

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD.,

Petitioner,

v.

TELCOM VENTURES LLC.,

Patent Owner.

U.S. Patent No. 9,832,708

“Mobile Device Mode Enablement Responsive to A Proximity Criterion”

DECLARATION OF KEVIN ALMEROOTH, PH.D., IN SUPPORT OF
PETITION FOR *INTER PARTES* REVIEW OF
U.S. PATENT NO. 9,832,708

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LIST OF EXHIBITS

Exhibit	Description
EX1001	U.S. Patent No. 9,832,708 (“’708 patent”)
EX1002	Declaration of Dr. Kevin Almeroth, Ph.D.
EX1003	Exhibit Intentionally Omitted
EX1004	Curriculum Vitae of Dr. Kevin Almeroth, Including List of Recent Expert Witness Engagements of Dr. Kevin Almeroth
EX1005	Prosecution History for U.S. Pat. No. 9,462,411
EX1006	Prosecution History for U.S. Pat. No. 9,832,708
EX1007	Prosecution History for U.S. Pat. No. 10,219,199
EX1008	Prosecution History for U.S. Pat. No. 10,660,015
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EX1010	Prosecution History for U.S. Pat. No. 11,304,118
EX1011	Prosecution History for U.S. Pat. No. 11,770,756
EX1012	Prosecution History for U.S. Pat. Appl. Pub. No. 2023/0403631
EX1013	Prosecution History for U.S. Pat. No. 11,924,743
EX1014	Prosecution History for U.S. Pat. No. 11,937,172
EX1015	Prosecution History for U.S. Pat. No. 12,028,793
EX1016	Patent Owner’s District Court Infringement Chart for ’708 Patent
EX1017	U.S. Pat. Pub. No. 2009/0069049 (“Jain”)
EX1018	U.S. Pat. Pub. No. 2006/0165060 (“Dua”)
EX1019	U.S. Pat. Pub. No. 2010/0082481
EX1020	U.S. Pub. No. 2010/0082490
EX1021	U.S. Pub. No. 2009/0307140
EX1022	“Product Overview”, Vivotech (Jun. 27, 2007), https://web.archive.org/web/20070627155330/ http://www.vivotech.com/products/vivo_pay/index.asp

Exhibit	Description
EX1023	“Kyocera Wireless Mobile Phones Excel in Cellular South WirelessWallet Consumer Trial”, Kyocera (Oct. 18, 2007), https://americas.kyocera.com/press-releases/press-releases_201503201874.htm
EX1024	U.S. Pub. No. 2005/0137977
EX1025	U.S. Pub. No. 2001/0026632
EX1026	NTT DoCoMo FOMA F900iC Basic Manual
EX1027	Jain et al., “An Identity-Authentication System” (Sep. 1997)
EX1028	U.S. Patent No. 6,957,339
EX1029	Jin et al., “Biohashing: two factor authentication featuring fingerprint data and tokenised random number” (Apr. 27, 2004)
EX1030	Bhargav-Spantzel, “Privacy Preserving Multi-Factor Authentication with Biometrics” (2006)
EX1031	“About NFC Technology”, NFC Forum (Jun. 15, 2006), https://web.archive.org/web/20060615050709/http://www.nfc-forum.org/aboutnfc/about_nfc_technology/
EX1032	Erik Rolf & Viktor Nilsson, “Near Field Communication (NFC) for Mobile Phones” (Aug. 2006)
EX1033	Wall Street Journal, Vivotech (Aug. 12, 2005), https://web.archive.org/web/20060915080521if_/http://www.vivotech.com:80/newsroom/coverage/Videos/Wall_Street_Journal/Wall_Street_Journal.wmv
EX1034	Near Field Communication - Interface and Protocol (NFCIP-1), Standard ECMA-340 (December 2002)
EX1035	NFC Forum News Conference, NFC Forum (June 5, 2006)
EX1036	Dean A. Gratton, “Developing Practical Wireless Applications”, Elsevier Digital Press (2007)
EX1037	Jacki Katzman, “NFC Forum Unveils Technology Architecture and Announces Initial Specifications and Mandatory Tag Format Support”, NFC Forum, at 3 (June 5, 2006)

Exhibit	Description
EX1038	Arumugam et al., “Consumer Electronics Application and Coverage Constraints Using Bluetooth and Proposed Bluetooth Evolution Technologies” (Aug. 2001)
EX1039	U.S. Pub. No. 2010/0082445
EX1040	Information Sciences Institute, RFC 793 Transmission Control Protocol (Sep. 1981), https://datatracker.ietf.org/doc/html/rfc793
EX1041	“Bluetooth Basics”, Bluetooth (Apr. 23, 2006), https://web.archive.org/web/20060423011921/http://www.bluetooth.com/Bluetooth/Learn/Basics/
EX1042	“iPhone Premieres This Friday Night at Apple Retail Stores”, Apple (Jun. 28, 2007), https://www.apple.com/newsroom/2007/06/28iPhone-Premieres-This-Friday-Night-at-Apple-Retail-Stores/
EX1043	“Review: Apple iPhone Bluetooth Headset”, Apple Insider (Jul. 30, 2007), https://appleinsider.com/articles/07/07/30/review_apple_iphone_bluetooth_headset
EX1044	“Eight Bluetooth Headsets Under the Microscope,” Treonauts (Aug. 12, 2005), https://blog.treonauts.com/2005/08/eight_bluetooth.html
EX1045	Near Field Communication - Interface and Protocol (NFCIP-1), Standard ECMA-340 (2 nd Edition, December 2004)

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Decl. of Dr. Kevin Almeroth

I, Dr. Kevin Almeroth, declare as follows:

I. Introduction

1. I have been retained by Quinn Emanuel Urquhart & Sullivan, LLP on behalf of the Petitioner Samsung Electronics Co., Ltd. (“Petitioner”) as an independent expert in this *inter partes* review (this “Proceeding”) before the Patent Trial and Appeal Board of the United States Patent and Trademark Office (the “Board”) to review claims 1-19 (“the challenged claims”) of U.S. Patent No. 9,832,708 (“the ’708 patent”). I have been asked by the Petitioner to assist in evaluating the claims and the disclosure of the ’708 patent.

A. Qualifications

2. EX1004 is a true and correct copy of my current CV, which describes my education, patents and publications, employment and research history, and professional activities and awards.

1. Educational Background

3. I hold three degrees from the Georgia Institute of Technology: (1) a Bachelor of Science degree in Information and Computer Science (with minors in Economics, Technical Communication, and American Literature) earned in June 1992; (2) a Master of Science degree in Computer Science (with specialization in Networking and Systems) earned in June 1994; and (3) a Doctor of Philosophy (Ph.D.) degree in Computer Science (Dissertation Title: Networking and System

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Support for the Efficient, Scalable Delivery of Services in Interactive Multimedia System, minor in Telecommunications Public Policy) earned in June 1997. I have taken a wide variety of courses as demonstrated by my minor. My undergraduate degree also included a number of courses more typical of a degree in electrical engineering, including digital logic, signal processing, and telecommunications theory.

