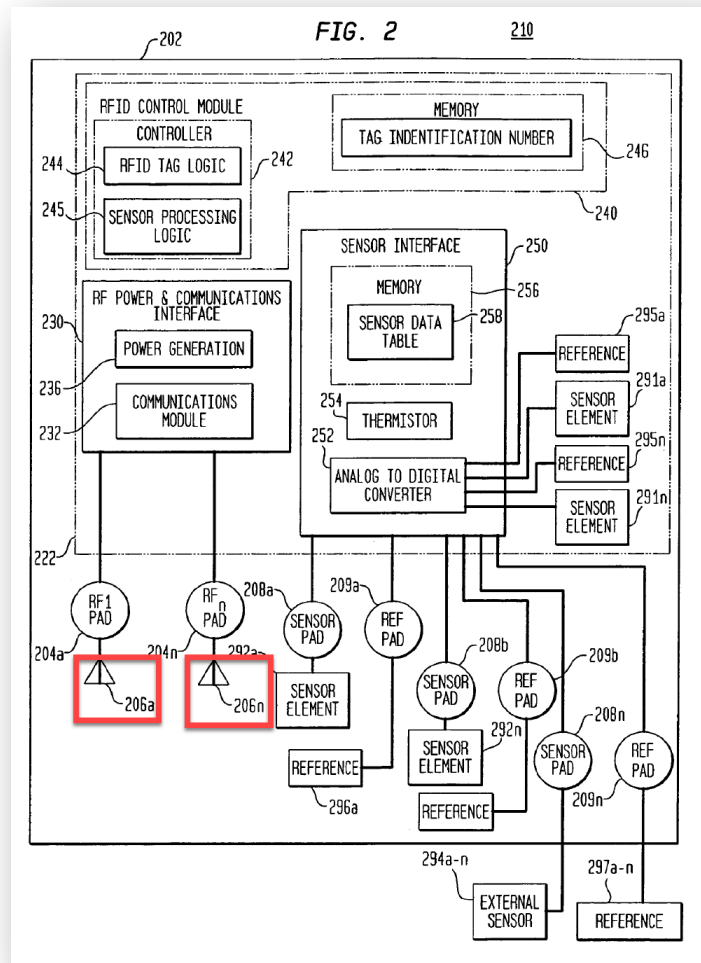
148. In addition, Bandy explains that “analog sensor data is obtained by one or more sensor elements 291, 292 and/or 294 and communicated to ADC 252,” which further demonstrates that Bandy discloses “a sensor interface having an analog to digital converter coupled to the at least one sensor and reference sensor element.” Bandy at 16:36-38, *see also* Figs. 7A and 7B.

149. Finally, in the related district court litigation, in response to Abbott's Initial Invalidity Contentions, Gentag admitted that Bandy discloses this limitation. Ex. 1014 (Gentag Invalidity Resp.) at 15-17.

6. Element [1e]: Antenna

150. Element [1e] recites "at least one antenna." Bandy discloses this limitation.

151. Bandy discloses that "[r]adio frequency addressable sensor 210 includes ... a plurality of antennas 206a through 206n," as shown in Fig. 2 (annotated below). Bandy at 6:55-57.



152. Bandy further states that “RF addressable sensor 210 may have *one or more antennas* configured to communicate with a conventional RFID reader and *one or more antennas* configured to communicate with wireless sensor reader 140.” Bandy at 10:57-61 (emphasis added).

153. Finally, in the related district court litigation, in response to Abbott’s Initial Invalidity Contentions, Gentag admitted that Bandy discloses this limitation. Ex. 1014 (Gentag Invalidity Resp.) at 18-19.

7. Element [1f]: Substrate

154. Element [1f] recites “a substrate.” Bandy discloses this limitation.

155. Bandy discloses that sensor elements in its RF addressable sensor may be integrated on a substrate or may be external to it. For example, Bandy states:

Sensor elements may be included in integrated circuit 222, on substrate 202, external to substrate 202, or in any combination of the above. As shown in FIG. 2, sensor elements 291 a–n are included as a component in integrated circuit 222. Sensor elements 292 a–n are included on the substrate 202. Any sensor element that is compatible with the fabrication of RF addressable sensor 210 can be used. In an embodiment of the invention, sensor elements 292 a–n can be thin film sensor elements that are deposited, printed, or directly assembled onto substrate 202. Sensor elements 294 a–n are external to the substrate 202. If the sensor element is located on the substrate (collectively sensor elements 292) or external to the substrate (collectively sensor elements 294), the sensor element will be coupled to one or more of the plurality of sensor pads 208 a through 208 n (collectively sensor pads 208).

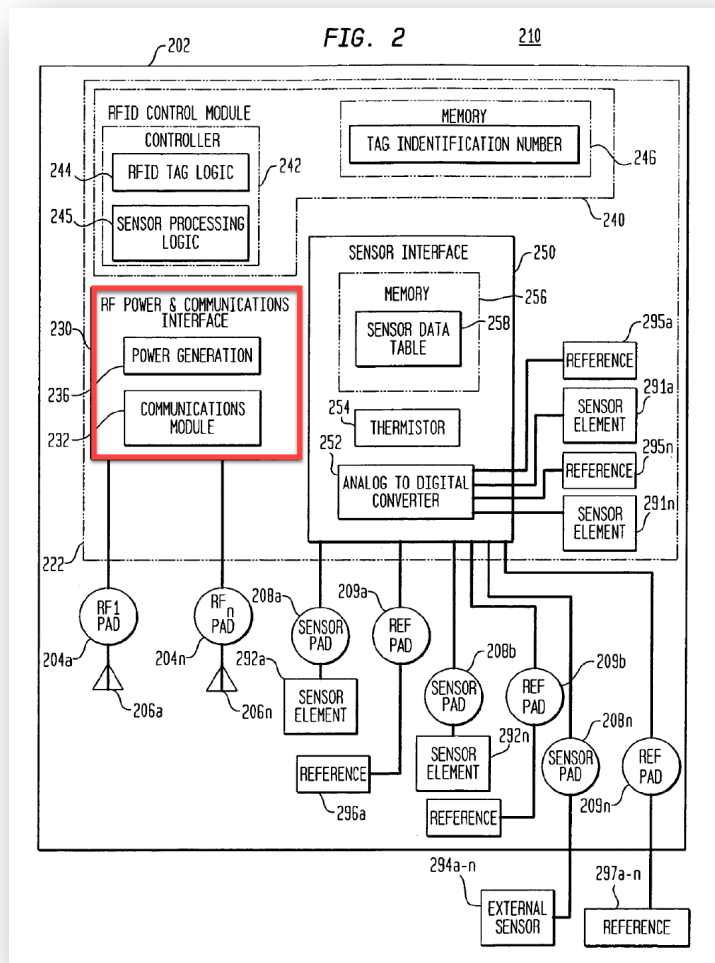
Bandy at 6:61-7:10.

156. In the related district court litigation, in response to Abbott’s Initial Invalidity Contentions, Gentag admitted that Bandy discloses this limitation. Ex. 1014 (Gentag Invalidity Resp.) at 19-21.

8. Element [1g]: RF Power and Communication Interface

157. Element [1g] recites “an RF power and communication interface coupled to the at least one antenna and sensor interface.” Bandy discloses this limitation.

158. As shown in Figure 2 (annotated below), Bandy’s RF-addressable sensor 210 includes an RF power and communications interface 230:



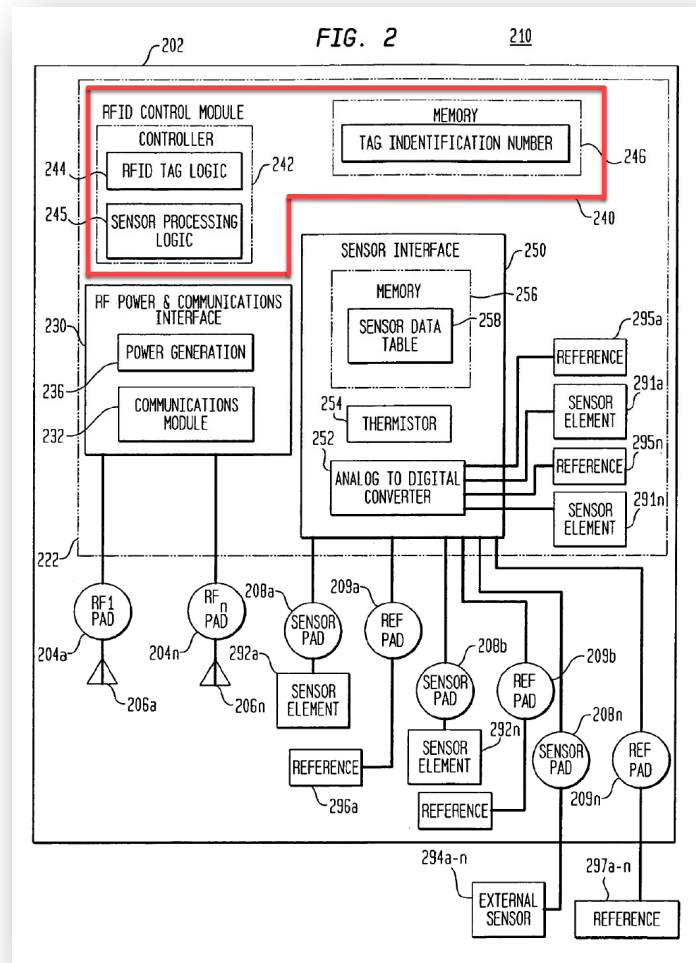
159. Bandy explains that RF power and communications interface 230 is “coupled to antennas 206.” Bandy at 11:30-34. Bandy also explains that RF pads 204 are coupled to both the RF power and communications interface and the sensor interface 250.” Bandy at 8:11-13.

160. In addition, in the related district court litigation, in response to Abbott’s Initial Invalidity Contentions, Gentag admitted that Bandy discloses this limitation. Ex. 1014 (Gentag Invalidity Resp.) at 21-23.

9. Element [1h]: Controller

161. Element [1h] recites “a controller coupled to the RF power and communications interface and the sensor interface.” Bandy discloses this limitation.

162. As shown in Figure 2 (annotated below), Bandy’s RFID control module 240 coupled to RF power and communications interface 230 and sensor interface 250:



163. Bandy explains that “[c]ontroller includes RFID tag logic 244 to respond to RFID tag interrogation and read communications by the wireless sensor reader 140 or another tag reader and logic to control the operating state of the RFID tag components of the RF addressable sensor.” Bandy at 10:62-11:2.

164. In addition, in the related district court litigation, in response to Abbott’s Initial Invalidity Contentions, Gentag admitted that Bandy discloses this limitation. Ex. 1014 (Gentag Invalidity Resp.) at 23-25.

10. Element [1i]: Memory

165. Element [1i] recites “a memory coupled to the controller and the sensor interface.” Bandy discloses this limitation.

166. Bandy describes that “sensor interface 250 may optionally include a memory 256.” Bandy at 9:63-66, Fig. 2. Bandy also describes that “[m]emory 246 may be separate or integrated with memory 256 of the sensor interface.” Bandy at 11:21-29, Fig. 2. Therefore, integrated memory 246/256 is coupled to controller 252 and sensor interface 250.

167. In addition, in the related district court litigation, in response to Abbott’s Initial Invalidity Contentions, Gentag admitted that Bandy discloses this limitation. Ex. 1014 (Gentag Invalidity Resp.) at 25-27.

11. Element [1j]: RF Sensor Communicates with a Wireless Device, which Communicates with a Remote Server

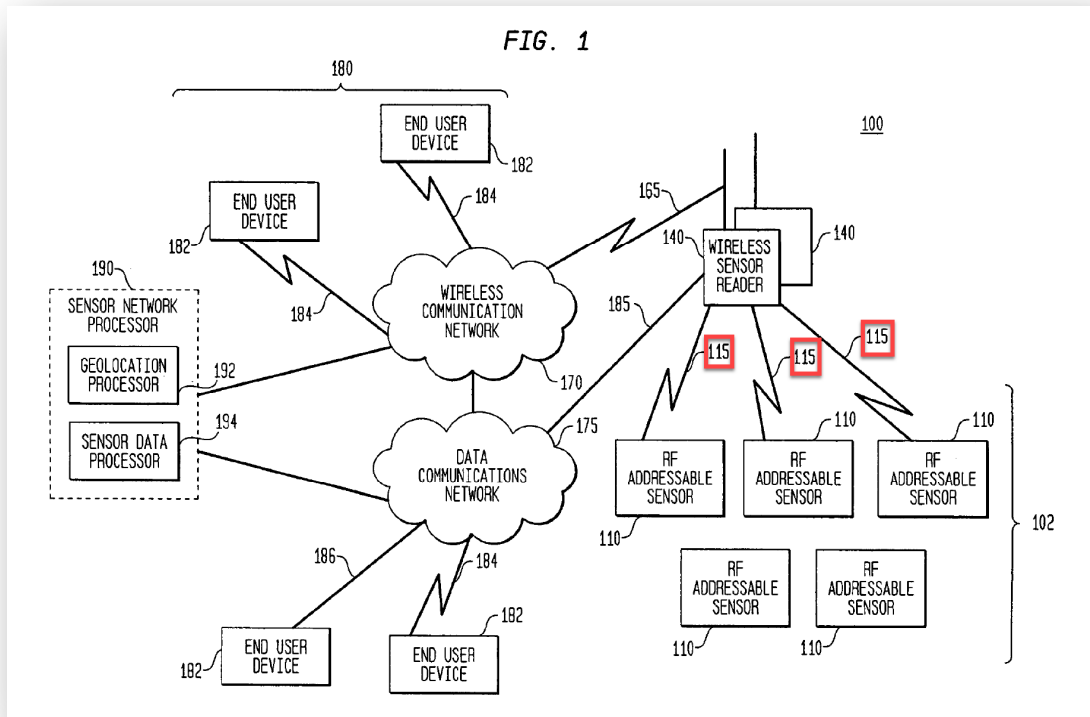
168. Element [1j] recites “wherein the RF addressable sensor communicates with a remote wireless device, said wireless device having multiple wireless communication means, geolocation means and a unique ID, whereby said wireless device is coupled to at least one communications network linked to [a]t least one remote server.” Bandy discloses and/or renders obvious this element obvious.

RF addressable sensor communicates with a remote wireless device:

169. Bandy explains that its RF addressable sensors can communicate with a remote wireless device (wireless sensor reader). For example, Bandy states “[w]ireless sensor reader 140 includes logic to interrogate the population of RF addressable sensors 102 and logic to read data and RFID tag data transmitted by the RF addressable sensors 110.” Bandy at 5:6-9. Bandy also states that “signals 115 are exchanged between the wireless sensor reader 140 and the population of RF addressable sensors 102 according to one or more protocols. Signals 115 are wireless signals such as radio frequency (RF) transmissions.” Bandy at 5:19-23.

