

Filed: March 24, 2023

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

WAVELYNX TECHNOLOGIES CORP.,
Petitioner,

v.

ASSA ABLOY AB,
Patent Owner.

Case No. IPR2023-00730
Patent 7,439,862

**DECLARATION OF STUART LIPOFF IN SUPPORT OF PATENT
OWNER'S PRELIMINARY RESPONSE**

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EXHIBIT LIST

EX2001	Declaration of Stuart Lipoff
EX2002	Curriculum Vitae – Stuart Lipoff
EX2003	Order Regarding Claim Construction – <i>HID Global Corp. v. Farpointe Data, Inc.</i> , No. 8:10-cv-01954-JVS-RNB, Dkt. 58 (C.D. Cal. Nov. 17, 2011).
EX2004	Order Regarding Cross Motions for Summary Judgment Regarding Infringement and Invalidity of '862 and '935 Patents – <i>HID Global Corp. v. Farpointe Data, Inc.</i> , No. 8:10-cv-01954-JVS-RNB, Dkt. 300 (C.D. Cal. Apr. 13, 2012).
EX2005	Plaintiffs' Opening Claim Construction Brief – <i>HID Global Corp. v. Farpointe Data, Inc.</i> , No. 8:10-cv-01954-JVS-RNB, Dkt. 29 (C.D. Cal. Sep. 30, 2011).
EX2006	Plaintiffs' Reply Claim Construction Brief – <i>HID Global Corp. v. Farpointe Data, Inc.</i> , No. 8:10-cv-01954-JVS-RNB, Dkt. 41 (C.D. Cal. Oct. 28, 2011).
EX2007	Summons and Proof of Service – <i>HID Global Corp. v. WaveLynx Techns. Corp.</i> , No. 1:22-cv-00362-GBW, Dkt. 7 (D. Del. Mar. 28, 2022).

I, Stuart Lipoff, declare as follows:

I. INTRODUCTION AND ASSIGNMENT

1. I reside at 2877 Paradise Road Unit 205, Las Vegas, NV 89109.

2. I have been retained by ASSA ABLOY AB (“Patent Owner”) in connection with the above-captioned Petition for Inter Partes Review (“IPR”) of U.S. Patent No. 7,439,862 to Ralph W. Quan (“’862 Patent,” Ex. 1001). I understand that Petitioner Wavelynx Technologies, Corp. (“Petitioner”) filed the Petition seeking institution of four Grounds:

Ground 1	Obviousness over U.S. Patent Publication No. 2005/0204167 (“Conlin”), including Provisional Application No. 60/553,677 (“Conlin ’677”).	Claims 1-6, 14, 16-17, 19-20
Ground 2	Obviousness over Conlin (including Conlin ’677) in view of U.S. Patent No. 4,600,829 (“Walton”)	Claims 7, 9-11, 13, 22-24, 26
Ground 3	RFID Handbook in view of Davis Presentation	Claims 1-6, 14, 16-17, 19-20
Ground 4	RFID Handbook in view of Davis Presentation in further view of Walton	Claims 7, 9-11, 13, 22-24, 26

3. I have been asked by counsel for Patent Owner to offer opinions regarding particular issues raised by the Petition at to the challenged claims ’862 Patent in view of certain asserted references and Grounds. This declaration sets forth the opinions I have reached to date regarding these matters.

4. As discussed below, I understand this proceeding to be at an early stage, and reserve the right to offer additional opinions and testimony.

5. I am being compensated by Patent Owner at my standard hourly consulting rate for my time spent on this matter. My compensation is not contingent on the outcome of the IPR or on the substance of my opinions.

6. I have no financial interest in Petitioners or Patent Owner.

II. QUALIFICATIONS

7. As shown in my curriculum vitae (“CV”), a true and correct copy of which is attached hereto as EX2002, I am currently the president of IP Action Partners Inc. and have over 50 years of experience in a wide variety of technologies and industries relating to data communications, including data communications over wireless and cable systems networks.

8. I earned a B.S. degree in Electrical Engineering in 1968 from Lehigh University and a second B.S. degree in Engineering Physics in 1969, also from Lehigh University. I also earned a M.S. degree in Electrical Engineering from Northeastern University in 1974 and an MBA degree from Suffolk University in 1983.

9. I am currently the president of IP Action Partners Inc., which is a consulting practice serving the telecommunications, information technology, media, electronics, and e-business industries.

10. I hold a Federal Communications Commission (“FCC”) General Radiotele-phone License and a Certificate in Data Processing (“CDP”) from the

Association for Computing Machinery (“ACM”)-supported Institute for the Certification of Computing Professionals (“ICCP”), and I am a registered professional engineer (by examination) in the State of Nevada and the Commonwealth of Massachusetts.

11. I am a fellow of the IEEE Consumer Electronics, Communications, Computer, Circuits, and Vehicular Technology Groups. I am also a member of the IEEE Consumer Electronics Society National Board of Governors, and was the Boston Chapter Chairman of the IEEE Vehicular Technology Society.

12. I previously served as 1996-1997 President of the IEEE Consumer Electronics Society, have served as Chairman of the Society’s Technical Activities and Standards Committee, as VP of Publications for the Society, and as VP of Industry and Standards for the Society. I am currently serving as the Historian for the Society. I have also served as an Ibuka Award committee member.

13. I have also presented papers at many IEEE and other meetings. A listing of my publications is included as part of my CV, which is attached as EX2002. For example, in Fall 2000, I served as general program chair for the IEEE Vehicular Technology Conference on advanced wireless communications technology, and I have organized sessions at The International Conference on Consumer Electronics and was the 1984 program chairman.