2. Career

4. I am a Professor Emeritus in the Department of Computer Science at the University of California, Santa Barbara (UCSB). While active at UCSB, I held faculty appointments and was a founding member of the Computer Engineering (CE) Program, Media Arts and Technology (MAT) Program, and the Technology Management Program (TMP). I was the Associate Director of the Center for Information Technology and Society (CITS) from 1999 to 2012. I have been a faculty member at UCSB since July 1997.

5. One of the major concentrations of my research has been the delivery of multimedia content and data between computing devices, including various network architectures. In my research, I have studied large-scale content delivery systems, and the use of servers located in a variety of geographic locations to provide scalable delivery to hundreds or thousands of users simultaneously. I have also studied smaller-scale content delivery systems in which content is exchanged

between individual computers and portable devices. My work has emphasized the exchange of content more efficiently across computer networks, including the scalable delivery of content to many users, mobile computing, satellite networking, delivering content to mobile devices, and network support for data delivery in wireless networks.

6. In 1992, the initial focus of my research was on the provision of interactive functions (*e.g.*, VCR-style functions like pause, rewind, and fast-forward) for near video-on-demand systems in cable systems; in particular, how to aggregate requests for movies at a cable head-end and then how to satisfy a multitude of requests using one audio/video stream broadcast to multiple receivers simultaneously. This research has continually evolved and resulted in the development of techniques to scalably deliver on-demand content, including audio, video, web documents, and other types of data, through the Internet and over other types of networks, including over cable systems, broadband telephone lines, and satellite links.

7. An important component of my research has been investigating the challenges of communicating multimedia content, including video, between computers and across networks including the Internet. I have worked on a variety of research problems and used a number of systems that were developed to deliver multimedia content to users. One content-delivery method I have researched is the

one-to-many communication facility called “multicast,” first deployed as the Multicast Backbone, a virtual overlay network supporting one-to-many communication. Multicast is one technique that can be used on the Internet to provide streaming media support for complex applications like video-on-demand, distance learning, distributed collaboration, distributed games, and large-scale wireless communication. The delivery of media through multicast often involves using Internet infrastructure, devices and protocols, including protocols for routing and TCP/IP.

8. Starting in 1997, I worked on a project to integrate the streaming media capabilities of the Internet together with the interactivity of the web. I developed a project called the Interactive Multimedia Jukebox (IMJ). Users would visit a web page and select content to view. The content would then be scheduled on one of a number of channels, including delivery to students in Georgia Tech dorms delivered via the campus cable plant. The content of each channel was delivered using multicast communication.

9. More recently, I have also studied issues concerning how users choose content, especially when considering the price of that content. My research has examined how dynamic content pricing can be used to control system load. By raising prices when systems start to become overloaded (*i.e.*, when all available resources are fully utilized) and reducing prices when system capacity is readily

available, users' capacity to pay as well as their willingness can be used as factors in stabilizing the response time of a system. This capability is particularly useful in systems where content is downloaded or streamed on-demand to users.

10. Protecting networks, including their operation and content, has been an underlying theme of my research almost since the beginning of my research career. Starting in 2000, I have been involved in several projects that specifically address security, network protection, and firewalls. After significant background work, a team on which I was a member successfully submitted a \$4.3M grant proposal to the Army Research Office (ARO) at the Department of Defense to propose and develop a high-speed intrusion detection system. Key aspects of the system included associating streams of packets and analyzing them for viruses and other malware. Once the grant was awarded, we spent several years developing and meeting the milestones of the project. A number of my students worked on related projects and published papers on topics ranging from intrusion detection to developing advanced techniques to be incorporated into firewalls. I have also used firewalls, including their associated malware detection features, in developing techniques for the classroom to ensure that students are not distracted by online content.

11. Recent work ties some of the various threads of my past research together. I have investigated content delivery in online social networks and proposed reputation management systems in large-scale social networks and marketplaces. On

the content delivery side, I have looked at issues of caching and cache placement, especially when content being shared and the cache has geographical relevance. We were able to show that effective caching strategies can greatly improve performance and reduce deployment costs. Our work on reputation systems showed that reputations have economic value, and as such, creates a motivation to manipulate reputations. In response, we developed a variety of solutions to protect the integrity of reputations in online social networks. The techniques we developed for content delivery and reputation management were particularly relevant in peer-to-peer communication.

12. My involvement in the research community extends to leadership positions for several academic journals and conferences. I am the co-chair of the Steering Committee for the ACM Network and System Support for Digital Audio and Video (NOSSDAV) workshop and on the Steering Committees for the International Conference on Network Protocols (ICNP), ACM Sigcomm Workshop on Challenged Networks (CHANTS), and IEEE Global Internet (GI) Symposium. I have served or am serving on the Editorial Boards of IEEE/ACM Transactions on Networking, IEEE Transactions on Mobile Computing, IEEE Network, ACM Computers in Entertainment, AACE Journal of Interactive Learning Research (JILR), and ACM Computer Communications Review. I have co-chaired a number of conferences and workshops including the IEEE International Conference on

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Network Protocols (ICNP), IEEE Conference on Sensor, Mesh and Ad Hoc Communications and Networks (SECON), International Conference on Communication Systems and Networks (COMSNETS), IFIP/IEEE International Conference on Management of Multimedia Networks and Services (MMNS), the International Workshop On Wireless Network Measurement (WiNMee), ACM Sigcomm Workshop on Challenged Networks (CHANTS), the Network Group Communication (NGC) workshop, and the Global Internet Symposium, and I have served on the program committees for numerous conferences.

13. Furthermore, in the courses I taught at UCSB, a significant portion of my curriculum covered aspects of the Internet and network communication including the physical and data link layers of the Open System Interconnect (OSI) protocol stack, and standardized protocols for communicating across a variety of physical media such as cable systems, telephone lines, wireless, and high-speed Local Area Networks (LANs). The courses I have taught also cover most major topics in Internet communication, including data communication, multimedia encoding, and mobile application design. My research and courses have covered a range of physical infrastructures for delivering content over networks, including cable, Integrated Services Digital Network (ISDN), Ethernet, Asynchronous Transfer Mode (ATM), fiber, and Digital Subscriber Line (DSL). For a complete list of courses I have taught, see my curriculum vitae (EX1004).

14. I co-founded a technology company called Santa Barbara Labs that was working under a sub-contract from the U.S. Air Force to develop very accurate emulation systems for the military's next generation internetwork. Santa Barbara Labs' focus was in developing an emulation platform to test the performance characteristics of the network architecture in the variety of environments in which it was expected to operate, and, in particular, for network services including IPv6, multicast, Quality of Service (QoS), satellite-based communication, and security. Applications for this emulation program included communication of a variety of multimedia-based services, including video conferencing and video-on-demand.

15. In addition to having co-founded a technology company myself, I have worked for, consulted with, and collaborated with companies for nearly 30 years. These companies range from well-established companies to start-ups and include IBM, Hitachi Telecom, Turner Broadcasting System (TBS), Bell South, Digital Fountain, RealNetworks, Intel Research, Cisco Systems, and Lockheed Martin.

16. Additional details about my employment history, fields of expertise, and publications are further included in my CV (EX1004).