170. In addition, Bandy teaches that wireless sensor reader 140 “could be a wireless phone, a personal digital assistant (PDA), a computer having wireless communications capabilities, or other type of mobile, handheld, and/or computing device.” Bandy at 5:14-18. Bandy also teaches that “reader 140 and the population of sensors 102 communicate via a single protocol for both RFID tag communications and sensor communications[, and alternatively] reader 140 and the population of sensors 102 communicate via a first protocol for RFID tag communications and via a second protocol for sensor communications.” Bandy at 5:24-30.

171. In Fig. 1, below, I have annotated signals 115 depicting wireless communications between the population of RF addressable sensors 102 and wireless sensor reader 140:



Multiple wireless communication means:

172. I understand that “multiple wireless communication means” can be interpreted as a means-plus-function term and is limited to the corresponding structure and its equivalents that I discussed in Section I.B.1.

173. Bandy discloses that the wireless device (wireless sensor reader) has multiple wireless communication means. According to Bandy

[w]ireless sensor reader 140 can be any wireless device capable of communicating via an air interface protocol with the population of RF addressable sensors.” In embodiments of the present invention, wireless sensor reader 140 could be a wireless phone, a personal digital assistant (PDA), a computer having wireless communications

capabilities, or other type of mobile, handheld, and/or computing device.

Bandy at 5:13-18.

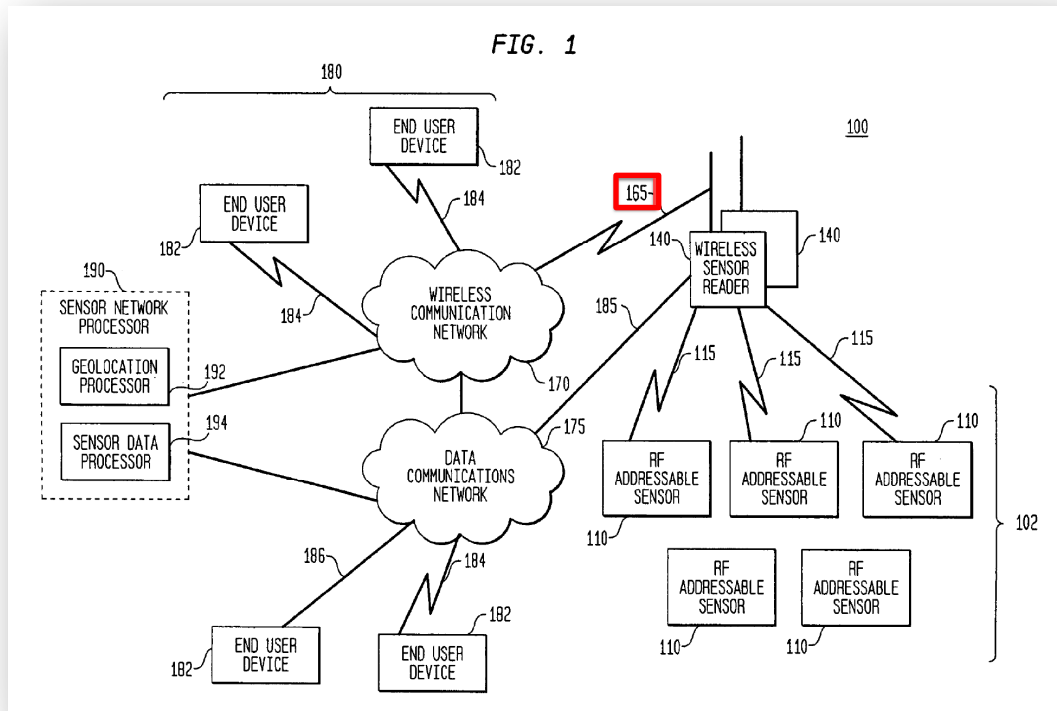
174. Further, Bandy states that “signals 115 are exchanged between the wireless sensor reader 140 and the population of RF addressable sensors 102 according to one or more protocols.” Bandy at 5:19-22. Bandy discloses that “reader 140 and the population of sensors 102 [can] communicate via a single protocol for both RFID tag communications and sensor communications,” or “reader 140 and the population of sensors 102 [can] communicate via a first protocol for RFID tag communications and via a second protocol for sensor communications.” Bandy at 5:23-30.

175. Further, Bandy points out that “[t]he present invention is also applicable to any other types of communication protocols between tags and readers otherwise known or yet to be developed.” Bandy at 5:41-44.

176. Bandy also explains that the wireless sensor reader 140 exchanges signals 165 with wireless communication network 170 “according to one or more protocols” (Bandy at 5:45-48), which can be different protocols from those used for wireless communication between the wireless sensor reader 140 and the RFID tags. Bandy goes on to explain that “the communications protocol used between reader 140 and wireless network 170 can be any wireless air interface protocol,

such as used in IS-41 or GSM wireless communications networks, for example.”
Bandy at 5:48-53.

177. In Fig. 1 below, I have annotated signal 165, communicated between wireless sensor reader 140 and the wireless communication network:



178. Accordingly, Bandy discloses structure that is the same or equivalent to the corresponding structure disclosed in the '307 patent for performing wireless communication, which includes a cell phone (*see* '307 patent claim 2), which “can communicate to a proximal cellphone tower ... via wireless link 510 or indirectly by other existing or emerging wireless communication means such as Bluetooth.” A POSITA would have understood that GSM and IS-41 are common protocols

used by cell phones to communicate with cellular phone towers and that Bluetooth is an example of an air interface protocol that can be used to communicate with RF addressable sensors.

Geolocation means:

179. Bandy also discloses that the wireless device (wireless sensor reader) has a geolocation means.

180. I understand that “geolocation means” is a means-plus-function term and is limited to the corresponding structure and its equivalents that I discussed in Section I.B.2.

181. Bandy describes that wireless sensor reader includes a geolocation means. For example, Bandy describes that “wireless sensor reader 840 performs geolocation processing to determine the exact location of the RF addressable sensor associated with the data,” which can include “GPS-based or non-GPS based techniques.” Bandy at 17:62-67.³ Bandy also discloses that wireless sensor reader

³ In addition, as noted above, Bandy discloses that the wireless sensor reader can be a wireless phone / cellular phone. Cellular phones before the priority date of the '307 patent commonly included geolocation features. Indeed, as of 1999, the Federal Communications Commission had already begun a concerted effort to require cell phone carriers to outfit cell phones with automated location identification (ALI) through GPS or non-GPS geolocation features. FCC Report (Ex. 1017) at 2, 5-7, 13-15 21, 48-50 (requiring carriers to begin selling location-

340 has an RF addressable sensor communications module 352 that includes “geolocation processing logic.” Bandy at 13:6-8. Moreover, Bandy explains that the RF addressable sensor configuration of Figure 2A provides an advantage that “the wireless components and geolocation features are provided by the RFID tag and cell phone combination thereby reducing the cost and making it suitable for sensor networks.” Bandy at 8:41-45.

182. Finally, Bandy states “[f]or more information concerning geolocation, see U.S. Patent No. 6,031,454, filed Nov. 13, 1997, entitled ‘Worker-Specific Exposure Monitor and Method for Surveillance of Workers,’ which is incorporated herein by reference in its entirety.” Bandy at 6:37-41.

183. Therefore, Bandy discloses structure that is the same or equivalent to the corresponding structure disclosed in the ’307 patent for performing geolocation, both by GPS and non-GPS-based means. Indeed, the ’307 patent, like Bandy, incorporates by reference U.S. Patent No. 6,031,454 for disclosure relating to geolocation by GPS or non-GPS means. *See* ’307 patent at 17:21-24 (“The reading, analysis and geolocation by GPS or non-GPS means is described in U.S.

capable handsets no later than March 1, 2001, and provide network-based location (triangulation) coverage by October 1, 2001). Accordingly, Bandy’s wireless sensor reader (e.g., a wireless phone/cellular phone) would have included GPS/non-GPS geolocation functionality.

Patent No. 6,031,454 that is included herein by reference in its entirety.”). Thus, Bandy discloses structure that is identical to the corresponding structure disclosed in the '307 patent for performing geolocation, both by GPS and non-GPS-based means.

Unique ID:

184. Bandy discloses or renders obvious that the wireless device (wireless sensor reader) has a unique ID. Bandy explains that “wireless sensor reader 140 could be a wireless phone, a personal digital assistant (PDA), a computer having wireless communications capabilities, or other type of mobile, handheld, and/or computing device.” Bandy at 5:11-18; *see also* Bandy at 2:28-29 (“The wireless sensor reader is implemented in a wireless device such as a phone or PDA.”). And, Bandy states that its wireless sensor reader can communicate over wireless communication network 170, which “may be coupled to a publicly accessible data communications network 175 ... such as the Internet.” Bandy at 5:45-48, 5:67-6:5.

185. A POSITA would recognize that wireless sensor readers such as wireless phones, PDAs, or computers having wireless communication capability, and that can communicate over wireless and data communication networks, such as the Internet, would have a unique ID such as an IP address, Media Access Control (MAC) address, and/or an International Mobile Equipment Identity (IMEI)

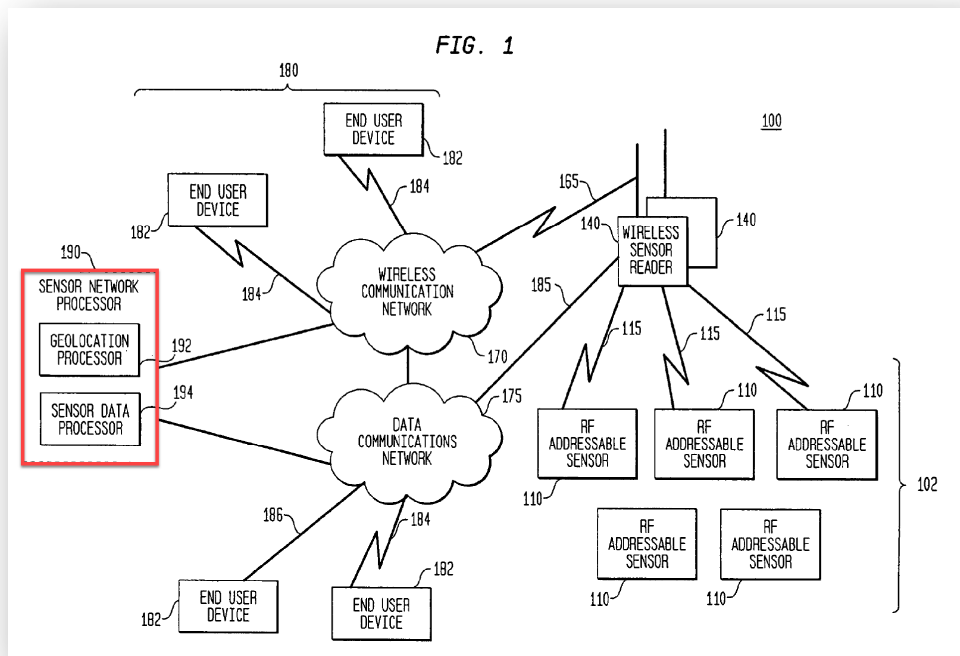
number. Such identification numbers would allow the wireless sensor reader to uniquely identify itself for authentication to communication networks 170, 180 as well to sensor network processor 190. A MAC address is a unique identifier assigned to devices having network capability. Similarly, an IMEI number is a unique identifier assigned to wireless phones.

Wireless device is coupled to at least one communications network linked to [a]t least one remote server

186. Bandy also discloses that the wireless device (wireless sensor reader) is coupled to at least one communications network linked to [a]t least one remote server (sensor data processor). For example, Bandy states that “[s]ensor data processor 190 is coupled to the wireless communications network 170 and/or the data communications network 175.” Bandy at 6:46-48. Wireless sensor reader 140 is also coupled to wireless communications network 170 and/or data communications network 175. *See* Bandy at 5:45-6:8.

187. Bandy also explains that “[s]ensor network processor 190 receives sensor data over network 180, and processes the data. Furthermore, in an embodiment, processor 190 transmits the processed data back over network 180 to reader 140, for example.” Bandy at 6:10-12. Bandy also explains that “the wireless sensor reader 140/340 communicates the received sensor data to sensor network processor 190 over communications network. In an embodiment, the wireless sensor reader may also communicate additional data to the sensor network

processor 190 such as data needed to perform geolocation.” Bandy at 15:65-16:3. Because the wireless sensor reader is linked to the sensor network processor 190 through wireless communications network 170 and/or data communications network 175, they are able to communicate with one another. I have annotated sensor network processor 190 in Figure 1 below:

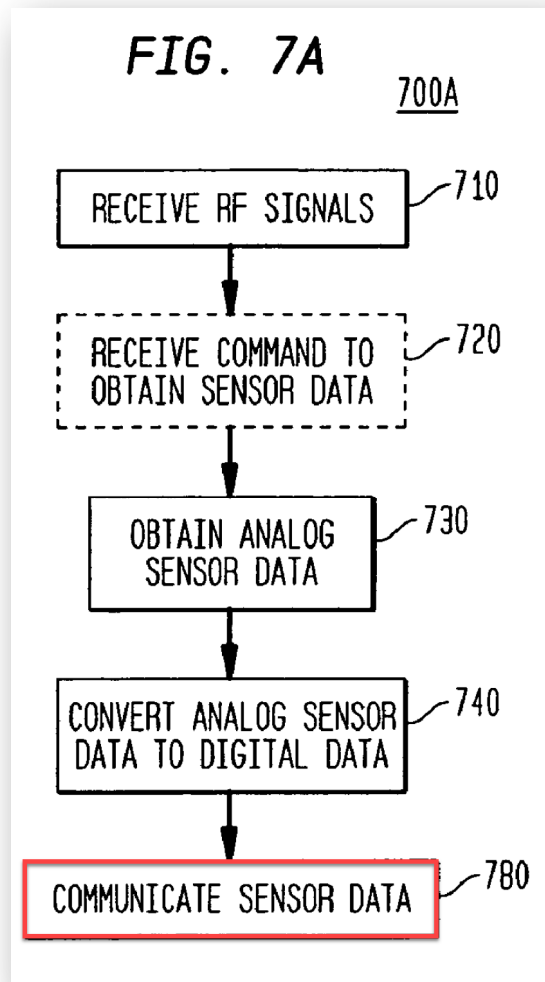


188. Accordingly, Bandy discloses or renders obvious this limitation.

12. Element [1k]: Wireless Device Obtains ID and Sensor Data from Sensor Interface

189. Element [1k] recites “wherein the wireless device communicates with the RF addressable sensor interface to obtain the ID and sensor data.” Bandy discloses this limitation.