14. I also conducted an eight-week IEEE sponsored short course on Fiber Optics System Design. In 1984, I was awarded IEEE's Centennial Medal and in 2000, I was awarded the IEEE's Millennium Medal.

15. As Vice President and Standards Group Chairman of the Association of Computer Users ("ACU"), I served as the ACU representative to the ANSI X3 Standards Group. For the FCC's Citizens advisory committee on Citizen's Band ("CB") radio ("PURAC"), I served as Chairman of the task group on user rule compliance. I have been elected to membership in the Society of Cable Television Engineers ("SCTE"), the ACM, and The Society of Motion Picture and Television Engineers ("SMPTE").

16. I also served as a member of the USA advisory board to the National Science Museum of Israel, presented a short course on international product development strategies as a faculty member of Technion Institute of Management in Israel, and served as a member of the board of directors of The Massachusetts Future Problem Solving Program.

17. I am a named inventor on seven United States patents and have several publications on data communications topics in Electronics Design, Microwaves, EDN, The Proceedings of the Frequency Control Symposium, Optical Spectra, and IEEE publications.

18. For 25 years, I worked for Arthur D. Little, Inc. (“ADL”), where I became Vice President and Director of Communications, Information Technology, and Electronics (“CIE”).

19. Prior to my time at ADL, I served as a Section Manager for Bell & Howell Communications Company for four years, and prior to that, as a Project Engineer for Motorola’s Communications Division for three years.

20. At ADL, I was responsible for the firm’s global CIE practice in laboratory-based contract engineering, product development, and technology based consulting. At both Bell & Howell and Motorola, I had project design responsibility for wireless communication and paging products.

21. During my 53 years in the practice of engineering research and product development, I have engaged in a number of projects that have provided me with relevant experience and expertise in a number of the foundation technologies and the industries within the scope of the ’862 Patent. These projects have included, for example, topics in: motor operated door controllers, wireless communications, wireless remote controls, access control security systems, data communications, and devices incorporating microprocessors.

22. I have worked on a number of security and alarm products. For the Philadelphia Police Department, I designed a wireless address alarm system that was also deployed by The White House Communications Agency. I have also specified

and managed aspects of the procurement of complex keypad based access control systems for use in secure areas of electric power utilities and industrial computer rooms.

23. Working with Cambridge Consultants Ltd (the UK subsidiary of the USA based Arthur D Little Inc), I consulted on several developments of Bluetooth related hardware and software stacks. This development was spun off to Cambridge Silicon Radio (CSR) to which I continued to provide consulting reports.

24. In my capacity as chairman of The IEEE Consumer Electronics Society Standards Committee, I followed the developments of both the IEEE 802.15 Bluetooth and IEEE 802.11 WiFi standards, as well as the IEEE Home Radio Frequency (HomeRF™) Working Group.

25. I have designed products and systems that incorporated microprocessors and microcomputers across multiple products and industry applications, including toys and games, industry controllers, motor controllers, and consumer products.

26. Additional information regarding my background, qualifications, publications, and presentations is provided in my CV, which is included as EX2002.

III. BACKGROUND OF ANALYSIS

27. In considering and forming my opinions, I have reviewed and considered the information and materials identified in this declaration, including the Petition, Dr. Tentzeris's declaration (EX1004), and the materials cited therein.

28. In reaching my opinions, I have relied upon my experience in the field and also considered the viewpoint of a person of ordinary skill in the art ("POSA," discussed below) at the time of the earliest claimed priority date of the '862 Patent, *i.e.*, 2004. As explained below, I am familiar with the level of a person of ordinary skill in the art regarding the technology at issue as of that time.

29. I am not an attorney and do not have formal training in the law regarding patents. This section presents my understanding of currently applicable legal principles which I have used in forming the opinions I provide. I have used my understanding of these legal principles, as I describe them in this section, to analyze the '862 Patent and Grounds 1-4.

30. As explained to me, a determination of patent validity over the prior art involves the following: First, the claim language must be construed to determine its scope and meaning. Second, the construed claim language must be compared with the asserted references to determine whether the claim is valid. I understand that every dependent claim includes the limitations of the claims upon which it depends.

Person of Ordinary Skill in the Art (“POSA”)

31. I understand that a person of ordinary skill in the art is a hypothetical person skilled in the art, not a judge, a layperson, a person skilled in the remote arts, or a genius in the art at hand. Relevant factors in determining the level of ordinary skill in the art include the educational level of the inventor and those who work in the field. Other considerations include various prior art approaches employed in the art, types of problems encountered in the art, the rapidity with which innovations are made, and the sophistication of the technology involved. Not all considerations may be present in every case, and the education level of inventors is not it-self conclusive. This person of ordinary skill is also a person of ordinary creativity, not an automaton.

32. Given the early stage of this proceeding, counsel has instructed me to tentatively apply the definition of POSA adopted by the Petition:

A person having ordinary skill in the art (“POSA”) at the time of the alleged invention would have had at least an undergraduate degree in electrical engineering, or equivalent education, and at least two years of work experience in the field of access control. More education can supplement practical experience and vice versa.

Petition at 4-5. Under this definition, I qualify as a POSA and would have qualified as a POSA as of the filing date of the earliest application to which the '862 Patent claims priority. I reserve the right to consider and provide a different definition for the POSA in connection with any subsequent opinions I offer in this matter.