3. Other Relevant Qualifications

17. I am a Member of the Association of Computing Machinery (ACM) and a Fellow of the Institute of Electrical and Electronics Engineers (IEEE).

18. As an important component of my research program, I have been involved in the development of academic research into available technology in the market place. One aspect of this work is my involvement in the Internet Engineering Task Force (IETF). The IETF is a large and open international community of network designers, operators, vendors, and researchers concerned with the evolution of the Internet architecture and the smooth operation of the Internet. I have been involved in various IETF groups including many content delivery-related working groups like the Audio Video Transport (AVT) group, the MBone Deployment (MBONED) group, Source Specific Multicast (SSM) group, the Inter-Domain Multicast Routing (IDMR) group, the Reliable Multicast Transport (RMT) group, the Protocol Independent Multicast (PIM) group, etc. I have also served as a member of the Multicast Directorate (MADDOGS), which oversaw the standardization of all things related to multicast in the IETF. Finally, I was the Chair of the Internet2 Multicast Working Group for seven years.

19. I am an author or co-author of approximately 200 technical papers, published software systems, IETF Internet Drafts and IETF Request for Comments (RFCs). A complete list of my publications is in my CV (EX1004).

20. I have been awarded numerous teaching awards, including Computer Science Outstanding Faculty Member (1997-98, 1998-99, 1999-2000, 2004-06,

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UCSB Spotlight on Excellence Award (2000-01), and UCSB Academic Senate Distinguished Teaching Award (2006-07).

B. Previous Expert Witness Testimony

21. The list of recent matters in which I have testified can be found at the end of EX1004.

C. Preparation for this Declaration

22. In forming my opinions, I have considered the '708 patent specification, including the Abstract, the figures, and the claim language itself, as would have been understood by a person of ordinary skill in the art as of the priority date of the '708 patent (a "POSITA"). My understanding of "POSITA" and "priority date" are set forth below. I have also reviewed the file history of the '708 patent, the Exhibits that are listed in the list of Exhibits, and any other material cited in this declaration.

23. In forming my opinions, I have relied on my personal knowledge and professional experience, and on the documents and information referenced in this declaration.

24. This declaration explains, based on facts and information available to me to date, the subject matter and opinions related to this Proceeding. As such, I am prepared to provide expert testimony regarding opinions formed resulting from my

analysis of the issues considered in this declaration if asked about those issues by the Board or by the private parties' attorneys.

25. Additionally, I may discuss my own work, teachings, and knowledge of the state of the art in the relevant time period. I may rely on handbooks, textbooks, technical literature, and the like to demonstrate the state of the art in the relevant period and the evolution of relevant technologies.

26. Throughout this declaration, I refer to specific pages of the '708 patent and other documents. The citations are intended to be exemplary and are not intended to convey that the citations are the only source of evidence to support the propositions for which they are cited.

27. I am being compensated for my time spent on this matter at a rate of \$850 per hour, and my compensation is in no way contingent upon the outcome of this matter or on the opinions I offer. All of the opinions expressed in this declaration are my own.

II. Legal Understanding

28. In this section, I describe my understanding of certain legal standards that I have relied upon in forming my opinions set forth in this declaration. I have been informed of these legal standards by Petitioner's attorneys. I am not an attorney and I have not thoroughly researched the law on patent invalidity. I am relying only on instructions from Petitioner's attorneys for these legal standards.

A. Claim Construction

29. I have been instructed by counsel that claim construction is a matter of law for the arbiter of law to decide. I understand that in an *inter partes* review, claims are construed using the same claim construction standard that would be used to construe the claim in a civil action.

30. I understand that a patent may include two types of claims, independent claims and dependent claims. An independent claim stands alone and includes only the limitations it recites. A dependent claim can depend on an independent claim or another dependent claim. I understand that a dependent claim includes all the limitations that it recites in addition to the limitations recited in the claim from which it depends.

B. Anticipation

31. I understand that a patent claim is anticipated when a single piece of prior art describes every element of the claimed invention, either expressly or inherently, arranged in the same way as in the claim. For inherent anticipation to be found, it is required that the missing descriptive material is necessarily present in the prior art. I understand that, for the purpose of an *inter partes* review, prior art that anticipates a claim can include both patents and printed publications from anywhere in the world.

C. Obviousness

32. I understand that a patent claim is unpatentable and invalid if the subject matter of the claim as a whole would have been obvious to a POSITA as of the time of the invention at issue. My understanding of a POSITA is set forth below. I understand that the following factors must be evaluated to determine whether the claimed subject matter is obvious: (1) the scope and content of the prior art; (2) the difference or differences, if any, between each claim of the patent and the prior art; and (3) the level of ordinary skill in the art at the time the patent was filed. Unlike anticipation, which allows consideration of only one item of prior art, I understand that obviousness may be shown by considering more than one item of prior art. Moreover, I have been informed and I understand that the so-called objective indicia of non-obviousness, also known as “secondary considerations,” are also to be considered when assessing obviousness. These include: (1) commercial success; (2) long-felt but unresolved needs; (3) copying of the invention by others in the field; (4) initial expressions of disbelief by experts in the field; (5) failure of others to solve the problem that the inventor solved; and (6) unexpected results. I also understand that evidence of objective indicia of non-obviousness must be commensurate in scope with the claimed subject matter.

III. The '708 Patent

33. The '708 patent is titled “Mobile device mode enablement responsive to a proximity criterion.”

34. The '708 patent lists inventors Peter D. Karabinis and Rajendra Singh.

35. The '708 patent was filed as U.S. Patent Application No. 15/251,882 on Aug. 30, 2016, and issued on November 28, 2017.

A. Priority Date

36. The '708 patent claims priority to U.S. Patent Application No. 12/264,711, filed on November 4, 2008.

37. More specifically, U.S. Patent Application No. 15/251,882 is a continuation of U.S. Patent Application No. 12/264,711, filed on November 4, 2008, and issued as U.S. Patent No. 9,462,411 on October 4, 2016.

B. Specification

38. The specification assumes familiarity with a “wireless communications device” such as “a wireless terminal, a wireless/mobile phone, a Personal Digital Assistant (PDA), a smart phone, a multi-media device including Global Positioning System (GPS) capability, etc.” EX1001 at 1:47-1:62, 3:4-8. It relies on long-established, generic concepts of computer systems such as “authorization” (5:37-56), “sensors” capable of detecting, inter alia, physiological input (mentioned only at 6:9-26), “short-range communications” (mentioned in the specification only at

8:24-29 and 8:47-60), “air interface[s]” (6:46-7:12, with a recitation of then-existing interfaces at 7:13-23), and “communications service[s]” (8:64-9:23). The specification acknowledges that the “adaptivity and mobility aspects of wireless communications” were already “important in people’s lives” at the time of alleged invention. EX1001 at 1:26-31. It also assumes that mobile phones could act as digital wallets. EX1001 at 1:36-39. The specification does not disclose or purport to disclose new or improved means of sensing (including physiological/biometric sensing) or proximity detection.