190. Bandy teaches that the wireless sensor reader obtains sensor data from RF addressable sensor 110 that includes a stored tag identification number and sensor data. For example, Bandy states that “the RF addressable sensor 110 communicates the digital sensor data to the wireless sensor reader 140/340.” Bandy at 16:41-42. Bandy also explains that the RF addressable sensor 110 communicates to the wireless sensor reader a tag identification number that “may include both the tag identification number stored in memory and the sensor data obtained by the sensor elements.” Bandy at 16:47-51, Fig. 7A (annotated and reproduced below).



Bandy at Fig. 7A.

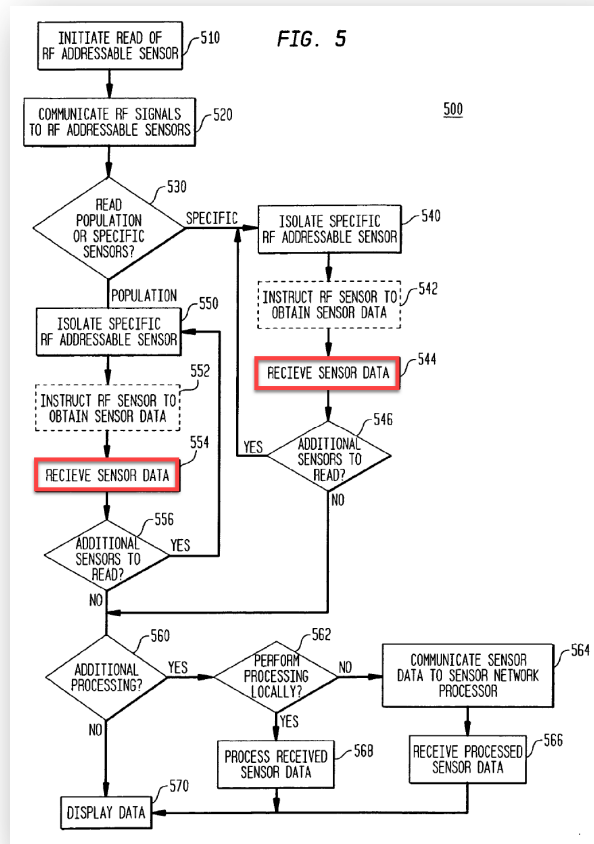
191. Bandy provides additional disclosure demonstrating that the “wireless device communications with the RF addressable sensor interface to obtain the ID and sensor data.” For example, Bandy states

when a sensor 110 having data table 258 is activated by wireless sensor reader 140, the sensor 110 identifies itself (e.g., by providing its identification number) and provides the cell phone reader with the necessary information for analyzing the sensor output. In an

embodiment, sensor data table 258 also includes sensor handling information that is communicated to reader 140.

Bandy at 10:14-32. Bandy also explains that “RFID tag processor 356 [in wireless sensor reader 340] includes logic to interrogate and read RFID tag information from RF addressable sensors.” Bandy at 13:1-3.

192. In addition, with reference to Fig. 5, Bandy explains that “[i]n step 544, the wireless sensor reader 140/340 receives the sensor data from the RF addressable sensor 110. Sensor data can include sensor element output data, sensor table data, reference data, and/or other data.” Bandy at 15:23-26, Fig. 5 (annotated below). Similarly, “[i]n step 554, the wireless sensor reader 140/340 receives the sensor data from the RF addressable sensor 110.” Bandy at 15:42-43, Fig. 5 (annotated below); *see also* Bandy at 17:54-56 (“[T]he wireless sensor reader 840 receives sensor data from the sensor elements within its read coverage range 845.”), Figs. 8-9.



193. Accordingly, Bandy discloses this limitation.

13. Element [11]: Remote Server Authenticates Sensor ID and Communicates Information and Software for the Sensor to the Wireless Device

194. Element [11] recites “wherein the remote server authenticates said unique sensor ID associated with said unique wireless device ID and communicates to said wireless device processed information relating to said sensor data and software related to the unique sensor ID, thereby allowing said wireless device to interpret said sensor anywhere worldwide.” Bandy discloses this limitation.

195. Bandy discloses communication of information and software for the sensor to the wireless sensor reader. Bandy teaches that “when a sensor 110 having data table 110 identifies itself (e.g., by providing its identification number) and provides the cell phone reader with the necessary information for analyzing the sensor output.” Bandy at 10:19-24. Thus, Bandy discloses that the sensor identification number is used to identify (i.e., authenticate) the sensor.

196. In addition, Bandy discloses communicating information and software for the sensor to the wireless sensor reader. For example, Bandy states that “some or all of the necessary information to handle and analyze the sensor is retrieved from processor 190.” Bandy at 10:29-32. In particular, “[s]oftware may also be downloaded directly and transparently into the cell phone or reader 140 to ‘train’ the wireless device to recognize and analyze that given type of RFID sensor.” Bandy at 10:33-36. “When the necessary processing and analysis information is downloaded from a remote location, ***only the ID of the RFID-sensor*** is necessary, providing a highly streamlined solution for universal sensor analyses for wireless devices such as cell phones.” *Id.* at 10:37-41 (emphasis added). Here again, Bandy confirms that the unique ID of the RFID sensor is used to identify and download the software and other information needed to process data from the sensor. The downloaded software “may be stored permanently or temporarily in wireless device 140.” Bandy at 10:36-37.

197. In addition, Bandy states that the remote server (sensor networking device 190) communicates to said wireless device (wireless sensor reader) processed information relating to said sensor data and software related to the unique sensor ID. For example, Bandy teaches that “[w]hen the necessary processing and analysis information is downloaded from a remote location, only the ID of the RFID-sensor is necessary, providing a highly streamlined solution for universal sensor analyses for wireless devices such as cell phones. Bandy at 10:37-41. Bandy’s originally-filed claims recited a “wireless sensor reader” with “means for receiving sensor processing information over the communications network” and “wherein the sensor processing information includes software for analyzing sensor data.” Bandy claims 29, 39, 40; As-filed Bandy Application (Ex. 1006) claims 30, 40, 41.

198. And, Bandy explains that “[s]ensor network processor 190 receives sensor data over network 180, and processes the data [and,] processor 190 transmits the processed data back over network 180 to reader 140, for example.” Bandy at 6:9-12. Bandy goes on to explain that “[s]ensor data processor 194 includes logic to receive sensor data from one or more RF addressable sensors 110, perform processing on the received data, and communicate information based on the processing to wireless reader 140 or an end user device 182. Bandy at 6:42-46.

199. Processing can also be divided between the wireless device and the remote sensor network processor. Bandy calls such systems “hybrid systems [] whereby only a basic sensor analysis protocol can be downloaded into the cell phones and the sensor data processing is done remotely.” Bandy at 10:41-45.

200. Based on the above disclosures, A POSITA would have understood that Bandy discloses a remote server that authenticates the ID of the RFID-sensor and in response to the authentication communicates to the wireless device (1) processed information relating to the sensor data and (2) software related to the unique sensor ID necessary for the wireless device to interpret the sensor anywhere worldwide. That is, the communication of processed information and software to enable interpreting and displaying the processed information occur in response to authentication of an RFID (a unique sensor ID) using the stored identification information for some or all of the sensor elements. *See* Bandy at 10:6-13.

201. According to Bandy, its system—which provides “a universal sensor platform” (Bandy at 10:14-16) and which downloads necessary software for sensor processing and/or processes some or all sensor data remotely (Bandy at 10:33-47)—“provid[es] a highly streamlined solution for universal sensor analyses for wireless devices such as cell phones.” Bandy at 10:40-41. Thus, Bandy’s system “allow[s] said wireless device to interpret said sensor anywhere worldwide.” Accordingly, Bandy discloses a system that meets the proposed construction for

this limitation—“wherein the remote authenticates a unique sensor ID associated with a unique wireless device ID and in response to the authentication communicates to the wireless device (1) processed information relating to the sensor data and (2) software related to the unique sensor ID necessary for the wireless device to interpret the sensor anywhere worldwide.”

B. Dependent Claims 2, 5, 9, and 10 are Obvious In View of Bandy

1. Dependent Claim 2: Wireless Device is a Cell Phone

202. Claim 2 depends from claim 1 and recites “[t]he system according to claim 1 wherein said wireless device is a cell phone.” Bandy discloses this limitation.

203. First, Bandy expressly states that its wireless sensor reader 140/340 can be a cell phone. For example, Bandy states that “[t]he wireless sensor reader is implemented in a wireless device such as a phone or PDA.” Bandy at 2:28-29. Bandy further states that “wireless sensor reader 140 could be a wireless phone, a personal digital assistant (PDA), a computer having wireless communications capabilities, or other type of mobile, handheld, and/or computing device.” Bandy at 5:14-18. Bandy also states that “the sensor 110 identifies itself (e.g., by providing its identification number) and provides the cell phone reader with the necessary information for analyzing the sensor output.” Bandy at 10:21-24; *see also id.* at 10:33-36 (“Software may also be downloaded directly and transparently

into the cell phone or reader 140 to ‘train’ the wireless device to recognize and analyze that given type of RFID-sensor.”), *id.* at 13:21-30, Figs. 4A-4C (“Device 430 can be an existing wireless device such as a wireless phone or PDA. In an alternate embodiment, device 430 is a device designed specifically to support communicating with RF addressable sensors 110 and with a communications network such as a wireless phone network or the Internet.”); *id.* at 14:37-40 (“wireless sensor reader 140/340 is also a wireless telephone device”).

2. Dependent Claim 5: Chemical Sensor

204. Claim 5 depends from claim 1 and recites that “[t]he system according to claim 1 wherein said sensor is a chemical sensor.” Bandy discloses this limitation.

205. Bandy describes that “[s]ensor elements 292a to 292n may be a number of different sensor types such as a chemical sensors, biological sensors, etc.” Bandy at 7:57-59. Bandy explains that “in chemical sensor elements, chemicals present in the air are absorbed differently by each of the thin film elements, changing the resistance of each and creating a characteristic electronic signature. Because many types of detectors can be added, this technology can be designed to recognize a wide range of chemicals. It should be noted that hybrid systems are also possible.” Bandy at 7:61-67.

206. Bandy repeatedly teaches that its sensor elements can include different types of sensor elements including “chemical sensor elements,” making the sensor a chemical sensor. Bandy at 18:32-39, 24:2-6; *see also id.* at 17:35-41 (“RF addressable sensor 810a may include sensor elements for detecting chemical agents.”), *id.* at 21:19-25 (similar), *id.* at 22:8-11 (similar), 19:64-67 (“The RF addressable sensor 1110 may have sensor elements for monitoring temperature, chemical composition, biological composition, or a combination of the above for an individual.”).

3. Dependent Claim 9: GPS Geolocation Means

207. Claim 9 depends from claim 1 and recites “[t]he system according to claim 1 wherein the system further includes a GPS means for geolocating said system.” Bandy discloses this limitation.

208. I understand that “GPS means for geolocating said system” is a means-plus-function term and is limited to the corresponding structure and its equivalents that I discussed in Section I.B.3.

209. Bandy discloses this limitation because both Bandy and the ’307 patent incorporate by reference U.S. Patent No. 6,031,454 (“’454 patent” or “Lovejoy”) for disclosure relating to GPS geolocation. ’307 patent at 17:21-24 (“The reading, analysis and geolocation by GPS or non-GPS means is described in U.S. Pat. No. 6,031,454 that is included herein by reference in its entirety”); Bandy

at 6:37-41 (“For more information concerning geolocation, see U.S. Pat. No. 6,031,454, filed Nov. 13, 1997, entitled “Worker Specific Exposure Monitor and Method for Surveillance of Workers,” which is incorporated herein by reference in its entirety.”).

210. Additionally, Bandy describes that “wireless sensor reader 840 performs geolocation processing to determine the exact location of the RF addressable sensor associated with the data,” which can include “GPS-based or non-GPS based techniques.” Bandy at 17:62-67. Bandy also states that “[a]n advantage of the RF addressable sensor configuration of FIG. 2A is that the wireless components and geolocation features are provided by the RFID tag and cell phone combination thereby reducing the cost and making suitable for sensor networks.” Bandy at 8:41-45.

211. In addition, Bandy states that “[s]ince either the location of cell phone towers and/or wireless sensor readers is usually known and can include GPS coordinates, precise geolocation of sensor can be achieved using either GPS, non-GPS, or hybrid systems.” Bandy at 6:33-36. Bandy also teaches that geolocation processor 192 “includes logic to receive data from one or more RF addressable sensors 110 and to perform GPS and/or non-GPS geolocation of the RF addressable sensors 110 based on the received data and/or signals.” Bandy at 6:16-36, Fig. 1. And Bandy describes that geolocation processor 353 in RF addressable

sensor 340 “includes algorithms to perform GPS based geolocation and/or non-GPS based geolocation.” Bandy at 13:6-20; Fig. 3.⁴

212. Therefore, Bandy discloses structure that is the same or equivalent to the corresponding structure disclosed in the '307 patent for performing GPS geolocation.

4. Dependent Claim 10: Non-GPS Geolocation Means

213. Claim 10 depends from claim 1 and recites “[t]he system according to claim 1 further including a non-GPS geolocation means for geolocating said system.” Bandy discloses this limitation.

⁴ In addition, as noted above, Bandy discloses that the wireless sensor reader can be a wireless phone / cellular phone. Cellular phones before the priority date of the '307 patent commonly included geolocation features. Indeed, as of 1999, the Federal Communications Commission had already begun a concerted effort to require cell phone carriers to outfit cell phones with automated location identification (ALI) through GPS or non-GPS geolocation features. FCC Report (Ex. 1017) at 2, 5-7, 13-15 21, 48-50 (requiring carriers to begin selling location-capable handsets no later than March 1, 2001, and provide network-based location (triangulation) coverage by October 1, 2001). Accordingly, Bandy’s wireless sensor reader (e.g., a wireless phone/cellular phone) would have included GPS/non-GPS geolocation functionality.

214. I understand that “non-GPS geolocation means for geolocating said system” is a means-plus-function term and is limited to the corresponding structure and its equivalents that I discussed in Section I.B.4.

215. Bandy discloses this limitation because both Bandy and the ’307 patent incorporate by reference the ’454 patent for disclosure relating to non-GPS geolocation. ’307 patent at 17:21-24 (“The reading, analysis and geolocation by GPS or non-GPS means is described in U.S. Pat. No. 6,031,454 that is included herein by reference in its entirety”); Bandy at 6:37-41 (“For more information concerning geolocation, see U.S. Pat. No. 6,031,454, filed Nov. 13, 1997, entitled “Worker Specific Exposure Monitor and Method for Surveillance of Workers,” which is incorporated herein by reference in its entirety.”).

216. As I discussed above, Bandy describes that “wireless sensor reader 840 performs geolocation processing to determine the exact location of the RF addressable sensor associated with the data,” which can include “GPS-based or non-GPS based techniques.” Bandy at 17:62-67. Bandy also states that “[a]n advantage of the RF addressable sensor configuration of FIG. 2A is that the wireless components and geolocation features are provided by the RFID tag and cell phone combination thereby reducing the cost and making suitable for sensor networks.” Bandy at 8:41-45.