Obviousness

33. I understand that a patent claim may be invalid because it was obvious in view of the prior art. Counsel has explained to me that the ultimate conclusion of whether a claim is obvious is a question of law based on the consideration of several underlying factual issues (which I have been informed are commonly known as the “Graham factors”), including: (1) the level of ordinary skill in the art that a POSA would have had at the time the claimed invention was made; (2) the scope and content of the prior art; (3) what difference, if any, existed between the claimed invention and the prior art; and (4) any secondary indications of obviousness or non-obviousness.

34. I understand that for a single reference or a combination of references to render the claimed invention obvious, a POSA at the time of the invention must have had motivation to arrive at the claimed invention by altering or combining the applied references and a reasonable expectation of success in doing so. I also understand that the obviousness analysis must avoid impermissibly applying hindsight when considering the prior art.

35. In determining obviousness, I further understand that evidence of objective indications of non-obviousness (also known as “secondary considerations”) is also considered and that this is to be done before any ultimate determination of obviousness is made. I have been advised that the following factors

may be considered as secondary considerations: (1) a long-felt and unmet need in the art for the invention; (2) failure of others to achieve the results of the invention; (3) commercial success of the invention; (4) copying of the invention by others in the field; (5) whether the invention was contrary to accepted wisdom of the prior art; (6) expression of disbelief or skepticism by those skilled in the art upon learning of the invention; (7) unexpected results; (8) praise of the invention by those in the field; and/or (9) commercial take-up or acquiescence (licensing).

36. I also understand that, in order for secondary considerations to be relevant to the issue of obviousness, a patentee must establish a clear connection or link (“nexus”) between such secondary considerations and the claimed invention. Stated one way, this means that the secondary consideration is sufficiently derived from merits of the claimed invention, rather than other factors. I understand that if the patentee comes forward with a showing of one or more secondary considerations and the required nexus, then the burden of coming forward with evidence in rebuttal shifts to the party challenging the patent. Additionally, a party asserting invalidity may come forward with evidence of the absence of such secondary considerations or nexus.

Inter Partes Review

37. As discussed, I have been informed by counsel and understand that Petitioner has filed a petition for the Board to institute Inter Partes Review of the

'862 Patent based on the specific obviousness arguments made in Grounds 1-4 as to the corresponding Challenged Claims. I understand that if instituted, Petitioner will bear a burden to show by a preponderance of the evidence that any claims are invalid. I further understand that to obtain institution, Petitioner must demonstrate a reasonable likelihood of prevailing on at least one of the challenged claims.

IV. BACKGROUND REGARDING THE '862 PATENT AND FIELD OF TECHNOLOGY

38. The '862 Patent generally relates to the fields of technology for providing access control. As the Davis Presentation makes clear, a wide variety of access control technologies were available to POSAs around the time of the invention, including (but certainly not limited to) contact smart cards, 13.56 MHz contactless smart cards, 125 kHz Prox cards, magnetic stripes, debit stripes, bar codes, optical stripes, and barium ferrite (magnetic technology). EX1001 at 6.

39. The '862 Patent focuses on integrating multiple reader antennas operating at different frequencies into a single RFID reader and resolving particular interference problems posed by doing so.

40. The specification explains that “[c]losely positioning the reader antennas 34, 38 within the reader housing 54 clearly reduces the size requirements of the reader housing,” but that adopting such positions “without regard to their specific arrangement can cause interference between the reader antennas 34, 38

which can correspondingly diminish 65 the communication range.” EX1001 at 10:59-65. It further explains:

When two antenna coils are closely positioned with respect to one another within an array of multiple antenna coils, small capacitances termed “parasitic” or “stray” capacitances are also created between the antenna coils. The parasitic or stray capacitances of a given antenna coil in combination with the inductance of that antenna coil creates a “self resonance” effect, which, if unaccounted for in the antenna coil design, significantly reduces the strength of the magnetic field emanating from either antenna coil, thereby significantly reducing the communication range of either antenna coil.

Id. at 11:5-15.

41. The independent claims reflect this focus on particular antenna configurations:

Claim 1	Requires that “the first and second antennas are oriented along axes that are substantially parallel to one another.”
Claim 9	Requires that “said first and second antennas are arranged in an opposing magnetic flux arrangement.”
Claim 14	Requires that “the first and second antennas are oriented along axes that are substantially parallel to one another” and “a signal generator coupled with said first and second reader antennas.”
Claim 17	Requires that “the first and second antennas are arranged in at least a partially overlapping arrangement along proximate adjacent planes” and “receiver electronics coupled with said first and second reader antennas.”

Claim 20	Requires "loop antenna[s]" arranged such that "a first plane defined by the first area is substantially orthogonal to a direction of magnetic flux created through the first antenna, wherein a second plane defined by the second area is substantially orthogonal to a direction of magnetic flux created through the second antenna" and that "said first and second loops are arranged relative to one another such that a portion of the first area in the first plane overlaps a portion of the second area in the second plane."
Claim 24	Requires "loop antenna[s]" arranged such that "first and second loops are arranged in an opposing magnetic flux arrangement where the direction of magnetic flux created through the first loop is substantially parallel but opposite to the direction of magnetic flux created through the second loop."

V. OPINIONS REGARDING THE ASSERTED GROUNDS

42. Given the early stage of this proceeding, counsel for Patent Owner has asked for my opinion on a set of discrete issues relating to the Grounds set forth in the Petition. Should the Petition be instituted, I reserve the right to provide further opinions addressing all Challenged Claims and conducting a full analysis of all claim limitations, as well as offer opinions relating to secondary considerations.