C. Prosecution History

1. Prosecution History of the '708 Patent (EX1006)

39. The Examiner first rejected the then-pending claims of the '708 patent for non-statutory obviousness-type double patenting in light of claims 1-4 of the '411 patent and as obvious in light of two prior art references. EX1006 at 56-64.

40. Applicant submitted a terminal disclaimer, amended two dependent claims, and added new claims. EX1006 at 97-120, 129-131. Applicant did not substantively challenge the Examiner’s conclusion that collectively and individually there was no novelty in “(i) communicating between a smartphone and an entity using a first air interface responsive to a proximity criterion having been satisfied, (ii) refraining from communicating between the smartphone and the entity using the first air interface absent the proximity criterion having been satisfied, and (iii)

communicating using a second air interface to receive a communications service by the smartphone, but not receiving the communications service from the entity via the first air interface.” EX1006 at 108-109. Instead, Applicant argued that the cited prior art did not teach performing step (i) and step (iii) “concurrently.” EX1006 at 109. Applicant argued against the cited prior art solely in reliance on the “concurrently” of what is now claim limitation 1[d]. *See* EX1006 at 187 (claim renumbering).

41. In the same response, Applicant argued that “concurrently” was important because it allowed a smartphone to act as a digital wallet: “A smartphone that concurrently performs the recitations (i) and (iii) of independent Claims 1 and 5 may function as a mobile wallet or a ‘digital wallet.’” EX1006 at 110. Pending claims 1 and 5 issued as claims 1 and 11, respectively. This is so, Applicant argued, because the claimed smartphone could “perform ... a mobile payment via the entity of independent Claims 1 and [11] concurrently with ... receiving a communications service from a base station.” EX1006 at 110. In contrast, the argument continued, the cited prior art taught using the two air interfaces in a “mutually exclusive” way, where one was a backup for accessing the communications service. EX1006 at 110-111.

42. Applicant also argued that the claims that issued as independent claims 16 and 18 were patentable over the cited prior art because of what are now limitations

16[e] and 16[f] (and 18[f] and 18g]): (1) “a point-to-point short-range link between the smartphone and the entity using a time division duplex protocol” and (2) “the entity is not involved in providing the communications service.” EX1016 at 112-113.

43. In the Notice of Allowability, the Examiner stated that the independent claims that issued as 1, 11, 16, and 18 were allowed in view of the arguments or remarks summarized above. EX1006 at 140-143 (notice of allowability and detailed action). *See also* EX1006 at 187 (claim renumbering). Jain was not considered by the Examiner during prosecution of the '708 patent.

2. '411 Patent File History

44. U.S. Patent Application No. 12/264,711 was filed on November 4, 2008 and issued on October 4, 2016 as U.S. Patent No. 9,462,411 (“’411 patent”).

45. Throughout prosecution, the Examiner rejected the claims of the '411 patent nine times, primarily on obviousness grounds. EX1005 at 74, 127, 197, 240, 295, 330, 382, 420, 453. Accordingly, Applicant amended the claims substantially, including a final Examiner's Amendment for allowance. EX1005 at 108, 166, 220, 266, 316, 351, 407, 434, 498. The breadth of the claims caused many of these rejections and amendments. EX1005 at 410 (“The Examiner also indicated that our response should make it clear where support for any claim amendments are found, and how these claim amendments distinguish over the cited art, as the claims are

broad. The undersigned indicated that the claims are broad, but that their filing date of November 4, 2008 is quite early relative to the claimed invention.”).

46. For claim 1’s sensing of physiological data, Applicant argued to distinguish prior art where the relevant fingerprint sensor was not “smartphone-based.” EX1005 at 484. Further, Applicant distinguished the prior art because the cited prior art, US 2007/0197261 (“Humbel”) indicated that “the combination of NFC transceiver plus biometric finger sensor did not yet exist in a mobile phone at the time of filing of Humbel.” EX1005 at 483.

47. For the sequencing of limitations in claim 1, Applicant conceded in an amendment that “the ‘detecting’ has been moved after the ‘sensing’ in the claim in order to provide proper antecedent basis for the ‘living organism,’ and to also indicate that the ‘detecting’ and the ‘sensing’ can occur in either order and/or simultaneously.” EX1005 at 435.

48. Applicant argued throughout several amendments that claim 1’s “selectively communicating ... responsive to the proximity criterion and a value of the physiological data ... and refraining ...” distinguished it from prior art. EX1005 at 225, 272, 274, 322, 354, 356, 357, 411, 437. Within these amendments, Applicant exchanged “preferentially” for “selectively.” EX1005 at 407. Further, Applicant argued to distinguish this limitation from prior art where there “is no refraining ... because communications using both air interfaces takes place.” EX1005 at 356; *see*

also EX1005 at 355 (“both air interfaces would come into play simultaneously”).

Additionally, Applicant argued to distinguish prior art where the communication “selections are based purely on which mode is enabled, but neither mode is selected preferentially, and neither mode is avoided, based on any criteria other than the selected mode.” EX1005 at 357.

D. Level of Ordinary Skill in the Art

49. I understand that a person of ordinary skill in the art (“POSITA”) is a hypothetical person who is presumed to be aware of all pertinent art, thinks along conventional wisdom in the art, and is a person of ordinary creativity—not an automaton. In deciding the level of ordinary skill, I understand that the following factors may be considered:

- The levels of education and experience of persons working in the field;
- The types of problems encountered in the field; and
- The sophistication of the technology.

50. I understand that asserted claims must be evaluated from the perspective of a POSITA. In my opinion, the relevant art for this patent relates to smartphones transmitting data (*e.g.*, to perform financial transactions), *i.e.*, applications for secure wireless communications, including over short and long range communication protocols. I understand that the relevant point in time for determining the qualifications of a person of ordinary skill in the state-of-the-art is

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the time of the alleged invention, which I assume to be the earliest effective filing date for the patent. Here, I understand that the earliest alleged priority date is November 4, 2008.

51. In my opinion, a person of ordinary skill in the art at the time of the '708 patent ("POSITA") had at least a Bachelor of Science in electrical engineering, computer engineering, or similar fields and at least two years of practical experience in the field of secure wireless communication applications. This level of skill is approximate, and more experience would compensate for less formal education, and vice versa.

52. I meet these criteria now and met them at the time of the alleged invention. I have applied this level of skill in my analysis. My opinions would not change if a slightly higher or lower level of ordinary skill applied.

E. Claim Construction

53. I have been instructed by Petitioner to perform my technical analysis of the disclosures of the prior art by applying the plain and ordinary meaning of all claim terms. I have not been asked to opine on the correctness of any claim constructions.

54. I reserve the right to provide additional opinions concerning claim construction or the application of certain claim constructions to the prior art, as

appropriate, and to respond to any particular claim construction-related argument advanced by PO and/or its expert.

55. As described in more detail in the remainder of this declaration, the prior art discloses or renders obvious the challenged claims under any reasonable potential claim interpretation.

F. Challenged Claims

56. I understand that claims 1-19 are at issue in Petitioner's petition for *inter partes* review. They are reproduced below for reference.