217. And Bandy further states that “[s]ince either the location of cell phone towers and/or wireless sensor readers is usually known and can include GPS coordinates, precise geolocation of sensor can be achieved using either GPS, non-GPS, or hybrid systems.” Bandy at 6:33-36. Bandy also teaches that geolocation processor 192 “includes logic to receive data from one or more RF addressable sensors 110 and to perform GPS and/or non-GPS geolocation of the RF addressable sensors 110 based on the received data and/or signals.” Bandy at 6:16-36, Fig. 1. And Bandy describes that geolocation processor 353 in RF addressable sensor 340 “includes algorithms to perform GPS based geolocation and/or non-GPS based geolocation.” Bandy at 13:6-20; Fig. 3.⁵

⁵ In addition, as noted above, Bandy discloses that the wireless sensor reader can be a wireless phone / cellular phone. Cellular phones before the priority date of the '307 patent commonly included geolocation features. Indeed, as of 1999, the Federal Communications Commission had already begun a concerted effort to require cell phone carriers to outfit cell phones with automated location identification (ALI) through GPS or non-GPS geolocation features. FCC Report (Ex. 1017) at 2, 5-7, 13-15 21, 48-50 (requiring carriers to begin selling location-capable handsets no later than March 1, 2001, and provide network-based location (triangulation) coverage by October 1, 2001). Accordingly, Bandy's wireless sensor reader (e.g., a wireless phone/cellular phone) would have included GPS/non-GPS geolocation functionality.

218. Therefore, Bandy discloses structure that is the same or equivalent to the corresponding structure disclosed in the '307 patent for performing non-GPS geolocation.

XI. Ground 2: Claim 3 Would Have Been Obvious Over BANDY in View of HELLER

219. Claim 3 depends from claim 1 and recites “[t]he system according to claim 1 wherein said sensor unit is integrated into a disposable wireless skin patch for diagnostic applications.” Bandy in view of Heller renders obvious this claim.

220. Bandy explains that the RF addressable sensor of its “invention can also be used for remote diagnostics monitoring,” wherein the sensor “may have sensor elements for monitoring temperature, chemical composition, biological composition, or a combination of the above.” Bandy at 19:56-58, 19:64-67. Such “remote monitoring application can have residential, industrial, commercial, security or medical institution applications.” Bandy at 20:1-3. In those applications, the sensor “is affixed to a person (or animal) such that the sensor elements of the RF addressable sensor are proximate to the surface of the skin. RF addressable sensor may include low power sensors to monitor certain conditions or characteristics such as the individual’s vital functions.” Bandy at 20:4-9.

221. A POSITA would have understood and/or found it obvious that to “affix” an RF addressable sensor for monitoring patient vital signs “such that the sensor elements of the RF addressable sensor are proximate to the surface of the

skin” would necessitate that the sensor, for example, be integrated with some sort of adhesive material such as a skin patch to adhere the sensor to the skin.

222. Heller discloses a disposable, wireless, on-skin sensor control unit that can be used for continuous and/or automatic *in vivo* monitoring of the level of an analyte. Heller at 3:27-31, 3:3-9, 50:18-19 (“One embodiment of the on-skin sensor control unit 44 is a disposable unit complete with a battery for operating the unit.”). Heller discloses a variety of methods for affixing its on-skin sensor control unit to a patient’s skin, including that the “on-skin sensor control unit 44 is provided on an adhesive patch 204.” Heller at 54:29-32.

223. Heller demonstrates that long before the alleged priority date of the ’307 patent, adhesive skin patches were used to affix wireless disposable sensors (Heller’s on-skin sensor control unit) to the skin of a person. Accordingly, a POSITA would have been motivated to use the same or similar technique to affix Bandy’s RF addressable sensor proximate to the surface of the skin of an individual as doing so would have been nothing more than applying a known technique to a known device ready for improvement to yield predictable results. A POSITA would have had a reasonable expectation of success in using an adhesive skin patch, as disclosed by Heller, with Bandy’s RF addressable sensor.

XII. Ground 3: Claims 1-3, 5, 9, and 10 Would Have Been Obvious Over Beck in View of Heller and Lovejoy

224. It is my opinion that claims 1-3, 5, 9, and 10 of the '307 patent are rendered obvious by Beck in view of Heller and Lovejoy.

A. Motivation to Combine Beck and Heller

225. A POSITA would have considered it obvious to, and would have had good reason to, implement the medical device of Beck using the disclosures of substrates, reference sensors, and wireless skin patches for glucose sensors from Heller. A POSITA would have been motivated to combine the teachings of Beck with the teachings of Heller. Like the '307 patent, both Beck and Heller are directed to remote medical sensor monitoring systems, particularly glucose meters. Heller, for its part, provides technical details relating to analyte monitors (including glucose meters) and provides techniques for improving sensor devices like those used in Beck's system. For example, Heller discloses use of reference sensors, substrates, and disposable wireless skin patches to improve medical diagnostic sensors such as glucose meters. Accordingly, a POSITA would have been motivated to make use of Heller's improvements in the field of diagnostic chemical sensing to improve the systems disclosed by Beck.

226. Beck discloses system 100 for remote medical access that includes a medical device 130 that can include remotely monitored medical sensors such as a glucose meter. Beck at [0034]. For example, Beck states:

[t]he medical device 130 of the system 100 is generally operable to monitor one or more biological/physiological conditions and communicate with the client computing device 120 via the physical communications link 140 established between the client computing device 120 and the medical device 130. In an exemplary embodiment, the medical device 130 includes a glucose meter such as the glucose meters manufactured by Roche Diagnostics Corporation which are generally operable to measure blood glucose levels of blood applied to test strips. While the medical device 130 of the exemplary embodiment includes a glucose meter, the medical device 130 could be implemented to monitor and/or analyze other biological/physiological parameters or conditions such as body fluids or bodily functions (e.g. blood, urine, saliva), bodily signals (e.g. electrocardio-signals, brain waves, blood pressure waves), and/or other bodily stimuli (e.g. respiration) to obtain measurements of blood pressure, blood gases, blood coagulation, electrolytes, cardiovascular activity, drug levels, respiration rate, stress, etc.

Beck at [0034]. Beck also states that communication link 140 between the client computing device and the medical device can be wireless. Beck at [0039] (“The communications interface 136 may alternatively, or in addition, include wireless technologies such as RF and/or IR transmitter/receivers to establish the physical communications link 140 between the client computing device 120 and the medical device 130.”).

227. Further, Beck discloses that the circuitry of medical device 130 includes a system bus 138 that “is generally operable to interconnect the processor 132, the memory 133, the communications interface 136, and the user I/O devices 137. To this end, the system bus 138 in the exemplary embodiment includes bus lines and/or traces which enable the various components of the medical device 130 to communicate with one another. Furthermore, the system bus 138 may be implemented with one or more buses utilizing one or more bus architectures such as PCI, ISA, VME, and PC-104.” Beck at [0042].

228. Heller discloses additional details for implementing the system described by Beck. For example, Heller discloses an analyte monitor that “includes a sensor, a sensor control unit, and a substrate” for monitoring an analyte such as blood glucose. Heller at Abstract, 9:12-16. Heller further discloses that sensor 42 includes working electrodes 58 where “[a] sensing layer (see Figures 3A and 3B) is often formed proximate to or on at least one of the working electrodes 58 to facilitate the electrochemical detection of the analyte and the determination of its level in the sample fluid.” Heller at 12:31-13:2. Heller recognizes that the relationship between sensor current and analyte level is dependent on temperature. *See* Heller at 67:20-68:4. Accordingly, Heller discloses that its sensor control unit includes a “measurement circuit 96 that obtains signals from the sensor circuit 97 and optional temperature probe circuit 99.” Heller at 66:30-32. Heller explains

that the processor of the sensor control unit can “modify the signals from the sensor circuit 97 using calibration data and/or output from the temperature control circuit.” Heller at 67:10-11. For example, the processing circuit can be designed to account for the sensor current-analyte level relationship “by using the temperature information from measurement circuit 96 to adjust a known profile for a given temperature in a known manner when the sensed temperature varies from the aforementioned given temperature.” Heller at 67:32-68:4; *see also* Heller at 66:30-68:20.

229. Heller also discloses several exemplary analyte sensors with various electrode configurations. *See, e.g.*, Figures 2-11. Each sensor includes one or more electrodes formed on a substrate. *See, e.g.*, Heller at 24:28-25:19. In one configuration, the analyte monitor has a sensor that includes “a substrate, a recessed channel formed in the substrate, and conductive material disposed in the recessed channel to form a working electrode.” Heller at Abstract; *see also*, Heller at 13:18-16:15.

230. In addition, Heller teaches that its “analyte monitoring system 40 includes, at minimum, a sensor 42, a portion of which is configured for implantation (e.g., subcutaneous, venous, or arterial implantation) into a patient, and a sensor control unit 44. The sensor 42 is coupled to the sensor control unit 44 which is typically attached to the skin of the patient.” Heller at 11:24-28. The on-

skin sensor control unit can be “a disposable unit complete with a battery for operating the unit.” Heller at 50:18-19.

231. The on-skin sensor control unit can be attached to the skin in a variety of ways, for example, by using a mounting unit that “typically includes an adhesive on a bottom surface of the mounting unit 77 to adhere to the skin of the patient,” (Heller at 54:18-19) or by providing “a coupled mounting unit 77 and housing 45 of an on-skin sensor control unit 44 [] on an adhesive patch” (Heller at 54:29-30).

232. A POSITA would have understood that Beck’s disclosure of a medical device 130 such as a glucose meter or other sensor that measures physiological data would include, or could be improved through inclusion of, a reference sensor element and wireless disposable skin patches, and that the circuitry such as the sensor electrodes would be implemented on a substrate.

233. A POSITA would have recognized that the disclosures of Beck and Heller are in the same field of medical diagnostic sensing devices. A POSITA would have also recognized that Heller’s disclosure relating to use of a temperature probe to adjust for the effects of varying temperature on sensor readings would apply to and could be used to improve Beck’s medical device that measures blood glucose and other biological and/or physiological conditions. Accordingly, a POSITA would have been motivated to modify Beck to add a temperature

probe/sensor as disclosed in Heller to improve the accuracy of sensor readings as temperature changed. Heller at 67:10-68:20; Beck at [0034].

234. In addition, a POSITA would have recognized that Heller's disclosure of implementing test device electrodes on a substrate was a known way to implement and/or improve Beck's medical device that measures blood glucose and other biological and/or physiological conditions. Heller at Abstract, 24:28-25:19; *see also* Heller at 13:18-16:15; Beck at [0034].

235. Moreover, a POSITA would have understood that to monitor certain biological and physiological conditions described by Beck would require affixing Beck's medical device to the person. *See, e.g.* Beck at [0002] (describing examples of biological/physiological parameters that can be monitored by medical devices). Heller discloses methods for affixing a medical device (Heller's on-skin sensor control unit) to the skin of a patient, including through the use of an adhesive patch. *See* Heller at 51:3-52:5, 54:18-19, 54:29-32. A POSITA would have been motivated to incorporate Heller's disclosed methods for affixing a medical device to the skin of a user to Beck's system. For example, a POSITA would have been motivated and/or found it obvious to integrate Heller's adhesive patch into Beck's medical device so as to attach it to the skin of a person.

236. A POSITA would have also seen Heller's disclosure of reference sensors, the provision of sensor electrodes on substrates, and adhesive patches as

providing well-known implementation details that a POSITA would be motivated to use in implementing Beck's medical device 130 (medical diagnostic sensors for measuring glucose or other biological/physiological parameters). Doing so would amount to nothing more than combining prior art elements according to known methods to yield predictable results. For example, Heller discloses that using a reference temperature sensor in conjunction with glucose measurements is merely one known way to implement such a test device to have greater accuracy because it allows the sensor to account for changes in the relationship between sensor current and analyte level that occur due to differences in temperature. Heller at 66:30-68:20, Fig. 29.

237. Similarly, placing sensor circuitry such as electrodes and temperature probes on a substrate was a conventional, well-known method of implementing diagnostic sensor circuitry like that which would be included in the medical devices in Beck's system. *See* Heller at 13:18-16:15. Placing sensor elements on substrates provides structure, for example, for affixing the sensor to a person and connecting to an analyte monitor, and for preventing the sensor elements from being damaged. *See* Heller at 13:18-16:15.

238. Additionally, a POSITA would have viewed use of adhesives including adhesive skin patches as nothing more than a known, conventional technique for affixing an on-skin sensor control unit to a person's skin for

monitoring. Heller at 51:3-52:5, 54:29-32. Thus, a POSITA would have been motivated to use such adhesives and adhesive patches to affix Beck's medical device to a person and would have had a reasonable expectation of success in so doing.

B. Motivation to Combine Beck and Lovejoy

239. A POSITA would have also considered it obvious to, and have good reason to, implement the client computing device of Beck using the disclosures of geolocation from Lovejoy.

240. Beck discloses its client computing devices 120 can be implemented "as handheld computing devices (e.g. Palm Pilots) and Internet enabled cellular phones." Beck at [0027]. Thus, Beck discloses that its client computing device can be portable.

241. Beck further discloses that its client computing device communicates with a medical device 130 over a physical communications link (which can be implemented as a wireless interface). *See* Beck at [0029]-[0030]. Beck discloses that "medical device 130 of system 100 is generally operable to monitor one or more biological/physiological conditions and communicate with the client computing device." Beck at [0034]. For example, the medical device can include a glucose meter or "could be implemented to monitor and/or analyze other biological/physiological parameters or conditions such as body fluids or bodily

functions (e.g., blood, urine, saliva), bodily signals (e.g., electrocardio-signals, brain waves, blood pressure waves), and/or other bodily stimuli (e.g., respiration) to obtain measurements of blood pressure, blood gases, blood coagulation, electrolytes, cardiovascular activity, drug levels, respiration rate, stress, etc.” Beck at [0034].

242. Given that Beck’s client computing device can be implemented as a portable handheld computing device such as a cellular phone and that its system is intended for use in monitoring various biological/physiological parameters and conditions of patients, a POSITA would have been motivated to include geolocation functionality in Beck’s system, for example, in its client computing device. Geolocation functionality would provide the ability to dispatch aid to a user in the event that Beck’s system determines that a user’s monitored biological/physiological parameters are at dangerous or life-threatening levels. Location information can provide vital information about an individual to allow timely responses. For example, it can help in identifying the location of an individual in case of emergency.

243. Lovejoy describes “[a] person-specific monitor that provides sensor information regarding hazards to which the person is exposed and means to geolocate the person at the time of the exposure.” Lovejoy at Abstract.