A. Grounds 1 and 2 – Conlin Does Not Disclose How Signal Generation Occurs

43. Counsel for Patent Owner asked me to examine Conlin and Conlin '677 to determine whether a POSA would understand whether and how signal generation occurred in the "update portion" and "base portion" embodiment relied upon by the Petition for Grounds 1 and 2. In particular, I was asked to ascertain whether a POSA

would understand Conlin and Conlin '677 to disclose “an integral reader capable itself of **generating exciter signals** and reading transponder signals.”

44. At the outset, it is important to note that radio frequency systems at the time of the invention did not necessarily contain “an integral reader capable itself of generating exciter signals and reading transponder signals.” Radio frequency systems historically have been implemented in a wide variety of configurations, including configurations that separate a signal-generating components from other reader components. From the court’s description, prior litigation involving the ’862 Patent (the “*Farpointe* Litigation”), involved a few examples of such distributed systems. EX2004 at 39-41 (discussing a “Dynasys Device” that “is not capable on its own of generating an excitation signal or reading transponders” and a “MultiProx product” whose “reader component functions only when used in conjunction with a physically separate controller device in separate housing, connected with a coaxial cable”). Thus, a POSA would not and could not assume that any given radio frequency system used “an integral reader capable itself of **generating exciter signals** and reading transponder signals,” but would examine the system to determine how it was configured.

45. Looking to Conlin itself, a POSA would understand that Conlin discloses various retrofit upgrades to existing installations to support newly introduced access control devices while continuing backward compatibility to older

existing access control devices. Nothing disclosed in Conlin suggests a need to pay attention to any particular physical orientation of radio frequency antennae. Furthermore, the examples disclosed in Conlin do not reveal or suggest a teaching of a single consistent physical layout of orientation for radio frequency antennae.

46. Moreover, looking to Conlin itself, a POSA would understand that the embodiment relied upon by the Petition—the “modular access control device 600” shown by Conlin’s Fig. 6 and discussed in connection with that figure, *see* Petition at 15-17—is not directed specifically to radio-frequency devices. This embodiment is a generalized example that Conlin teaches could be applied to a variety of technologies, particularly “infrared,” “keypad, LCD, USB, CAN and/or TCPIP connectivity interface electronics.” EX1006 at [0046] (introducing these as “[s]everal possible structure and functional variations”). Only after repeatedly mentioning these technologies does Conlin state, almost as an afterthought, that “[i]n addition . . . it is also possible to include antennas, tuning networks, and appropriate RF reader electronics for other frequency reader systems.” *Id.*

47. Obviously, a POSA would understand that signal generation and transmission varies greatly across these differing technologies in a manner that creates “structur[al] and functional variations,” as Conlin itself indicates. *Id.* As an example, Conlin ’677 discloses the modular reader might include both infrared communications means as well as RF communications means. However only the

RF communications means are associated with antennas. So for this generalized disclosure, Conlin commensurately uses generic language throughout to describe the basic structure of the “modular access control device 600,” but does not discuss the particular structures and functions that should be implemented when using any one technology.

48. Conlin, for example, explains that the “base portion 610” and “update portion 620” are provided with “an electrical connector,” but does not specifically describe what that “electrical connector” entails for any given technology. EX1006 at [0045]-[0046]. Conlin also generally states that “[i]n some cases, update module 620 includes a processor and computer readable medium, while in other cases it is limited to a selector contact,” but does not describe which “case” would be advantageous for particular technologies. *Id.* at [0046].

49. Conlin ’677’s disclosure is similarly generic. *See, e.g.*, EX1007 at 6 (again describing “several possible structural and functional variations”). Although it describes “one embodiment” in which “the system includes functionality at both 125 KHz and 13.56 MHz,” the additional description does not relate to **signal generation** for (or communication at) those frequencies. *Id.* at 7-8. It describes a “microcontroller in the base assembly” “**read[ing]** the value on an analog to digital converter channel to determine what type of cover” has been mounted to it. *Id.*

50. I have also looked generally at Conlin and Conlin '677 and identified only one instance in which either reference discusses **signal generation**. Conlin describes “access control device 140 send[ing] an electrical signal to operate the associated actuator.” *See* EX1006 at [0028]. This refers to a signal that implements access (e.g., a signal to lock or unlock a door)—it does not relate to signal generation by the “base portion” or “update portion” for enabling wireless communication with a transponder.

51. Thus, in my opinion, a POSA would not understand Conlin or Conlin '677 to disclose whether or how signal generation occurs in the embodiment relied upon by the Petition for Grounds 1 and 2. To the extent the Challenged Claims require “an integral reader capable itself of **generating exciter signals** and reading transponder signals,”¹ in my opinion, a POSA would not find the claimed inventions obvious in light of Grounds 1 or 2.