Claim	Limitation
1[pre]	A method of operating a smartphone using a first air interface and a second air interface that differs from the first air interface, the method comprising:
1[a]	communicating between the smartphone and an entity using the first air interface responsive to a proximity criterion having been satisfied between the smartphone and the entity to provide information to the entity over a short-range link between the smartphone and the entity;
1[b]	refraining from communicating between the smartphone and the entity by the smartphone using the first air interface absent the proximity criterion having been satisfied between the smartphone and the entity; and
1[c]	communicating between the smartphone and a base station using the second air interface to receive a communications service from the base station via the second air interface, wherein the smartphone receives the communications service from the base station via the second air interface but does not receive the communications service from the entity via the first air interface,
1[d]	wherein the communicating between the smartphone and the entity using the first air interface responsive to the proximity criterion

Claim	Limitation
	having been satisfied between the smartphone and the entity to provide information to the entity over the short-range link between the smartphone and the entity is performed concurrently with the communicating between the smartphone and the base station using the second air interface to receive a communications service from the base station via the second air interface.
2[pre]	The method according to claim 1,
2[a]	further comprising detecting that the proximity criterion between the smartphone and the entity is satisfied.
3[pre]	The method according to claim 2, wherein the detecting comprises:
3[a]	detecting that a proximity criterion of less than 10 meters in distance is satisfied between the smartphone and the entity,
3[b]	wherein the detecting is performed by the smartphone, by a device that is associated with the entity and/or by a system that is associated with the smartphone.
4[pre]	The method according to claim 1,
4[a]	wherein the entity comprises a first device, wherein the information provided to the entity comprises first information, and wherein the method further comprises: selectively sending, by the smartphone, second information to a second device and receiving, by the smartphone, third information from the second device responsive to the proximity criterion having been satisfied between the smartphone and the entity,
4[b]	wherein the smartphone does not receive the communications service from the second device.
5[pre]	The method according to claim 1,
5[a]	wherein the communicating, over the short-range link, between the smartphone and the entity using the first air interface responsive to the proximity criterion having been satisfied is performed over a

Claim	Limitation
	point-to-point short-range link between the smartphone and the entity using a time division duplex protocol.
6[pre]	The method of claim 1,
6[a]	further comprising enabling a function by the smartphone in response to an identity, wherein the identity is communicated between the smartphone and the entity.
7[pre]	The method of claim 6,
7[a]	wherein the enabling the function is performed in response to comparing the identity with one or more identities.
8[pre]	The method of claim 6,
8[a]	further comprising establishing the short-range link between the smartphone and the entity in further response to the identity.
9[pre]	The method of claim 1,
9[a]	further comprising providing a notification at the smartphone in response to receiving a signal from the entity.
10[pre]	The method of claim 1, wherein the entity comprises a first device to which the smartphone provides the information over the short-range link, and
10[a]	wherein the method further comprises sending the information to a second device responsive to the proximity criterion having been satisfied between the smartphone and the entity.
11[pre]	A smartphone comprising:
11[a]	a processor that is configured to control the smartphone to perform operations comprising:
11[b]	communicating between the smartphone and an entity using a first air interface responsive to a proximity criterion having been satisfied

Claim	Limitation
	between the smartphone and the entity to provide information to the entity over a short-range link between the smartphone and the entity;
11[c]	refraining from communicating between the smartphone and the entity by the smartphone using the first air interface absent the proximity criterion having been satisfied between the smartphone and the entity; and
11[d]	communicating between the smartphone and a base station using a second air interface to receive a communications service from the base station via the second air interface, wherein the smartphone receives the communications service from the base station via the second air interface but does not receive the communications service from the entity via the first air interface,
11[e]	wherein the communicating between the smartphone and the entity using the first air interface responsive to the proximity criterion having been satisfied between the smartphone and the entity to provide information to the entity over the short-range link between the smartphone and the entity is performed concurrently with the communicating between the smartphone and the base station using the second air interface to receive a communications service from the base station via the second air interface.
12[pre]	The smartphone according to claim 11,
12[a]	wherein the operations further comprise detecting that the proximity criterion between the smartphone and the entity is satisfied.
13[pre]	The smartphone according to claim 12, wherein the detecting comprises:
13[a]	detecting that a proximity criterion of less than 10 meters in distance is satisfied between the smartphone and the entity,
13[b]	wherein the detecting is performed by the smartphone, by a device that is associated with the entity and/or by a system that is associated with the smartphone.

Claim	Limitation
14[pre]	The smartphone according to claim 11,
14[a]	wherein the entity comprises a first device, wherein the information provided to the entity comprises first information, and wherein the operations further comprise: selectively sending, by the smartphone, second information to a second device and receiving, by the smartphone, third information from the second device responsive to the proximity criterion having been satisfied between the smartphone and the entity,
14[b]	wherein the smartphone does not receive the communications service from the second device.
[15pre]	The smartphone according to claim 11,
[15a]	wherein the communicating, over the short-range link, between the smartphone and the entity using the first air interface responsive to the proximity criterion having been satisfied is performed over a point-to-point short-range link between the smartphone and the entity using a time division duplex protocol.
16[pre]	A method of operating a smartphone using a first air interface and a second air interface that differs from the first air interface, the method comprising:
16[a]	communicating between the smartphone and an entity using the first air interface responsive to a proximity criterion having been satisfied between the smartphone and the entity to provide information to the entity;
16[b]	refraining from communicating between the smartphone and the entity by the smartphone using the first air interface absent the proximity criterion having been satisfied between the smartphone and the entity; and
16[c]	communicating, by the smartphone, using the second air interface to receive a communications service via the second air interface, wherein the smartphone receives the communications service via the

Claim	Limitation
	second air interface but does not receive the communications service from the entity via the first air interface,
16[d]	wherein the communicating between the smartphone and the entity using the first air interface responsive to the proximity criterion having been satisfied between the smartphone and the entity to provide information to the entity is performed concurrently with the communicating by the smartphone using the second air interface to receive the communications service via the second air interface,
16[e]	wherein the communicating between the smartphone and the entity using the first air interface responsive to the proximity criterion having been satisfied between the smartphone and the entity to provide information to the entity is performed over a point-to-point short-range link between the smartphone and the entity using a time division duplex protocol, and
16[f]	wherein the entity is not involved in providing the communications service.
17[pre]	The method according to claim 16,
17[a]	wherein the communicating by the smartphone using the second air interface to receive the communications service via the second air interface comprises communicating between the smartphone and a base station using the second air interface to receive the communications service from the base station via the second air interface.
18[pre]	A smartphone comprising:
18[a]	a processor that is configured to control the smartphone to perform operations comprising:
18[b]	communicating between the smartphone and an entity using a first air interface responsive to a proximity criterion having been satisfied between the smartphone and the entity to provide information to the entity;

Claim	Limitation
18[c]	refraining from communicating between the smartphone and the entity by the smartphone using the first air interface absent the proximity criterion having been satisfied between the smartphone and the entity; and
18[d]	communicating, by the smartphone, using a second air interface to receive a communications service via the second air interface, wherein the smartphone receives the communications service via the second air interface but does not receive the communications service from the entity via the first air interface,
18[e]	wherein the communicating between the smartphone and the entity using the first air interface responsive to the proximity criterion having been satisfied between the smartphone and the entity to provide information to the entity is performed concurrently with the communicating by the smartphone using the second air interface to receive the communications service via the second air interface,
18[f]	wherein the communicating between the smartphone and the entity using the first air interface responsive to the proximity criterion having been satisfied between the smartphone and the entity to provide information to the entity is performed over a point-to-point short-range link between the smartphone and the entity using a time division duplex protocol, and
18[g]	wherein the entity is not involved in providing the communications service.
19[pre]	The smartphone according to claim 18,
19[a]	wherein the communicating by the smartphone using the second air interface to receive the communications service via the second air interface comprises communicating between the smartphone and a base station using the second air interface to receive the communications service from the base station via the second air interface.