244. Lovejoy discloses a monitor that can “serve as a person-specific (or genomic) monitor, tailored specifically to allow individuals to self-monitor themselves for exposures to given chemicals or combination hazards to which they may have a unique susceptibility (or genetic predisposition) as determined by medical and genetic tests.” Lovejoy at 2:36-41. Lovejoy’s monitor can include a “highly accurate positional capability ... to allow exposures to be pinpointed to a given location.” Lovejoy at 2:42-45. Lovejoy states, that in case of an emergency, a worker can press an emergency call button on the monitor which allows the worker to be precisely located and allow for effective intervention.” Lovejoy at 2:48-51.

245. In addition, Lovejoy discloses known implementation techniques for implementing geolocation functionality including GPS and non-GPS geolocation features in mobile devices such as Beck’s client computing device to allow for effective intervention, e.g., the dispatch of emergency services in the event dangerous or life-threatening levels of sensor-monitored parameters. For example, Lovejoy teaches that its disclosed personal monitor includes “geolocating capabilities (GPS or the radar-responsive tags).” Lovejoy at 4:32-37. Lovejoy goes on to explain that “[i]n situations where line-of-sight to 4 GPS satellites can be guaranteed and greater size and weight are acceptable, GPS can be utilized for geolocating. With GPS locating, reduced cost in the locating infrastructure is

realized.” Lovejoy at 8:59-9:33. Lovejoy also teaches that for non-GPS radar-responsive tag geolocation, “[t]ime-of-arrival with a triangulation algorithm is preferably used for tag position determination.” Lovejoy at 9:57-10:33.

246. A POSITA would have been motivated to implement Beck’s client computing device with the geolocation teachings of Lovejoy, that is, to include one or both of GPS geolocating functionality or non-GPS geolocating functionality (e.g., using a triangulation algorithm applied to radio frequency signals received by/emitted from the client computing device). First, cellular phones before the priority date commonly included geolocation features. For example, by 1999, the Federal Communications Commission had already begun a concerted effort to require cell phone carriers to outfit cell phones with automated location identification (ALI) through GPS or non-GPS geolocation features. FCC Report (Ex. 1017) at 2, 5-7, 13-15, 21, 48-50 (requiring carriers to begin selling location-capable handsets no later than March 1, 2001, and provide network-based location (triangulation) coverage by October 1, 2001). Accordingly, to the extent that Beck’s client computing device was implemented in a cellular phone, it would have included GPS/non-GPS geolocation functionality, or a POSITA would have viewed adding such geolocation functionality to Beck’s client computing device as nothing more than implementing the device with features normally found on conventional cell phones of the time. That the inclusion of geolocation features

was required by the FCC well before the priority date of the '307 patent, further demonstrates that their addition would have been nothing more than the combination of prior art elements according to known methods to yield predictable results.

247. Additionally, a POSITA would have been motivated to implement Lovejoy's geolocation features in Beck's client computing device 120 because it would allow the server computing device 110 to customize protocol components to the location of the client computing device 120. For example, Beck describes that "the protocol components 204 generally configure the client computing device 120 to use a particular communications protocol when communicating with an identified medical device 130." Beck at [0062]. Beck also describes that "the server computing device 110 comprises several protocol components 204 that when transferred to a client computing device configure the client computing device 120 to use a particular communications protocol when communicating with an identified medical device." Beck at [0047]. A POSITA would have been motivated to provide location information for Beck's client computing device 120 to the server computing device 110 to provide additional context for communications with the medical device.

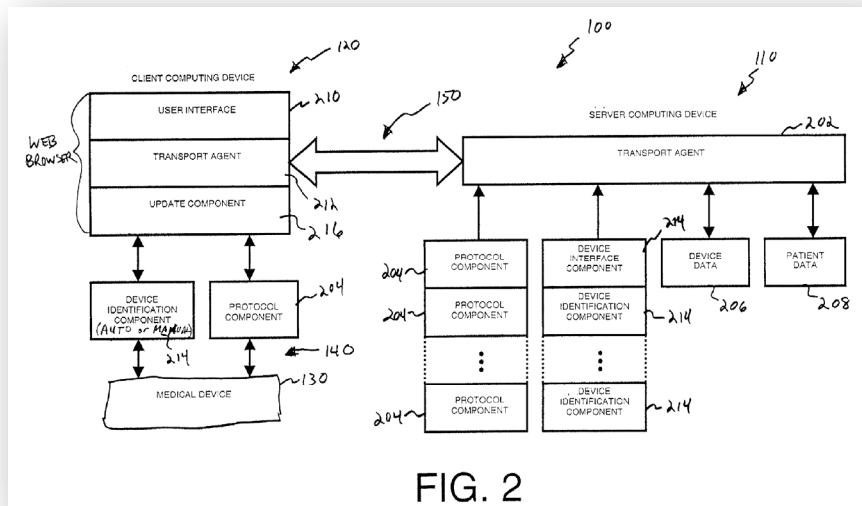
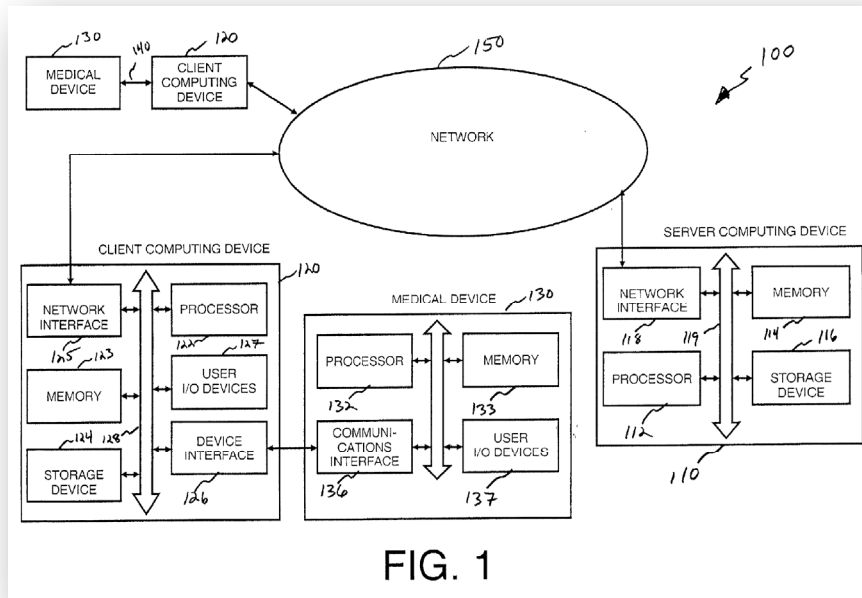
C. Independent Claim 1 is Obvious Over Beck in View of Heller and Lovejoy

1. Element [1pre]: Preamble

248. The preamble to claim 1 recites “[a] radio frequency (RF) addressable diagnostic sensor unit comprising.” For the purposes of my analysis, Counsel instructed me to assume this preamble is limiting. Beck discloses this limitation.

249. Beck describes “[s]ystems, client computing devices, server computing devices, and methods ... for accessing medical device, providing remote access to medical devices, and/or remotely accessing medical devices.” Beck at [0004]. Beck also explains that its “client computing devices utilize protocol components that may be obtained from a server computing device via a network to communicate with medical devices in a communications protocol supported by the medical device.” Beck at Abstract.

250. For example, Figures 1 and 2 of Beck, shown below, show system 100, which “includes a server computing device 110, a client computing device 120, a medical device 130 operable coupled to the client computing device 120 via a communications link 140, and a network 150 which operably couples the client computing device 120 to the server computing device 110.” Beck at [0014].



251. Beck teaches that medical device 130 can be a medical diagnostic sensing unit that can remotely monitor biological and physiological conditions of a patient. For example, Beck states that

[t]he medical device 130 of the system 100 is generally operable to monitor one or more biological/physiological conditions and communicate with the client computing device 120 via the physical communications link 140 established between the client computing device 120 and the medical device 130. In an exemplary embodiment, the medical device 130 includes a glucose meter such as the glucose meters manufactured by Roche Diagnostics Corporation which are generally operable to measure blood glucose levels of blood applied to test strips. While the medical device 130 of the exemplary embodiment includes a glucose meter, the medical device 130 could be implemented to monitor and/or analyze other biological/physiological parameters or conditions such as body fluids or bodily functions (e.g. blood, urine, saliva), bodily signals (e.g. electrocardio-signals, brain waves, blood pressure waves), and/or other bodily stimuli (e.g. respiration) to obtain measurements of blood pressure, blood gases, blood coagulation, electrolytes, cardiovascular activity, drug levels, respiration rate, stress, etc.

Beck at [0034]. A POSITA would understand that these types of biological/physiological monitoring describe the use of sensors elements in the medical device 130 configured to measure the one or more biological/physiological conditions.

252. Beck also describes that client computing device 120 of system 100 includes a device interface 126 with “wireless technologies such as RF and/or IR transmitter/receivers to establish the physical communications link 140 between the client computing device 120 and the medical device 130.” Beck at [0030].

253. Likewise, medical device 130 includes communications interface 136 that includes “wireless technologies such as RF and/or IR transmitter/receivers to establish the physical communications link 140 between the client computing device 120 and the medical device 130.” Beck at [0039]. Moreover, the communications link between the medical device 130 and client computing device 120 is established “by simply placing the medical device 130 within transmission range of the corresponding IR and/or RF transmitters/receivers of the client computing device 120.” Beck at [0063]. Thus, Beck discloses that the connection between the client computing device and the medical device can be wireless – established, for example, by radio frequency communication.

254. Accordingly, Beck discloses this limitation.

2. Element [1a]: Sensor Element

255. Element [1a] recites “at least one sensor element.” Beck or Beck in view of Heller renders obvious this claim limitation.

256. As I discussed above, Beck states that

[t]he medical device 130 of the system 100 is generally operable to monitor one or more biological/physiological conditions and communicate with the client computing device 120 via the physical communications link 140 established between the client computing device 120 and the medical device 130. In an exemplary embodiment, the medical device 130 includes a glucose meter such as the glucose meters manufactured by Roche Diagnostics

Corporation which are generally operable to measure blood glucose levels of blood applied to test strips. While the medical device 130 of the exemplary embodiment includes a glucose meter, the medical device 130 could be implemented to monitor and/or analyze other biological/physiological parameters or conditions such as body fluids or bodily functions (e.g. blood, urine, saliva), bodily signals (e.g. electrocardio-signals, brain waves, blood pressure waves), and/or other bodily stimuli (e.g. respiration) to obtain measurements of blood pressure, blood gases, blood coagulation, electrolytes, cardiovascular activity, drug levels, respiration rate, stress, etc.

Beck at [0034]. Beck also describes that the medical device “obtain[s] measurement data indicative of a biological/physiological condition.” Beck at [0035].

257. A POSITA would have known that in order for Beck’s medical device to measure biological or physiological parameters—such as glucose, cardiovascular activity, or electrolytes—the medical device would necessarily include at least one sensor element. Beck, however, does not describe details of such sensors.

258. Heller discloses an analyte monitor that “includes a sensor, a sensor control unit, and a substrate” for monitoring an analyte such as blood glucose. Heller at Abstract, 9:12-16. Heller further discloses details concerning sensor implementation, including that sensor 42 includes working electrodes 58 where

“[a] sensing layer (see Figures 3A and 3B) is often formed proximate to or on at least one of the working electrodes 58 to facilitate the electrochemical detection of the analyte and the determination of its level in the sample fluid.” Heller at 12:31-13:2. Thus, Heller discloses use of an electrochemical sensor to measure blood glucose.

259. A POSITA would have been motivated to incorporate Heller’s sensors—such as Heller’s glucose sensor—into the medical devices disclosed by Beck as it would amount to combining prior art elements according to known methods to yield predictable results.

260. Accordingly, Beck or Beck in view of Heller disclose or render obvious this limitation.

3. Element [1b]: Reference Sensor Element

261. Limitation [1b] recites: “at least one reference sensor element.” Beck in view of Heller renders obvious this claim limitation.

262. As I discussed above, Beck states that

[t]he medical device 130 of the system 100 is generally operable to monitor one or more biological/physiological conditions and communicate with the client computing device 120 via the physical communications link 140 established between the client computing device 120 and the medical device 130. In an exemplary embodiment, the medical device 130 includes a glucose meter such as the glucose meters manufactured by Roche Diagnostics

Corporation which are generally operable to measure blood glucose levels of blood applied to test strips. While the medical device 130 of the exemplary embodiment includes a glucose meter, the medical device 130 could be implemented to monitor and/or analyze other biological/physiological parameters or conditions such as body fluids or bodily functions (e.g. blood, urine, saliva), bodily signals (e.g. electrocardio-signals, brain waves, blood pressure waves), and/or other bodily stimuli (e.g. respiration) to obtain measurements of blood pressure, blood gases, blood coagulation, electrolytes, cardiovascular activity, drug levels, respiration rate, stress, etc.

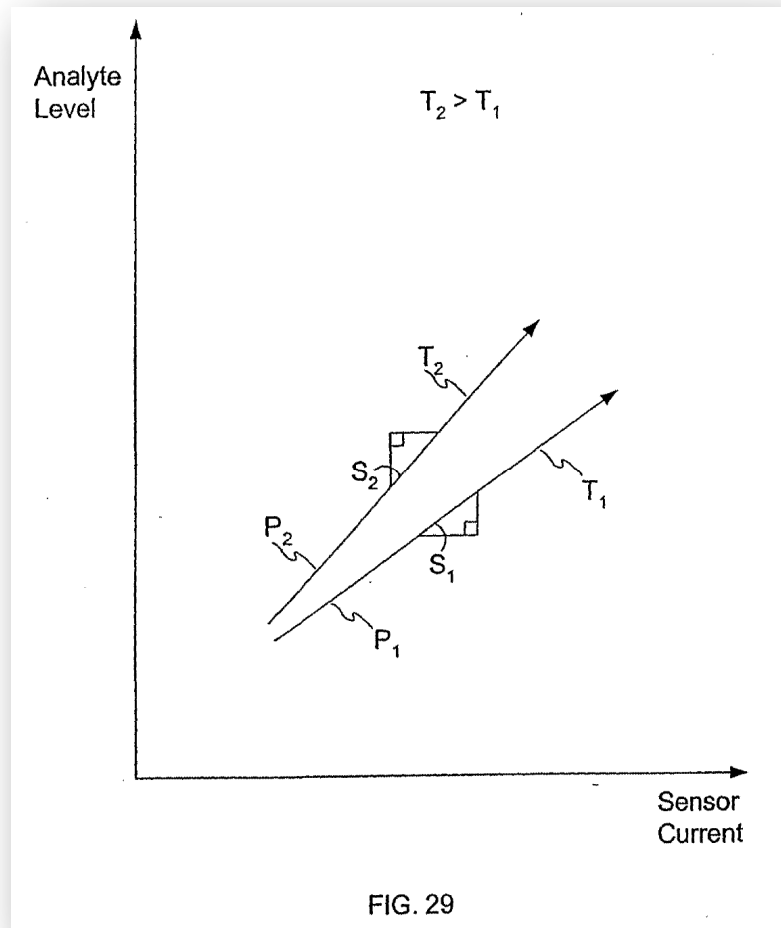
Beck at [0034]. Beck also describes that the medical device “obtain[s] measurement data indicative of a biological/physiological condition.” Beck at [0034].