B. Grounds 1 and 2 – Conlin Does Not Teach Configurations for Multiple Reader Antennas

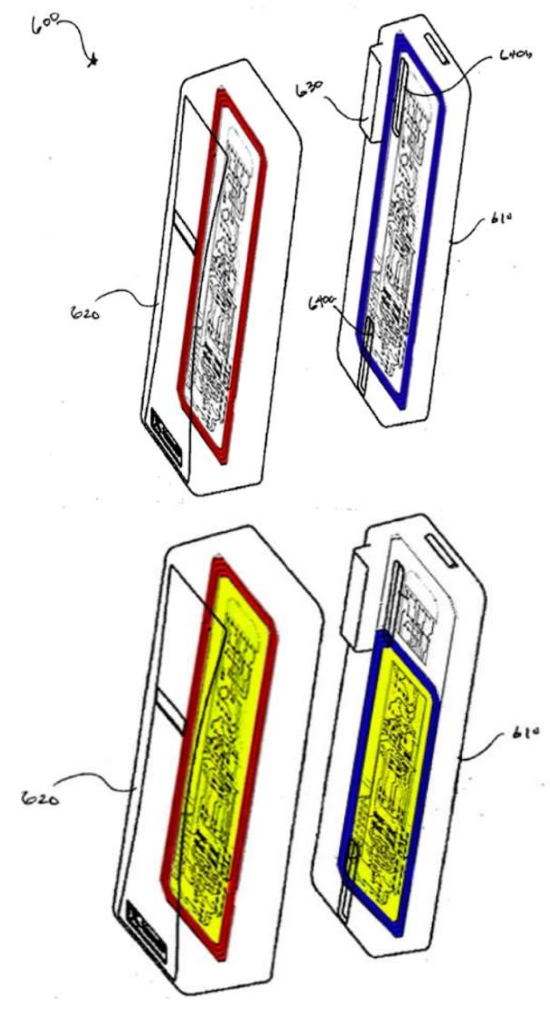
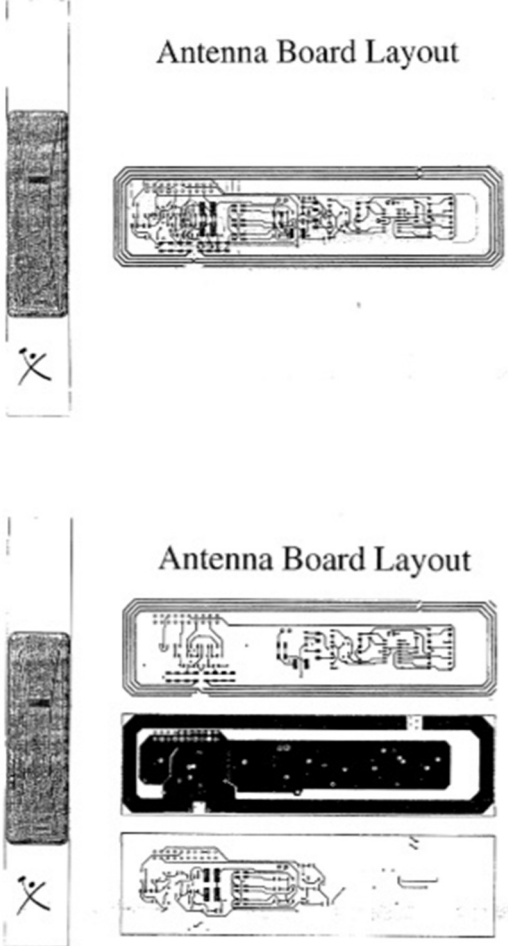
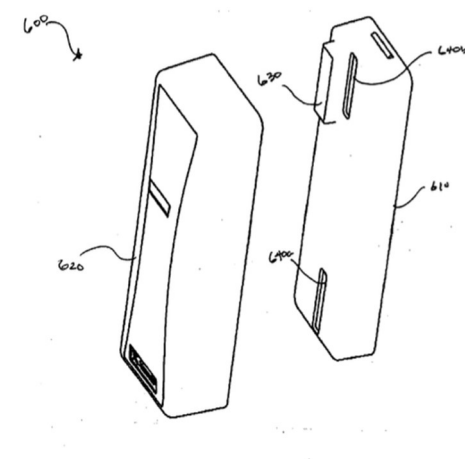
52. Counsel for Patent Owner asked me to examine Conlin and Conlin '677 to determine whether a POSA would understand them to disclose any configurations

¹ I understand that the *Farpointe* Court adopted this interpretation of “RFID reader.” EX2004.

for multiple reader antennas, including those shown in the Petition's annotated figures. *See* Petition at 30, 33, 45.

53. From my review, there are no disclosures in either Conlin or Conlin '677 that describe any configurations for arranging multiple reader antennas, nor any that identify which reader antenna configurations are advantageous. In particular, **the Conlin references lack any teachings regarding how antennas in the “base portion” and “update portion” should be arranged relative to each other.** As discussed above, *supra* Section V.B, the Conlin references' disclosures regarding this embodiment relied upon by the Petition are generic, and do not provide any teachings regarding how a POSA could (or should) implement multiple radio-frequency antennas. Conlin, for example, only states that the embodiment could “include antennas, tuning networks, and appropriate RF reader electronics.” EX1006 at [0046].

54. The Petition and Dr. Tentzeris appear to argue that a POSA would deem the claimed reader antenna configurations disclosed by virtue of Conlin's Figure 6 and select “antenna boards” from Conlin '677, which they would then combine together into a hypothetical device that is not described or shown in either reference:

Petition (at 30, 33, 45)	Conlin '677 (EX1007 at 43-44)	Conlin (EX1006 FIG. 6)
 The Petition drawings show two perspective views of a rectangular device. The top view shows a red rectangular frame (620) on the front face and a blue rectangular frame (610) on the back face. The bottom view shows a yellow rectangular frame (620) on the front face and a blue rectangular frame (610) on the back face. Reference numerals 600, 630, 640, and 610 are used to label various parts of the device.	Antenna Board Layout  The Conlin '677 drawings show two perspective views of a rectangular device, similar to the Petition drawings. The top view shows a red rectangular frame (620) on the front face and a blue rectangular frame (610) on the back face. The bottom view shows a yellow rectangular frame (620) on the front face and a blue rectangular frame (610) on the back face. Reference numerals 600, 630, 640, and 610 are used to label various parts of the device.	 FIG. 6 The Conlin (EX1006 FIG. 6) drawing shows two perspective views of a rectangular device. The top view shows a red rectangular frame (620) on the front face and a blue rectangular frame (610) on the back face. The bottom view shows a yellow rectangular frame (620) on the front face and a blue rectangular frame (610) on the back face. Reference numerals 600, 630, 640, and 610 are used to label various parts of the device.