IV. State of the Art

57. As the '708 patent recognizes, even before the patent's priority date, mobile phones could communicate using a variety of wireless protocols and frequencies that were well known at the time of alleged invention in late 2008. EX1001 at 1:47-2:6. The market for mobile phones capable of cellular network communications had been well-established since the 1990s, with the Nokia 3210 released in 1999 eventually selling over 160 million units. Manufacturers added other standardized wireless communication technology to mobile phones by the early 2000s. The first IEEE standard for Wi-Fi (802.11) was published in 1997, and by 2005 phones with both cellular and Wi-Fi communication capabilities, such as the 2005 Samsung SCH-i730, were common. So too were phones with Bluetooth capabilities, such as the Nokia 6310 and, again, the Samsung SCH-i730.

58. Near Field Communications (NFC), which allows for short-range wireless communication using RFID technology (more specifically, magnetic field induction), facilitating communication between devices in close proximity, was also common at that time. Examples of mobile phones with integrated NFC capabilities include the 2004 Fujitsu F900ic, the 2004 Nokia 3220 NFC Shell, and the 2007 Nokia 6131 NFC.

59. Manufacturers quickly began exploring applications to leverage devices that had both cellular capabilities and these secondary communication

IPR of U.S. Patent No. 9,832,708

Decl. of Dr. Kevin Almeroth

capabilities. One of those applications was mobile payment. Mobile payment technology was commercially deployed as early as 2004 in Japan with NTT Docomo's support of the Sony FeliCa chip for mobile phones coupled with Osaifu-Keitai ("Wallet Mobile") software. This technology was also deployed in the United States, with mobile phone and payment companies teaming up to conduct pilot programs of their own mobile payment software, including a 2006 pilot by Nokia and MasterCard, a 2007 pilot program by Motorola and Discover, a 2007 pilot by Kyocera and MasterCard, and companies such as ViVOtech releasing full mobile payment solutions. *See* EX1022:



See also screenshot from EX1033:



V. Grounds

Ground	Basis	Reference	Claims
1	§103	Jain (U.S. Pat. Appl. Pub. No. 2009/0069049)	1-19
2	§103	Dua (U.S. Pat. Appl. Pub. No. 2006/0165060)	1-19

A. Ground 1: Jain (EX1017)

1. Analysis

(a) Claim 1

- (i) 1[pre]: *A method of operating a smartphone using a first air interface and a second air interface that differs from the first air interface, the method comprising:*

60. In my opinion, Jain discloses this limitation. Jain describes operating a “mobile device 110” to “wirelessly execut[e] transactions” with retail point-of-sale terminal 114. Jain ¶¶[0005], [0018]-[0019], [0021], [0029]; FIG. 1. Jain interfaces mobile device 110 (e.g., “a smartphone” (¶[0018])) with a transaction card 112 that “convert[s] the mobile device 110 to a contactless payment device loaded with a financial vehicle (FV) that may be, for example, a credit card, a debit card, a gift card and/or other retail payment product” (¶[0029]).

61. In such embodiments, transaction card 112 is included as part of the mobile device 110. Jain ¶[0019] (“a mobile device [110a] having a transaction card 112a”), FIG. 1 (showing transaction card 112a within mobile device 110a). The reference to “10a” in paragraph 19 of Jain’s specification is a typographic error. No

figures show a “10a” and Jain’s Figure 1 clearly shows element 110a that matches the description of “10a” in the specification.

62. Jain FIG. 1 provides an example of such wireless transactions, where a customer’s mobile device 110a with transaction card 112a wirelessly executes transactions with a nearby POS device 114. Jain ¶[0019]. Jain discloses that mobile device 110 (*smartphone*, red) can use its transaction card 112 to communicate with POS device 114 using protocols such as NFC, Bluetooth, or RFID (*first air interface*, yellow). Jain ¶[0023].