263. As I also discussed above, a POSITA would have known that in order for Beck’s medical device to measure biological or physiological parameters—such as glucose, cardiovascular activity, or electrolytes—the medical device would necessarily include at least one sensor element.

264. Heller discloses implementation details for sensors that can be used in an analyte monitor. For example, Heller discloses an analyte monitor that “includes a sensor, a sensor control unit, and a substrate” for monitoring an analyte such as blood glucose. Heller at Abstract, 9:12-16.

265. In addition to the electrodes and the sensing layer I discuss in relation to the preceding limitation, Heller states that “sensor 42 may also include a temperature probe 66 (see Figures 6 and 8).” Heller at 13:12-13. Heller further discloses that its sensor control unit includes a “measurement circuit 96 that obtains signals from the sensor circuit 97 and optional temperature probe circuit 99.” *See* Heller at 66:30-68:20. Heller explains that the processor of the sensor control unit can “modify the signals from the sensor circuit 97 using calibration data and/or output from the temperature control circuit.” Heller at 67:10-11.

266. Heller goes on to explain that the relationship between analyte level and sensor current changes based on temperature, as shown in Figure 29, reproduced below. *See* Heller at 67:20-68:5. And the processor of the sensor control unit “is designed to account for this relationship by using the temperature information from measurement 96 to adjust a known profile for a given temperature in a known manner when the sensed temperature varies from the aforementioned temperature.” Heller at 67:32-68:4. Thus, Heller’s temperature probe/sensor is a reference sensor because the data it generates is used to adjust data generated by Heller’s glucose sensor.



267. A POSITA would have been motivated to incorporate Heller's reference sensor—such as Heller's temperature sensor—into the medical devices disclosed by Beck—e.g., for monitoring glucose—to account for the effect of varying temperature on its glucose sensor and improve the accuracy of the glucose sensor. Such a combination represents use of a known technique (incorporation of a temperature sensor and implementation of temperature-based adjustments) to improve similar devices (Beck's medical device) in the same way.

268. Accordingly, Beck in view of Heller render this limitation obvious.

4. Element [1c]: Unique ID Number

269. Element [1c] recites “a unique identification ID number.” Beck discloses this limitation.

270. Beck discloses this element. For example, Beck discloses that device identification component 214 of the client computing device 120 “identif[ies] the medical device without the need for the user to enter identifying information for the medical device.” Beck at [0055]. Beck goes on to explain that ways of identifying the medical device 130 include through “identification codes retrieved from the medical device 130,” “serial numbers retrieved from the medical device 130,” and “other information retrieved from the medical device 130.” Beck at [0055]. A POSITA would have understood that a “serial number” or “identification code” for the medical device is a unique ID number that would uniquely identify the medical device and corresponding sensor.

5. Element [1d]: Sensor Interface with an A/D Converter

271. Element [1d] recites “a sensor interface having an analog to digital converter coupled to the at least one sensor and reference sensor element.”

272. Beck alone or in view of Heller renders obvious this claim limitation.

273. Beck discloses that medical device 130 includes I/O devices 137 that “provide a user of the medical device 130 with mechanisms for entering

information into the medical device 130, receiving information from the medical device 130, and/or controlling operation of the medical device 130.” Beck at [0040]. Beck also discloses that medical device 130 “obtain[s] measurement data indicative of a biological/physiological condition.” Beck at [0035]. As discussed above, to obtain such measurement data medical device 130 would necessarily include at least one sensor element and reference sensor element, e.g., a glucose sensor in the case that the medical device includes a glucose meter.

274. Beck also teaches that “those skilled in the art may elect to implement all or portions of the functional components [of Beck’s system] with ... integrated analog/digital hybrid circuits without undue experimentation and such implemented functional components may replace all or a portion of the hardware components illustrated in FIG. 1.” Beck at [0044].

275. A POSITA would have understood that sensors, such as glucose sensors and temperature sensors, generate an analog signal that represents a continuous range of values corresponding to the in-sample glucose concentration and temperature, respectively. A POSITA would have also understood that use of such sensors with Beck’s medical device, which can include analog/digital hybrid circuits, would require converting the analog signal to a digital signal by an interface that includes an analog to digital converter coupled to the respective glucose sensor and temperature (reference) sensor.

276. Although Beck does not expressly disclose an analog to digital converter, such devices were conventional and in widespread use well-before the priority date of the '307 patent. For example, Heller discloses that for on-skin sensor control unit 44, “the sensor circuit 97 and the optional temperature probe circuit 99 provide raw signals from the sensor to the measurement circuit 96. The measurement circuit 96 converts the raw signals to a desired format,” and “may be used, for example, to convert the raw signal to a format that can be used by digital logic circuits,” i.e., digital format. Heller at 62:10-16. Heller further describes methods for “collecting an analog signal representing a level of an analyte in a bodily fluid” and “converting the analog signal into a digital signal representing a level of an analyte in a bodily fluid.” Heller at 104-105 (claim 39).

277. A POSITA would have understood that Heller’s sensor circuit is a sensor interface (e.g., because it provides raw signals from the sensor to the measurement circuit.) A POSITA would have further understood Heller’s measurement circuit, which converts an analog signal to a digital signal, incorporates an analog to digital converter for each of the glucose sensor (sensor element) and the temperature sensor (reference sensor element).

278. To the extent not already part of Beck’s system, a POSITA would have been motivated to further modify Beck’s system to incorporate a sensor interface having an analog to digital converter coupled to at least the glucose sensor

(sensor element) and the temperature sensor (reference sensor element) to enable processing of the glucose and temperature signals. Such a modification represents use of known technique to improve similar devices in the same way. Such a modification would have also been obvious to try as analog to digital converters and their functions were well-known before the priority date of the '307 patent.

279. Accordingly, Beck alone or in view of Heller renders obvious this limitation.

6. Element [1e]: Antenna

280. Element [1e] recites “at least one antenna.” Beck discloses this claim limitation.

281. Beck discloses this element. For example, Beck teaches that the communications interface 136 of the medical device can “include wireless technologies such as RF and/or IR transmitter/receivers to establish the physical communications link 140 between the client computing device 120 and the medical device 130.” Beck at [0039]. A POSITA would have understood that RF transmitters and receivers would require that communications interface 136 of medical device 130 include or be coupled to at least one antenna for transmitting and/or receiving RF communications.

7. Element [1f]: Substrate

282. Element [1f] recites “a substrate.”

283. Beck in view of Heller renders obvious this limitation.

284. Beck discloses that “[i]n an exemplary embodiment, the medical device 130 includes a glucose meter.” Beck at [0034]. In addition, “the medical device 130 could be implemented to monitor and/or analyze other biological/physiological parameters or conditions such as body fluids or bodily functions (e.g. blood, urine, saliva), bodily signals (e.g. electrocardio-signals, brain waves, blood pressure waves), and/or other bodily stimuli (e.g. respiration) to obtain measurements of blood pressure, blood gases, blood coagulation, electrolytes, cardiovascular activity, drug levels, respiration rate, stress, etc.” Beck at [0034].

285. As discussed with respect to elements 1a and 1b, above, a POSITA would have known that in order for Beck’s medical device to measure biological or physiological parameters—such as glucose, cardiovascular activity, or electrolytes—the medical device would necessarily include at least one sensor element. Beck, however, does not describe details of such sensors.

286. Heller discloses an analyte monitor that “includes a sensor, a sensor control unit, and a substrate” for monitoring an analyte such as blood glucose. Heller at Abstract, 9:12-16. Heller further discloses details concerning sensor implementation, including that sensor 42 includes working electrodes 58 where “[a] sensing layer (see Figures 3A and 3B) is often formed proximate to or on at

least one of the working electrodes 58 to facilitate the electrochemical detection of the analyte and the determination of its level in the sample fluid.” Heller at 12:31-13:2.

287. And Heller discloses several exemplary analyte sensors with various electrode configurations. *See, e.g.*, Figures 2-11. Each sensor includes one or more electrodes formed on a substrate. *See, e.g.*, Heller at 24:28-25:19.

288. Placing sensor circuitry such as electrodes and temperature probes on a substrate was a conventional, well-known method of implementing diagnostic sensor circuitry like that which would be found in sensors in Beck’s medical devices. *See* Heller at 13:18-16:15. In addition, placing sensor elements on substrates also provides structure, for example, for affixing the sensor to a person, connecting to an analyte monitor, and preventing damage to the sensor / reference sensor elements. *See* Heller at 13:18-16:15

289. A POSITA would have been motivated to incorporate sensors as disclosed by Heller, which include one or more electrodes formed on a substrate, into the medical devices disclosed by Beck as it would represent combining prior art elements according to known methods to yield predictable results. Therefore, a POSITA would have been motivated to incorporate sensors formed on a substrate, as taught by Heller, into Beck’s medical devices to facilitate affixing or implanting the sensor on a person.

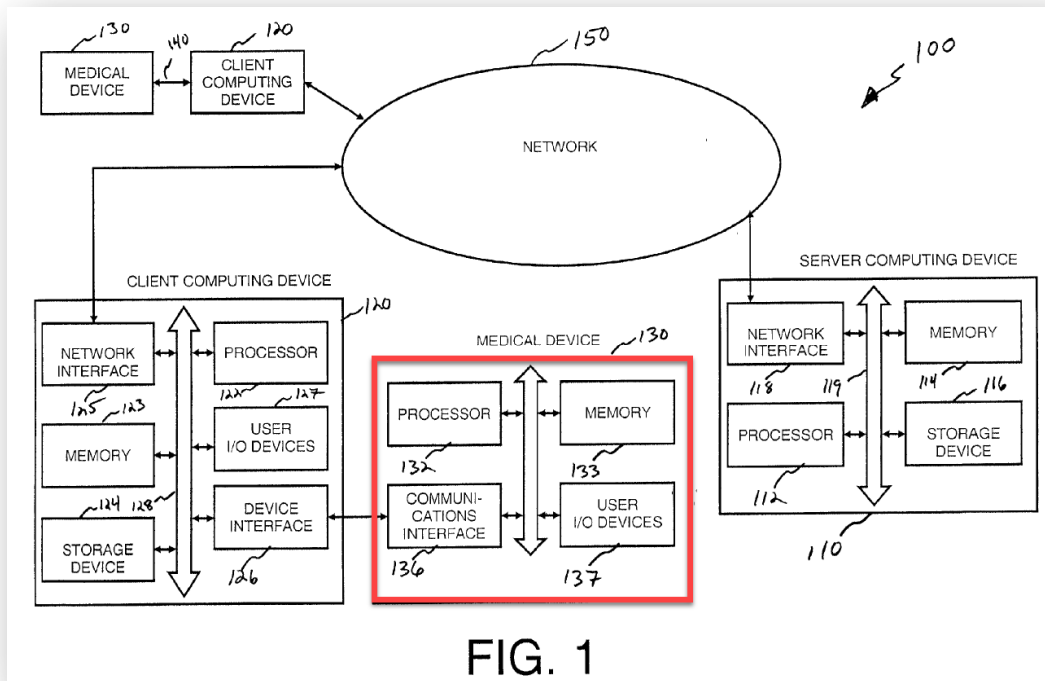
290. Accordingly, Beck in view of Heller renders obvious this limitation.

8. Element [1g]: RF Power and Communication Interface

291. Element [1g] recites “an RF power and communication interface coupled to the at least one antenna and sensor interface.”

292. Beck in view of Heller renders obvious this claim limitation.

293. As I discussed above, a POSITA would have understood that I/O devices 137 of the medical device 130 would include a sensor interface. Beck at [0040]. Figure 1 of Beck, annotated below, also shows that in the medical device 130, communications interface 136 is coupled to the user I/O interfaces 137. Beck at [0035], [0039], [0063]. As also discussed above, a POSITA would have also understood that Beck’s disclosure of IR and/or RF transmitters and/or receivers would require that communications interface 136 include or be coupled to at least one antenna for transmitting or receiving RF and/or IR signals, which would correspond to an RF communication interface.



294. Beck also teaches that medical device 130 includes an indicator like an LED “that provides visual feedback that the medical device 130 is powered” and “a button or switch to power the medical device 130 on or off.” Beck at [0041]. A POSITA would have understood that to include such features, and to be able to operate and wirelessly transmit/receive information the medical device would include a power interface to allow the device to be powered on or off, and to provide power to communications interface 136 (including its wireless RF transmitter/receiver).

295. Thus, a POSITA would have recognized that the RF transmitters and/or receivers of the medical device 130 for communicating with client

computing device 120 would include an RF power and communications interface. Beck at [0030], [0039].

296. In addition, Heller discloses the use of inductive coupling to eliminate electrical contacts between the on-skin sensor control unit and the sensor, which “are commonly a source of noise and failure.” Heller at 59:23-25. Heller teaches that eliminating such contacts enables the sensor control unit to be “entirely sealed which may increase the waterproofing of the on-skin sensor control unit.” Heller at 59:26-27. Heller explains:

Power is transmitted to the sensor via inductive coupling, using, for example, closely space[d] antennas (e.g., facing coils) (not shown) on the sensor and the on-skin sensor control unit. Changes in the electrical characteristics of the sensor control unit 44 (e.g., current) induce a changing magnetic field in the proximity of the antenna. The changing magnetic field induces a current in the antenna of the sensor. The close proximity of the sensor and on-skin sensor control unit results in reasonably efficient power transmission.

Heller at 59:11-19. Heller further points out that the power can be used to power various components of the sensor and the same inductive coupling approach can be used to transfer data, stating:

The induced current in the sensor may be used to power potentiostats, operational amplifiers, capacitors, integrated circuits, transmitters, and other electronic components built into the sensor structure. Data is transmitted back to the sensor control unit, using, for example,

inductive coupling via the same or different antennas and/or transmission of the signal via a transmitter on the sensor.

Heller at 59:19-23. Notably, because both power and data are transmitted by inductive coupling using closely spaced antennas, a POSITA would have understood that Heller discloses an RF power and communication interface. For the same reason, a POSITA would have understood that Heller's RF power and communication interface is coupled to the at least one antenna and sensor interface. Heller at 59:12-14, 59:21-23.

297. To the extent that Beck alone does not disclose this limitation, a POSITA would have been motivated to modify Beck's medical device to incorporate inductive coupling for transmission of power and data between one or more components, to eliminate the need for electrical contacts between the medical device and sensor. A POSITA would have been motivated to do so to reduce noise and failure, which Heller points out are commonly caused by electrical contacts and to completely seal the medical device to make it more waterproof. A POSITA would have had a reasonable expectation of success in modifying Beck to use inductive coupling in its medical device as the modification represents use of a known technique (inductive coupling) to improve similar devices (Beck's medical device) in the same way.