I disagree that a POSA would understand these devices—particularly the purportedly multi-frequency antenna configurations shown in Petitioner’s picture—to be disclosed by Conlin and/or Conlin ’677.

55. *First*, these devices are simply not shown or described in the Conlin references. A POSA would recognize that there are not any figures in Conlin nor Conlin ’677 showing antenna boards placed into the “update” portion or the “base” portion, nor any passages discussing how the antenna boards should be oriented in either portion. To arrive at the devices shown, one would need to assume both the relative scale of the antenna boards (*i.e.*, that they span largely the entire “update” and “base” portions) and their three-dimensional orientation within each of the “update” and “base” portion (*e.g.*, even if the boards would be placed “upright” within each housing, that they would both be placed at exactly the angles shown). Neither the Petition nor Dr. Tentzeris identify any basis for these assumptions. *See, e.g.*, EX1004 ¶ 111.

56. *Second*, as Dr. Tentzeris acknowledges, Conlin ’677’s depictions of antenna boards are so unclear that “the ’677 application does not indicate exactly which frequency” the antenna boards shown are for. EX1004 ¶92. Put differently, a POSA would understand that neither Conlin nor Conlin ’677 disclose any usable examples of circuit boards with reader antennas. A POSA would, as Dr. Tentzeris

indicates, be forced to design their own antennas and circuit boards for use in each of the “base” and “update” portions. *See id.* ¶93.

57. I disagree with Dr. Tentzeris that this task would be “routine customization” to a POSA. Designing and customizing circuit boards to have a single radio frequency antenna—which provides a relatively higher-energy transmission—is an intricate task that requires taking into account how current runs through the board and how the various features on the board interact with each other and signaling from the antenna. Customizing two boards with two different antennas would at least double the experimental effort required, and then customizing them to operate within close proximity to each other would multiply that effort further. Notably, the POSA according to Dr. Tentzeris merely has “at least an undergraduate degree in electrical engineering, or equivalent education, and at least two years of work experience in the field of access control.” EX1004 ¶31. In my experience, such individuals would not find customizing single-antenna circuit boards to be a “routine” task, much less the more complicated task actually before them here.

58. *Third*, I disagree that this design task would provide a POSA with motivation to make the hypothetical devices shown in the Petition, such as by “setting the antenna on the disclosed antenna board.” EX1004 ¶106. Just like the antennas themselves, Conlin and Conlin ’677 do not describe the circuitry on the

antenna board—it would be counter-productive to try to guess at, and then try to copy, the circuitry configuration used from Conlin '677's poor-quality images.

59. Petitioner and Dr. Tentzeris also incorrectly insert the same exemplary “antenna board” from EX1007 at 43 into both the “update portion” and “base portion.” Petition at 28-30 (showing this antenna board). Conlin '677 provides this antenna board when discussing “Snap-on covers containing ‘Antenna Board.’” EX1007 at 42. As such, the exemplary board relates only to the “**update** portion” of a reader, and not the “base portion.” A POSA therefore would not understand Petitioner's hypothetical devices to be disclosed by Conlin and Conlin '667.

60. Even if a POSA did use the same antenna board for both portions, that would result in a *single*-frequency device. By the laws of physics, a 125 kHz loop antenna designed to work at comparable distances as a 13.56 MHz loop antenna should look dramatically different—the 125 kHz antenna would need to have a comparatively larger diameter and more turns of antenna wire to achieve a comparably sized electromagnetic field at its different frequency. A POSA, therefore, would not understand Petitioner's hypothetical device shown at pages 30 and 33 of the Petition—which shows antenna loops of the same size, shape, and number of turns—to reflect a first antenna operating at 125 kHz and a second antenna operating at 13.56 MHz. The same is true for the hypothetical device shown at page 45 of the Petition—reducing a three-loop coil's size would somewhat

increase that antenna's frequency, but the continuing similarities to the other antenna (e.g., same number of antenna loops and shape) would suggest that they operate at closer frequencies, not at starkly different frequencies, such as 125 kHz and 13.56 MHz. Thus, for this reason as well, a POSA would not understand Conlin and Conlin '667 to disclose "multi-frequency" devices of the hypothetical configuration shown. Petitioner reaches these hypothetical devices from the Conlin references only by starting with the claim language and working backwards.

61. Thus, in my opinion, a POSA would not understand Conlin or Conlin '677 to disclose any configurations for multiple reader antennas. Because each independent claim requires a particular configuration for its "first" and "second" reader antennas,² *supra* Section IV, in my opinion a POSA would not find the claimed inventions obvious in light of Grounds 1 or 2.

C. Grounds 3 and 4 - RFID Handbook and Davis Presentation Do Not Disclose How Signal Generation Occurs

62. Counsel for Patent Owner asked me to examine the RFID Handbook and the Davis Presentation to determine whether they teach a POSA how signal generation occurs in the selected easy-key System and MIFARE readers relied upon

² I reserve the right to provide additional arguments regarding the particular configurations claimed should the Petition be instituted.

by the Petition for Grounds 3 and 4. In particular, I was asked to ascertain whether a POSA would understand the RFID Handbook and the Davis Presentation to disclose that the selected easy-key System and MIFARE readers are each “an integral reader capable itself of **generating exciter signals** and reading transponder signals.”