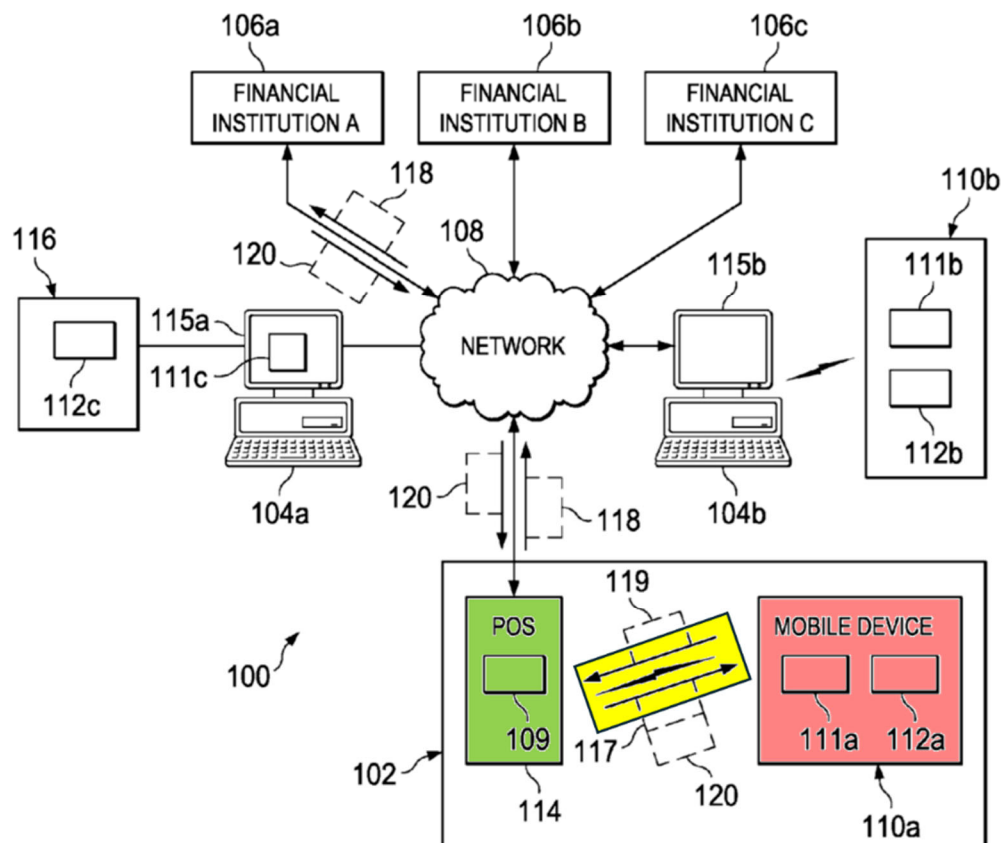
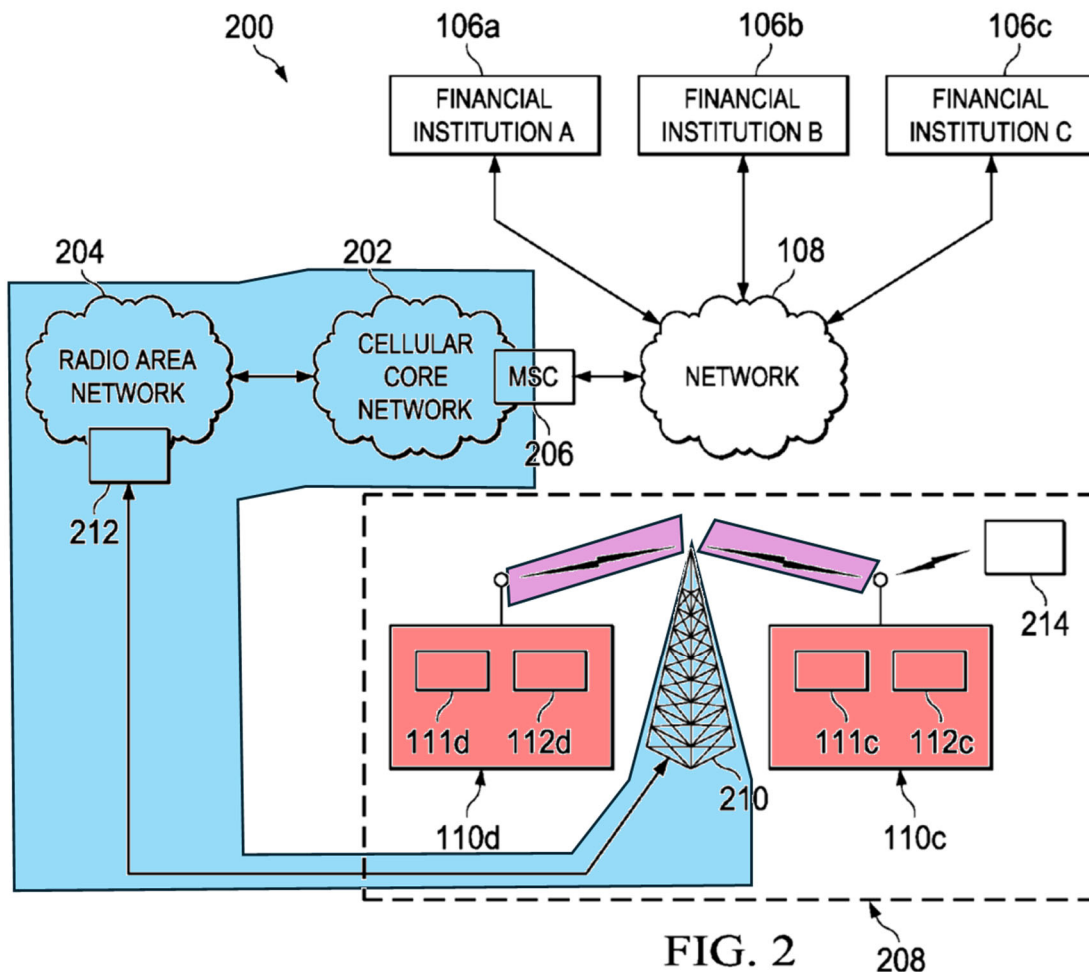


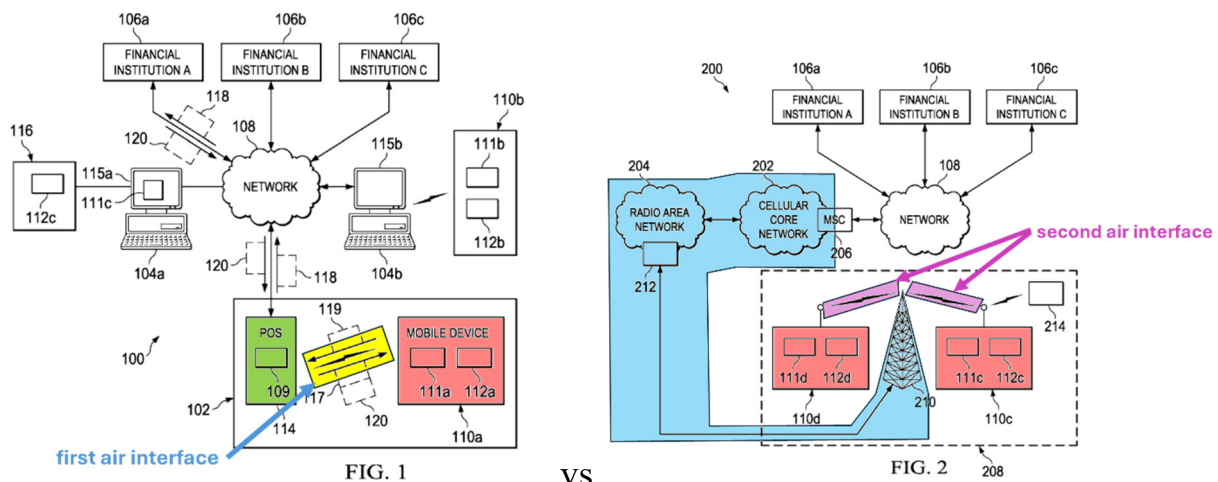
FIG. 1

63. Jain also discloses that mobile device 110 is a cell phone or smart phone capable of communicating via cellular radio technology (*a second air interface*, purple). Jain ¶[0021]. Jain discloses, for example, that device 110 (*smartphone*, red) can make and receive voice calls over a cellular network (blue). Jain ¶¶[0040], [0042]-[0043],[0056]. Jain also discloses that device 110 uses the cellular network for data communications with, e.g., financial institutions 106 (shown as either 106a, 106b, or 106c). *See, e.g.*, Jain ¶¶[0027], [0030], [0041]-[0044], [0046]-[0048], and FIG. 2.



64. A POSITA would understand that the mobile devices 110a, 110c, and 110d in FIGs. 1 and 2 (annotated in red) are the same mobile device 110 having transaction card 112 discussed herein. Jain ¶[0017] (“Like reference symbols in the various drawings indicate like elements.”), ¶[0027] (discussing a mobile device that is in proximity-based communication with POS device 114 per FIG. 1, and stating “[i]n some implementations, the financial institution 106 may transmit the authorization response 120 to the mobile device through a cellular core network (see FIG. 2)”).

65. That the cellular signal (*second air interface*) to base station 210, radio area network 204, and cellular core network 202 *differs from* the NFC interface (*first air interface*) using a short-range protocol can be seen by comparing Jain paragraph 23 and Figure 1 with Jain paragraph 41 and Figure 2:



66. Also, use of the two interfaces is separately controllable. See, e.g., Jain ¶[0024] (“transaction card 112 may receive one or more commands to switch the

[*first air interface*] antenna off from a cellular network (not illustrated) through the mobile device 110.”). The mobile device can also communicate with financial institutions even when the mobile device “is not proximate a retail device, such as the POS device of FIG. 1,” or “outside the operating range of a POS terminal.” *Id.* ¶[0041], ¶[0046].