298. Indeed, the use of inductive coupling to power and communicate with sensors was well-known before the priority date of the '307 patent. *See, e.g.*, U.S. Patent No. 6,002,344 to Bandy et al. (Ex. 1018, "Bandy-344") at 5:44-53 (disclosing sensors in RFID tags (an inductive coupling application) and transmission of data with the same). A POSITA would have known that sensors with RFID tags use inductive coupling and convert an electromagnetic signal into power to power the tag. In addition, such sensors necessarily would include an RF power and communications interface. A power interface is a standard medium that ensures power is provided to an RFID tag. Additionally, a communication interface would enable communication between an RFID tag and the rest of the system.

299. Accordingly, Beck in view of Heller renders obvious this limitation.

9. Element [1h]: Controller

300. Element [1h] recites "a controller coupled to the RF power and communications interface and the sensor interface." Beck or Beck in view of Heller render this limitation obvious.

301. As discussed above, Beck teaches that medical device 130 includes a processor 132, "which controls the general operation of the medical device. More specifically, the processor as a result of executing software and/or firmware routines of the memory is generally operable to obtain measurement data indicative of a biological/physiological condition." Beck at [0035].

302. To the extent Beck alone does not disclose this limitation, the combination of Beck in view of Heller (to incorporate Heller’s inductive coupling approach to transfer power and data) as described in the preceding element render this limitation obvious. In that combination, inductive coupling—which as I describe in the preceding element provides an RF power and communication interface—is used to transfer data from the sensor to the medical device for processing. Accordingly, the combination results in processor 132 of Beck (a controller) coupled to the RF power and communication interface and the sensor interface.

10. Element [1i]: Memory

303. Element [1i] recites “a memory coupled to the controller and the sensor interface.” Beck discloses this limitation.

304. As discussed above, Beck discloses that medical device 130 includes memory 133 that “is operable to store data and instructions used by the processor 132. To this end, the memory 133, in an exemplary embodiment, includes random access memory for storing data, software instructions, and/or other information needed by the processor 132. However, the memory 133 may alternatively include other volatile memory types such as DRAM, SDRAM, and SRAM for storing data and software instructions and/or non-volatile memory such as ROMs, PROMs,

EEPROMs, and flash memory for storing data and firmware instructions.” Beck at [0037].

11. Element [1j]: RF Sensor Communicates with a Wireless Device, which Communicates with a Remote Server

305. Element [1j] recites “wherein the RF addressable sensor communicates with a remote wireless device, said wireless device having multiple wireless communication means, geolocation means and a unique ID, whereby said wireless device is coupled to at least one communications network linked to [a]t least one remote server.”

306. Beck in view of Lovejoy renders this limitation obvious.

RF addressable sensor communicates with a remote wireless device:

307. Beck discloses “a medical device 130 operabl[y] coupled to the client computing device 120 via a communications link 140, and a network 150 which operably couples the client computing device 120 to the server computing device 110.” Beck at [0014]. As discussed above, medical device 130 includes a sensor element and can be accessed wireless via communications link 140. Beck at [0030] (“The device interface 126 may alternatively, or in addition, include wireless technologies such as RF and/or IR transmitter/receivers to establish the physical communications link 140 between the client computing device 120 and the medical device 130.”). Accordingly, medical device 130 is an RF addressable sensor,

which communicates with a remote wireless device—here client computing device 120.

Multiple wireless communication means:

308. I understand that “multiple wireless communication means” can be interpreted as a means-plus-function term and is limited to the corresponding structure and its equivalents that I discussed in Section I.B.1 .

309. Beck describes that the client computing device 120 comprises multiple wireless communication means. For example, Beck teaches that client computing devices 120 can include “handheld computing devices (e.g. Palm Pilots) and Internet enabled cellular phones.” Beck at [0027]. A POSITA would understand that Internet enabled cellular phones as of the priority date of the ’307 patent could wirelessly communicate with a cellular phone tower and included other wireless communication capabilities, such as Bluetooth. Beck also discloses that its client computing device is capable of wireless communication with medical device 130 using radio frequency and/or infrared transmitters and receivers. Beck at [0030] (“The device interface 126 may alternatively, or in addition, include wireless technologies such as RF and/or IR transmitter/receivers to establish the physical communications link 140 between the client computing device 120 and the medical device 130.”).

310. Accordingly, Beck discloses structure that is the same or equivalent to the corresponding structure disclosed in the '307 patent for performing wireless communication. As discussed above, Beck discloses that client computing device can be an Internet enabled cell phone. The '307 patent similarly discloses that the remote wireless device includes a cell phone (*see* '307 patent claim 2), which “can communicate to a proximal cellphone tower ... via wireless link 510 or indirectly by other existing or emerging wireless communication means such as Bluetooth” ('307 patent at 17:24-27). A POSITA would have understood that Beck's internet enabled cell phone would provide similar structure and wireless communication capabilities as those which the '307 patent describes are possessed by its remote wireless device at least as implemented as a cell phone. In addition, a POSITA would have understood that cellular communication protocols, internet communication protocols, and RF and/or IR communication protocols as disclosed by Beck are common protocols used by cell phones as of the priority date of the '307 patent to communicate with long-range and short-range devices such as cellular phone towers and RF addressable sensors.

Geolocation means:

311. I understand that “geolocation means” is a means-plus-function term and is limited to the corresponding structure and its equivalents that I discussed in Section I.B.2 .

312. First, as discussed above, Beck discloses that its client computing device can be an internet enabled cellular phone. Cellular phones before the priority date of the '307 patent commonly included geolocation features. Indeed, as of 1999, the Federal Communications Commission had already begun a concerted effort to require cell phone carriers to outfit cell phones with automated location identification (ALI) through GPS or non-GPS geolocation features. FCC Report at 2, 6, 13-14. (Ex. 1017). Accordingly, Beck's client computing device—an Internet enabled cellular phone—would have included GPS/non-GPS geolocation functionality.

313. Second, Beck in view of Lovejoy renders obvious a wireless device with geolocation means. As I discussed above, a POSITA would have been motivated to modify Beck's client computing device with the teachings of geolocation in Lovejoy because cell phones as of the priority date commonly had geolocation capability and Lovejoy merely provides known implementation details for incorporating geolocation functionality into a portable device.

314. For example, Lovejoy teaches that its disclosed personal monitor includes "geolocating capabilities (GPS or the radar-responsive tags)." Lovejoy at 4:32-37. Lovejoy goes on to explain that "[i]n situations where line-of-sight to 4 GPS satellites can be guaranteed and greater size and weight are acceptable, GPS can be utilized for geolocating. With GPS locating, reduced cost in the locating

infrastructure is realized.” Lovejoy at 8:59-9:33. Lovejoy also teaches that for non-GPS radar-responsive tag geolocation, “[t]ime-of-arrival with a triangulation algorithm is preferably used for tag position determination.” Lovejoy at 9:57-10:33. Lovejoy also teaches that non-GPS geolocation can be performed with an interrogator system using VHF or UHF (Lovejoy at 9:19-20) or one or more interrogator and receiver antennas, radar auxiliary receivers (Lovejoy at 9:57-65).

315. Accordingly, a POSITA would have been motivated to implement the client computing device with the geolocation teachings of Lovejoy, that is, to include one or both of GPS geolocating functionality or non-GPS geolocating functionality (e.g., using a triangulation algorithm applied to radio frequency signals received by/emitted from the client computing device). A POSITA would have viewed adding such geolocation functionality to Beck’s client computing device as nothing more than implementing the device with features normally found on conventional cell phones of the time. And given that the inclusion of geolocation features was required by the FCC well before the priority date of the ’307 patent, a POSITA would have had a reasonable expectation of success in modifying Beck’s client computing device to implement geolocation functionality as disclosed in Lovejoy.

316. Therefore, Beck in view of Lovejoy discloses structure that is the same or equivalent to the corresponding structure disclosed in the ’307 patent for

performing geolocation, both by GPS and non-GPS-based means. Indeed, the '307 patent incorporates by reference Lovejoy for disclosure relating to geolocation by GPS or non-GPS means. *See* '307 patent at 17:21-24 (“The reading, analysis and geolocation by GPS or non-GPS means is described in U.S. Patent No. 6,031,454 that is included herein by reference in its entirety.”). Thus, the combination of Beck and Lovejoy discloses structure that is identical to the corresponding structure disclosed in the '307 patent for performing geolocation, both by GPS and non-GPS-based means.

Unique ID:

317. Beck discloses a wireless device (client computing device 120) has a unique ID.

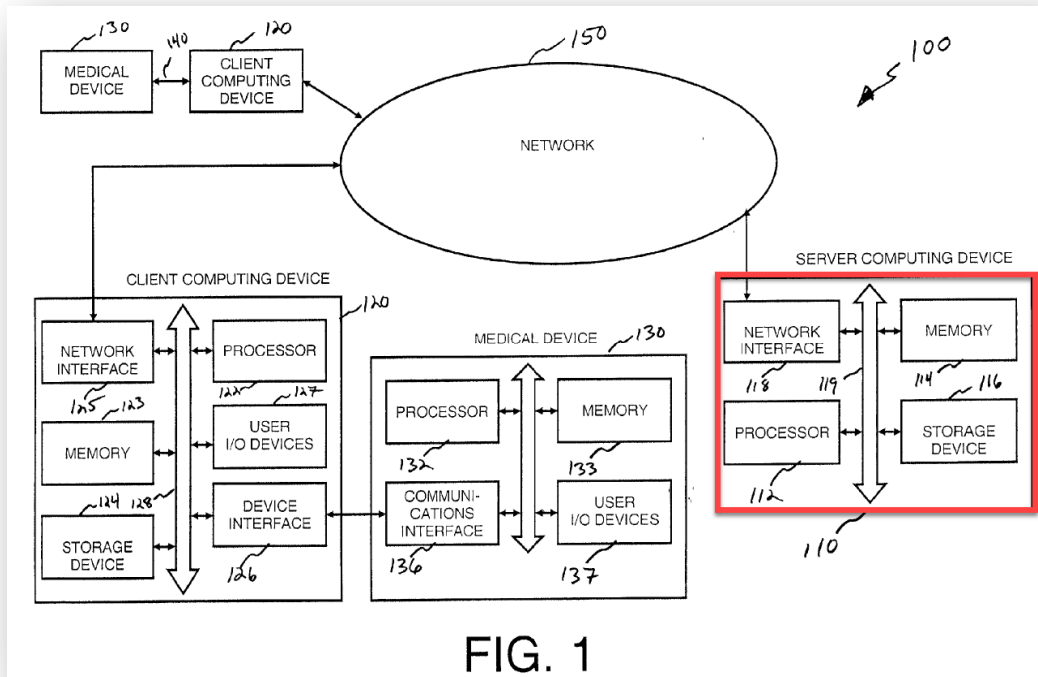
318. For example, Beck discloses that server 110 authenticates client computing device 120 based on “the network address of the client computing device, the serial number of the medical device, stored authentication keys (e.g., PGP keys), etc.” Beck at [0065]. Accordingly, a POSITA would have understood that because the network address of the client computing device can be used to authenticate the client computing device, such network address is or is equivalent to a unique ID.

319. In addition, Beck states that client computing devices 120 can include “handheld computing devices (e.g. Palm Pilots) and Internet enabled cellular

phones.” Beck at [0027]. A POSITA would also recognize that an Internet enabled cellular phone would have an IP address, Media Access Control (MAC) address, and/or an International Mobile Equipment Identity (IMEI) number for uniquely identifying the respective device. A MAC address is a unique identifier assigned to devices having network capability. Similarly, an IMEI number is a unique identifier assigned to wireless phones.

Wireless device is coupled to at least one communications network linked to [a]t least one remote server

320. Beck also discloses that the wireless device (client computing device) is coupled to at least one communications network linked to at least one remote server (server computing device). For example, Beck states that “The network interface 125 of the exemplary client computing device 120 generally operably couples the exemplary client computing device 120 to the network 150 such that the client computing device 120 may communicate with the server computing device 110 via the network 150.” Beck at [0028]. I have annotated server computing device 110 in Figure 1, shown below:



321. Further, Beck describes that “system 100 comprises a set of protocol components 204 which the server computing device 110 transfers to the client computing device 120.” Beck at [0015].

12. Element [1k]: Wireless Device Obtains ID and Sensor Data from Sensor Interface

322. Element [1k] recites “wherein the wireless device communicates with the RF addressable sensor interface to obtain the ID and sensor data.” Beck discloses this limitation.

323. Beck discloses this claim element because client computing device 120 obtains the sensor ID and sensor data from medical device 130. For example, Beck teaches that the device identification component 214 of the client computing

devices causes the client device to identify the medical device including through the medical device serial number:

[t]he *device identification component 214 of the exemplary client computing device 120 generally causes the client computing device 120 to identify the medical device 130* without the need for the user to enter identifying information for the medical device 130. To this end, the device identification component 214 in an exemplary embodiment scans a predetermined port of the client computing device 120 to determine the type of medical device 130 operably coupled to the predetermined port. The exact procedure that the device identification component 214 utilizes to identify the medical device 130 operably coupled to the client computing device 120 depends upon the communications protocols utilized by the medical devices supported by the system 100.” Several known techniques may be used such as identifying the medical device 130 based upon (i) responses received from the medical device 130 due to stimulus signals applied to the medical device 130, (ii) identification codes retrieved from the medical device 130, (iii) *serial numbers retrieved from the medical device 130*, and/or (iv) other information retrieved from the medical device 130.”

Beck at [0055] (emphasis added). These identification codes and serial numbers disclosed in Beck are unique sensor IDs.

324. Beck also teaches that “the client computing device 120 performs various operations in regard to communicating with the medical device 130 on the

behalf of the client computing device 120 and/or the server computing device 110,” which includes “retriev[ing] stored measurement data, updat[ing] calibration or other parameters used to obtain measurement data, perform[ing] a test to obtain measurement data, or other tasks.” Beck at [0074]. Beck also teaches that

the client computing device 120 obtains the data from the medical device 130 via the protocol component 204, and after completing the transfer of data from the medical device 130 to the client computing device 120, the client computing device 120 transfers the data to the server computing device 110. However, the client computing device 120 may alternatively begin the transfer of received data to the server computing device 110 before receiving all of the requested data from the medical device 130.

Beck at [0075].

13. Element [11]: Remote Server Authenticates Sensor ID and Communicates Information and Software for the Sensor to the Wireless Device

325. Element [11] recites “wherein the remote server authenticates said unique sensor ID associated with said unique wireless device ID and communicates to said wireless device processed information relating to said sensor data and software related to the unique sensor ID, thereby allowing said wireless device to interpret said sensor anywhere worldwide.” Beck discloses this limitation.