63. From my review, the Davis Presentation does not mention either the easy-key System or MIFARE readers, and the RFID Handbook is silent regarding the generation of exciter signals for these particular devices. It is worth noting that the RFID Handbook does not purport to provide a holistic description of either reader, and neither appears to be meaningfully discussed in the text of the RFID Handbook excerpts provided in EX1008. The statements relied upon by the Petition and Dr. Tentzeris are predominantly from the short descriptions accompanying the figures.

64. The RFID Handbook describes the easy-key System as a “[r]eader for inductively coupled transponder in the frequency range < 135 kHz with integral antenna,” and depicts it without the remaining system components. EX1008 at 9, This incomplete description would not be sufficient to inform a POSA how the easy-key System generates exciter signals. The same is true for the RFID Handbook’s description of the MIFARE reader. The RFID Handbook describes MIFARE as a “[r]eader with integral antenna and matching circuit” that has “two functional

blocks, HF interface and control system,” but does not go deeper into how signal generation occurs for MIFARE or depict it with its accompanying system. EX1008 at 80, 92.

65. Thus, in my opinion, a POSA would not understand the RFID Handbook and the Davis Presentation to disclose how signal generation occurs in the readers relied upon by the Petition for Grounds 3 and 4. To the extent the Challenged Claims require “an integral reader capable itself of **generating exciter signals** and reading transponder signals,” in my opinion a POSA would not find the claimed inventions obvious in light of Grounds 3 or 4.

D. Grounds 3 and 4 – The RFID Handbook and the Davis Presentation Do Not Teach Configurations for Multiple Reader Antennas

66. Counsel for Patent Owner asked me to examine the RFID Handbook and the Davis Presentation to determine whether a POSA would understand them to disclose any configurations for multiple reader antennas, including those shown in the Petition’s annotated figures. *See* Petition at 68, 70, 77, 79-80, 83.

67. The Davis Presentation slide deck provides a high-level discussion of “Migration Strategies” across a variety of technologies. Apart from 13.56 MHz and 125 kHz Prox technologies, the Davis Presentation specifically notes that its multi-technology card could involve “contact smart cards,” “magnetic strips,” “debit stripe,” bar code,” “optical stripe,” “barium ferrite (magnetic technology)” or others

(“etc.”). EX1011 at 6. The Davis Presentation uses generic language throughout to describe possible functionalities of multi-technology readers, but it does not show or describe any exemplary multi-technology readers, nor describe the particular structures that should be implemented to achieve the corresponding functions when using any one technology. As an example, Davis Presentation does not specify whether its contemplated multi-technology readers use the same antenna at different frequencies, different antennas at the same frequency that carry different data, the same antennas at the same frequency but with different orientations, or some other configuration.

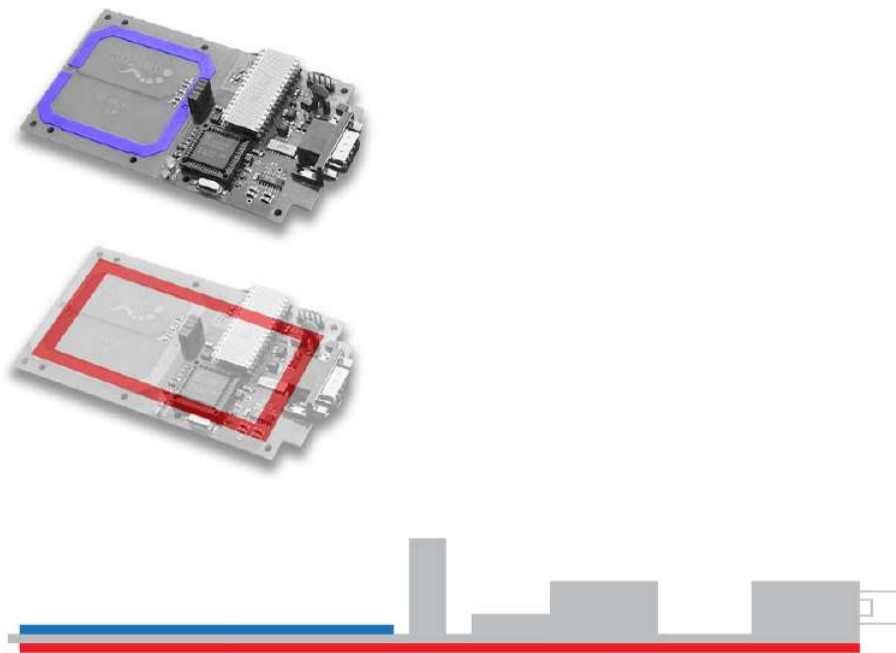
68. Like the other references offered by Petitioner, there is no teaching of the need to design specific antenna orientations, much less orientations to achieve the objective of the ’862 Patent—avoiding deleterious interactions between antennas packaged compactly in an integral housing operating at two different frequencies by orienting them in a deliberate and careful way.

69. Neither the Petition nor Dr. Tentzeris identify any instance where the RFID Handbook describes multi-technology or multi-frequency readers. I likewise have not identified any locations where the RFID Handbook provides disclosures relating to such devices.

70. Thus, from my review, there are no disclosures in either the Davis Presentation or the RFID Handbook that describe any configurations for arranging

multiple reader antennas, nor any disclosures that teach which reader antenna configurations may be advantageous in a multi-frequency device. Likewise, neither reference shows (or otherwise identifies) any exemplary structure for any multi-technology reader.