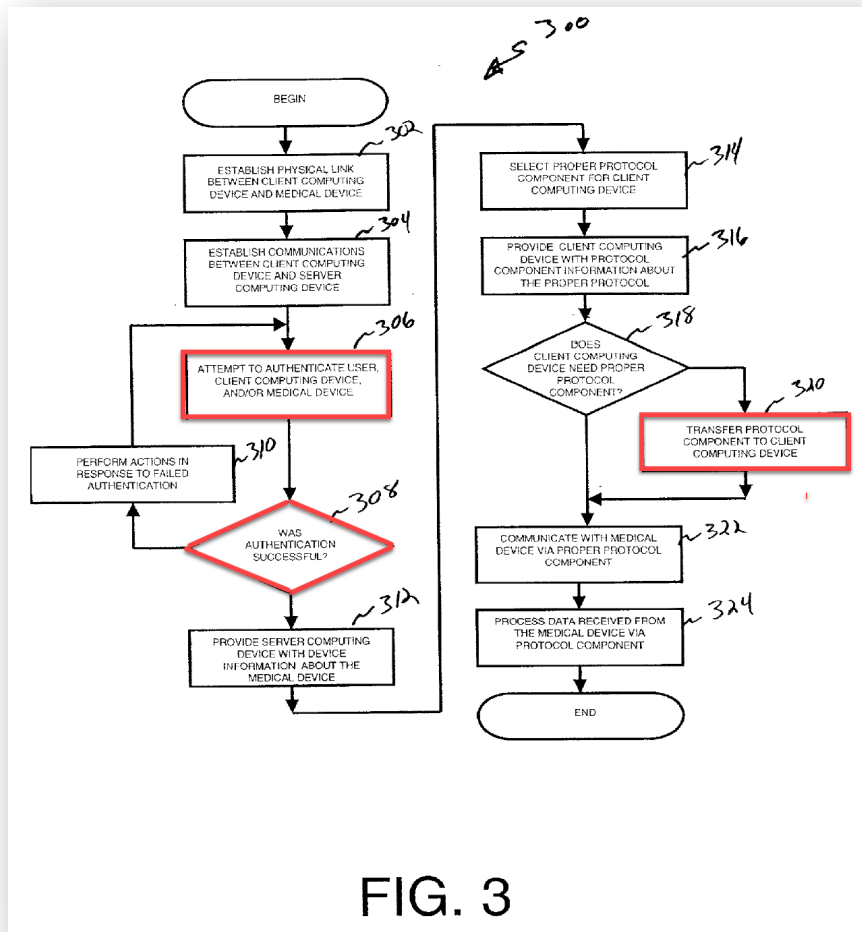
326. For example, Beck teaches that “the server computing device 110 attempts to authenticate the user, the client computing device 120, and/or the

medical device 130 via various authentication schemes.” Beck at [0065]. Beck explains that authentication is based “upon the network address of the client computing device 120, the serial number of the medical device 130, stored authentication keys (e.g. PGP keys), etc. Beck at [0065]. Beck thus explains that the server computing device 110 authenticates the unique sensor ID (e.g., serial number of the medical device 130) to determine whether to grant access to software and processed information related to said sensor data. Beck at [0065]. If the authentication attempt fails, the server computing device can take actions including “logging the network address of the client computing device 120, blocking connections from the client computing device 120 if a threshold number of attempts is exceeded, etc.” Beck at [0066]. The server can “reattempt to authenticate the user, the client computing device 120, and/or the medical device 130.” Beck at [0066].

327. Beck teaches that server computing device 110 “provides the update component 216 of the client computing device 120 with protocol component information that identifies the proper protocol component 204 to be used with the identified medical device 130. Beck at [0069]. Beck also teaches that “protocol components are illustratively software components which provide a set of rules that govern how the client computing device communicates with a medical device.” Beck at [0015]. Beck also teaches that client computing device 120

“receives a copy of the proper protocol component 204 from the server computing device 110.” Beck at [0071].

328. Beck describes that the server device 110 provides the protocol component information to the client computing device 120 in response to authentication of the sensor ID of the mobile device. For example, steps 306 and 308 of method 300 shown in Figure 3, annotated below, correspond to authentication of the medical device based on sensor ID. Beck at [0065]-[0066]. In response to determining a successful authentication (step 308), server computing device 110 communicates the proper protocol component to the client computing device 120 (step 320). Beck at [0071]. Additionally, if successful authentication occurs, client computing device 120 “provides the server computing device 110 with device information from which the server computing device determines the *proper protocol component 204* to be used with the medical device 130” (step 316). Beck at [0067]. As shown in Figure 3 (annotated and reproduced below), the client computing device 120 obtains this information from the medical device 130, which can include “information such as serial number, model number, device type, version number, etc.” Beck at [0067].



329. Beck also explains that the server computing device 110 provides processed information relating to said sensor data to the client computing device 120 in response to successful authentication. For example, Beck discloses that server computing device 110 also “processes data received from the measurement device 130 via the client computing device 120.” Beck at [0076]. Beck goes on to explain that “[i]n response to a request received from the client computing device 120, the server computing device 110 at later date retrieves and/or analyzes the historic data for the authenticated user, the client computing device 120, and/or

the medical device 130. Further, the server computing device 110 provides the client computing device 120 with results data in the form of a HTML document that includes tables, charts, graphs, explanations, etc. to aid in assessing the meaning of the current measurement data and/or the historic measurement data.” Beck at [0076].

330. Notably, if authentication is not successful the server will not provide the aforementioned software components or results data (processed information).

331. Therefore, a POSITA would have understood that Beck discloses that only in response to authenticating the unique sensor ID associated with the unique wireless device ID will the remote server (Beck’s server computing device) communicate to the wireless device (e.g., Beck’s Internet enabled cellular phone) (1) processed information relating to the sensor data and (2) software related to the unique sensor ID necessary for the wireless device to interpret the sensor anywhere worldwide.

332. Accordingly, Beck discloses a system that meets the proposed construction for this limitation—“wherein the remote server authenticates a unique sensor ID associated with a unique wireless device ID and in response to the authentication communicates to the wireless device (1) processed information relating to the sensor data and (2) software related to the unique sensor ID necessary for the wireless device to interpret the sensor anywhere worldwide.”

D. Dependent Claims 2-3, 5, 9, and 10 are Obvious Over Beck in View of Heller and Lovejoy

1. Dependent Claim 2: Wireless Device is a Cell Phone

333. Claim 2 depends from claim 1 and recites that “[t]he system according to claim 1 wherein said wireless device is a cell phone.” Beck discloses this limitation because Beck discloses that client computing device 120 can be a cell phone.

334. For example, Beck describes that “[m]any special purpose computing devices such as handheld computing devices (e.g. Palm Pilots) and Internet enabled cellular phones ... could be used to implement the client computing device 120.” Beck at [0027].

2. Dependent Claim 3: Wireless Skin Patch

335. Claim 3 depends from claim 1 and recites “[t]he system according to claim 1 wherein said sensor unit is integrated into a disposable wireless skin patch for diagnostic applications.”

336. Beck in view of Heller renders obvious that said sensor unit is integrated into a disposable wireless skin patch for diagnostic applications.

337. As discussed with respect to elements 1[a] and 1[b], above, Beck’s medical device monitors biological and physiological conditions via sensors such as glucose sensors. *See* Sections I.A.2 and I.A.3

338. Beck also teaches that medical device 130 can communicate wirelessly with client computing device: “[t]he communications interface 136 may alternatively, or in addition, include wireless technologies such as RF and/or IR transmitter/receivers to establish the physical communications link 140 between the client computing device 120 and the medical device 130.” Beck at [0039].

339. As discussed above, a POSITA would have understood that to use a medical device to monitor a physiological condition as described by Beck would require affixing the medical device to the person.

340. Heller teaches that its on-skin sensor control unit can be attached to a person’s skin in a variety of ways, for example, by using a mounting unit that “typically includes an adhesive on a bottom surface of the mounting unit 77 to adhere to the skin of the patient” (Heller at 54:18-19), or by providing “a coupled mounting unit 77 and housing 45 of an on-skin sensor control unit 44 [] on an adhesive patch” (Heller at 54:29-30). The on-skin sensor control unit can be “a disposable unit complete with a battery for operating the unit.” Heller at 50:18-19. Heller at 51:3-52:5. Heller discloses that the “on-skin sensor control unit 44 is provided on an adhesive patch 204. Heller at 54:29-32. These disclosures by Heller of using adhesives including adhesive skin patches into diagnostic sensors show that this is nothing more than a known technique for affixing an RF addressable diagnostic sensor to a person’s skin for remote monitoring.

341. Heller demonstrates that long before the alleged priority date of the '307 patent, adhesive skin patches were used to affix sensors, including wireless disposable sensors (Heller's on-skin sensor control unit), to the skin of a person. Accordingly, a POSITA would have been motivated to use the same or similar technique to affix Beck's medical device (such as a glucose sensor or electrocardio-signal sensor) to a person's skin. Doing so would have been nothing more than applying a known technique to a known device ready for improvement to yield predictable results. A POSITA would have had a reasonable expectation of success in using an adhesive skin patch, as disclosed by Heller, with Beck's medical device.

3. Dependent Claim 5: Chemical Sensor

342. Claim 5 depends from claim 1 and recites "[t]he system according to claim 1 wherein said sensor is a chemical sensor." Beck alone or in view of Heller render obvious this limitation obvious.

343. As discussed above, Beck explains that "the medical device 130 includes a glucose meter such as the glucose meters manufactured by Roche Diagnostics Corporation which are generally operable to measure blood glucose levels of blood applied to test strips." Beck at [0034]. A POSITA would have understood that glucose measurements, for example, are made with a chemical/electrochemical sensor.

344. In addition, as discussed with respect to elements 1a and 1b, above, a POSITA would have known that in order for Beck's medical device to measure biological or physiological parameters—such as glucose, cardiovascular activity, or electrolytes—the medical device would necessarily include at least one sensor element.

345. To the extent Beck alone does not disclose or render obvious this limitation, Heller discloses details for implementing sensors that are applicable to Beck. For example, Heller discloses “devices and methods for the *in vivo* monitoring of an analyte using an electrochemical sensor to provide information to a patient about the level of the analyte.” Heller at 2:5-7. Accordingly, a POSITA would have been motivated to look to Heller for details on implementing sensors for use with Beck's system.

346. Heller explains that “[a]n ‘electrochemical sensor’ is a device configured to detect the presence and/or measure the level of an analyte in a sample via electrochemical oxidation reactions and on the sensor.” Heller at 9:28-30. In one example, Heller discloses an electrochemical sensor that can assay the amount of glucose present “based on the reaction of a of glucose molecule with two non-leachable ferricyanide anions in the presence of glucose oxidase.” Heller at 35:24-26. A POSITA would have been motivated to use an electrochemical glucose

sensor as described by Heller with Beck's medical device to facilitate measurement of blood glucose with Beck's system.

347. Accordingly, Beck alone or in view of Heller render this claim obvious.

4. Dependent Claim 9: GPS Geolocation Means

348. Claim 9 depends from claim 1 and recites that "[t]he system according to claim 1 wherein the system further includes a GPS means for geolocating said system."

349. Beck in view of Lovejoy discloses a system that includes a GPS means for geolocating said system.

350. I understand that "GPS means for geolocating said system" is a means-plus-function term and is limited to the corresponding structure and its equivalents that I discussed in Section I.B.3.

351. As I discussed above, a POSITA would have been motivated to implement Beck's client computing device 120 (which can be an Internet enabled cellular phone) with Lovejoy's geolocation functionality, and Lovejoy discloses geolocation by GPS. For example, Lovejoy teaches that its disclosed personal monitor includes "geolocating capabilities (GPS or the radar-responsive tags)." Lovejoy at 4:32-37. Lovejoy goes on to explain that "[i]n situations where line-of-sight to 4 GPS satellites can be guaranteed and greater size and weight are

acceptable, GPS can be utilized for geolocating. With GPS locating, reduced cost in the locating infrastructure is realized.” Lovejoy at 8:59-9:33.

352. Therefore, Beck in view of Lovejoy discloses structure that is the same or equivalent to the corresponding structure disclosed in the ’307 patent for performing GPS geolocation. Indeed, the ’307 patent incorporates by reference Lovejoy for disclosure relating to geolocation by GPS or non-GPS means. *See* ’307 patent at 17:21-24 (“The reading, analysis and geolocation by GPS or non-GPS means is described in U.S. Patent No. 6,031,454 that is included herein by reference in its entirety.”). Thus, the combination of Beck and Lovejoy renders obvious structure that is identical to the corresponding structure disclosed in the ’307 patent for performing GPS-based geolocation.

5. Dependent Claim 10: Non-GPS Geolocation Means

353. Dependent claim 10 depends from claim 1 and recites “further including a non-GPS geolocation means for geolocating said system.”

354. Beck in view of Lovejoy discloses a system that includes a non-GPS means for geolocating said system.

355. I understand that “non-GPS geolocation means for geolocating said system” is a means-plus-function term and is limited to the corresponding structure and its equivalents that I discussed in Section I.B.4 .

356. As I discussed above, a POSITA would have been motivated to implement Beck's client computing device 120 (which can be an Internet enabled cellular phone) with Lovejoy's geolocation functionality, and Lovejoy discloses non-GPS geolocation using radar-responsive tags. For example, Lovejoy teaches that its disclosed personal monitor includes "geolocating capabilities (GPS or the radar-responsive tags)." Lovejoy at 4:32-37. Lovejoy goes on to explain that with non-GPS radar-responsive tag geolocation, "[t]ime-of-arrival with a triangulation algorithm is preferably used for tag position determination." Lovejoy at 10:10-11. Lovejoy also teaches that non-GPS geolocation can be performed with an interrogator system using VHF or UHF (Lovejoy at 9:19-20) or one or more interrogator and receiver antennas, radar auxiliary receivers (Lovejoy at 9:57-65).

357. Therefore, Beck in view of Lovejoy discloses structure that is the same or equivalent to the corresponding structure disclosed in the '307 patent for performing non-GPS geolocation. Indeed, the '307 patent incorporates by reference Lovejoy for disclosure relating to geolocation by GPS or non-GPS means. See '307 patent at 17:21-24 ("The reading, analysis and geolocation by GPS or non-GPS means is described in U.S. Patent No. 6,031,454 that is included herein by reference in its entirety."). Thus, the combination of Beck and Lovejoy discloses structure that is identical to the corresponding structure disclosed in the '307 patent for performing non-GPS-based geolocation.

XIII. Conclusion

All statements made herein of my own knowledge are true, and all statements made on information and belief are believed to be true. Further, I am aware that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001. I declare under penalty of perjury that the foregoing is true and correct.

Executed on January 15, 2024, in Corona Del Mar, California

A handwritten signature in black ink, appearing to read 'M. Sarrafzadeh', written in a cursive style.

Majid Sarrafzadeh