71. The Petition and Dr. Tentzeris appear to argue that a POSA would deem the claimed reader antenna configurations disclosed by virtue of the RFID Handbook's Figure 11.3 (showing the MIFARE device), over which they superimpose a purported low-frequency antenna (supposedly from easy-key System) to create a hypothetical device nowhere described or shown in either reference:



See, e.g., Petition at 68-70. I disagree that a POSA would understand this device—particularly the purportedly multi-frequency antenna configuration shown—to be disclosed by the RFID Handbook and/or the Davis Presentation.

72. *First*, this device is simply not shown or described. As discussed above, a POSA would recognize that there are not any figures in the RFID Handbook nor the Davis Presentation showing multiple reader antennas configured into a single reader, nor any passages discussing how reader antennas should be oriented in such a device.

73. *Second*, in my opinion, the RFID Handbook’s disclosures would not lead a POSA towards this hypothetical antenna configuration. The reference describes both the easy-key System and MIFARE readers as using “integral antenna[s],” EX1008 at 9, 92, *i.e.*, antennas that have been incorporated into the circuit board. A POSA would understand that such integral antennas and their placement must be carefully designed to avoid interference with the electronics of the circuit board.

74. A POSA therefore would not consider the “integral” antennas of the easy-key System and MIFARE readers to be fungible and readily combinable in the manner that Petitioner and Dr. Tentzeris assume. Instead, a POSA would understand that adding an additional radio-frequency antenna to the MIFARE reader would compound the interference issues already at play, and may demand revising the

placement, shape, and orientation of the MIFARE reader's existing 13.56 MHz antenna, its circuitry components, and/or a low-frequency antenna taken from the easy-key System.

75. Dr. Tentzeris acknowledges that at least some changes to the circuit board components would be necessary, such as adding “a signal generator” and “other conventional receiver electronics,” as well as connections between those components and “the microcontroller and power source already incorporated on the MIFARE reader board.” EX1004 ¶235. But neither the Petition nor Dr. Tentzeris consider how those changes (*e.g.*, the additional current running through) and the hypothetical configuration show would affect either the operability of MIFARE's existing 13.56 MHz antenna or how the additional low-frequency antenna may affect the existing circuit board components. *See, e.g., id.* ¶¶235-38.

76. A POSA therefore would not understand Petitioner's hypothetical device to be disclosed by the Davis Presentation and the RFID Handbook, much less a multi-frequency device of the hypothetical configuration shown.

77. Thus, in my opinion, a POSA would not understand the RFID Handbook and the Davis Presentation to disclose any configurations for multiple reader antennas. Because each independent claim requires a particular configuration for its “first” and “second” reader antennas, *supra* Section IV, in my opinion a POSA would not find the claimed inventions obvious in light of Grounds 3 or 4.

E. Grounds 2 and 4 – Walton Does Not Teach Configurations for Multiple Reader Antennas, and a POSA Would Not Be Motivated to Combine it with the Other Asserted References to Make the Claimed Inventions

78. Counsel for Patent Owner asked me to examine whether Walton discloses the claimed antenna configurations, or provides any motivation to make them when combined with (1) Conlin (including Conlin '677); or (2) the Davis Presentation and the RFID Handbook, as in Grounds 2 and 4.

79. In my opinion, Walton does not disclose the claimed antenna configurations. Each challenged independent claim requires a “first” and “second *reader* antenna” that enables communication with a “first” and “second transponder,” respectively. Walton teaches something fundamentally different: a dedicated transmitting antenna (“coil antenna 20” for “radiat[ing] an electromagnetic field”) and a dedicated receiving antenna (“reader antenna coil 24” that “is adapted to receive modulated radio frequency signals from the identifier section 14”) for communication with the same transponder (“identifier section 14”). EX1023 at 3:57-59, 4:9-13.

80. In my opinion, Walton also would not provide a POSA with any motivation to make the claimed antenna configurations. Walton does not teach using two reader antennas or two transponders, much less how multiple reader antennas should be configured when used together in the same reader for communicating with

two transponders. There is simply nothing in Walton to suggest that its teachings would be applicable to another context.

81. If anything, a POSA would be discouraged from applying Walton's teachings to a system for communicating with multiple transponders. Unlike Petitioner's hypothetical devices based on Conlin and Conlin '677 (Ground 1) and the Davis Presentation and the RFID Handbook (Ground 3), which purport to use a single antenna for communicating with a given transponder, Walton uses two antennas (separate transmitting and receiving antennas) to communicate with a given transponder. Implementing Walton's teachings would therefore require doubling the antennas in these devices, and thereby compound the interference problems. Confusingly, Dr. Tentzeris acknowledges that implementing Walton would involve using two antennas for each transponder, and that this would create additional interactions between the antennas' magnetic fields. EX1004 ¶184 (“[A] POSITA would have known that by placing *two or more antennas within each* of an update portion or a base portion, the magnetic fields of each antenna *may interact* with the other antenna”) (emphasis added). But he offers no explanation as to how a POSA could resolve this compounded problem, or how his fabricated device would be reconcilable with the claims.

82. Thus, in my opinion, a POSA would not understand Walton to disclose any configurations for multiple **reader** antennas, and would not provide motivation

for a POSA to make the claimed antenna configurations. Therefore, for this reason (in addition to those provided above in Sections V.A through V.D), in my opinion a POSA would not find the claimed inventions obvious in light of Grounds 2 or 4.

VI. CONCLUSION

83. For the reasons provided above, in my opinion, a POSA would not find any of the challenged claims obvious in light of the references asserted in Grounds 1, 2, 3, or 4.

84. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the results of these proceedings.

Executed on June 11, 2023 in Las Vegas, Nevada.



Stuart Lipoff