- (ii) **1[a]: *communicating between the smartphone and an entity using the first air interface responsive to a proximity criterion having been satisfied between the smartphone and the entity to provide information to the entity over a short-range link between the smartphone and the entity;***

67. In my opinion, Jain discloses this limitation. As an initial matter, I observe that the limitation consists of two steps that are recited out of order. First, the claim requires that *a proximity criterion has been satisfied between the smartphone and an entity*. Responsive to the criterion being satisfied, the claim then requires *communicating between the smartphone and the entity using the first air interface ... to provide information to the entity over a short-range link between the smartphone and the entity*. I address these two steps below, in logical sequence. Relevant elements are shown in annotated Jain FIG. 1. The *smartphone* (mobile device 110) is in red. The *entity* (POS device 114) is in green. The *short-range link* over the *first air interface* is in yellow.

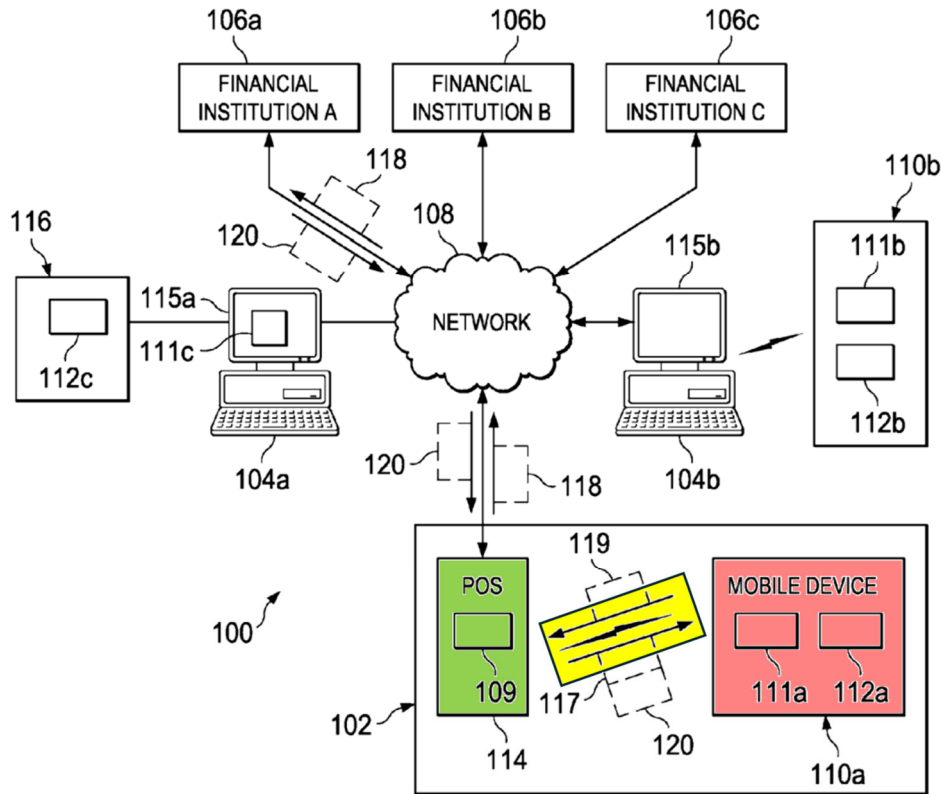


FIG. 1

68. First, I discuss Jain’s disclosure that *a proximity criterion has been satisfied between the smartphone and an entity*. Jain discloses that mobile device 110’s transaction card 112 “may execute transactions with the POS device 114 using short range signals such as NFC (e.g., ISO 18092/ECMA 340), ... Bluetooth, ... proximity signals, and/or other signals compatible with retail payment terminals...” Jain ¶[0023]. The mobile device first “wirelessly receive[s] a request from the POS device 114 to execute a transaction and/or and provide a response.” Jain ¶[0023].

69. In my opinion, a POSITA would have understood that mobile device 110 can only receive the “request” if close enough to POS device 114 to actually

receive and decode the short-range signal corresponding to the request. EX1045 at §10 and Figure 5; EX1036 at 220. Jain's NFC and other short range wireless communication protocols are only effective if an underlying signal of sufficient strength is detected such that the device and the POS can communicate using that protocol. EX1035 at 4, 36; EX1037 at 3. That signal strength rapidly deteriorates as distance increase. EX1035 at 4, 36; EX1037 at 3. Jain itself recognizes that NFC communication may require a proximity of "10 cm or less." Jain ¶[0030]. Accordingly, for Jain's mobile device to receive and recognize a request from the POS device received via NFC, the mobile device and POS device must be sufficiently close: *a proximity criterion has been satisfied between the smartphone and an entity.*

70. A POSITA would also understand that Jain renders this obvious. NFC and other short range wireless communication protocols require satisfying a proximity condition because such wireless communication protocols are only effective within a short range. The communication signals between the device and terminal must be strong enough to engage in communication with that protocol. The strength of the signal is dependent on distance between device and terminal, where signal strength increasingly attenuates as the distance gets greater.

71. Without a reaching a certain signal strength or otherwise satisfying a *proximity condition*, both devices are sending unnecessary communication signals

guaranteed to be lost. This wastes time and processing. Especially for communications executing financial transactions, either device indiscriminately transmitting sensitive financial information without ensuring communication to the correct device is a security risk. Either device is sending communications that will likely to subject to errors, like packet loss, due to transmission past an effective range, increasing the risk of miscommunication. And devices trying to read wireless communications with weak signal strength are also likely to misinterpret noise or other small unintended wireless signals as communications.

72. Implementing NFC to determine whether a proximity condition is satisfied and communicating based on that condition's satisfaction, were well-known to a POSITA. For example, EX1020 discloses using NFC to limit the range at which communication may take place. EX1020 ¶¶[0041] ("In certain embodiments, the communication may occur within a range of approximately 2 to 4 cm. The close range communication with the NFC device 44 may take place via magnetic field induction, allowing the NFC device 44 to communicate with other NFC devices or to retrieve information from tags having radio frequency identification (RFID) circuitry."), [0063] ("The device 10 may be configured to communicate with the transaction terminal 120 using a short range wireless communication protocol, when positioned over the box 124. ... In some embodiments, the wireless communication device 126 may be a near field

communication (NFC) device and the device 10 may be configured to initiate NFC communications with the terminal 120.”). Further, EX1020 discloses using other wireless signals to determine proximity. EX1020 ¶[0073] (“The [identifying information] may be used by the device 10 to indicate that the device is located within communication range of the hot spot 169.”). This makes common sense. Where a particular wireless signal is restricted to a particular distance (*e.g.*, “2 to 4 cm” or “10 cm or less” for NFC (Jain ¶[0030]; EX1020 ¶[0041])), a device receives messages at a certain signal strength and generally without errors when the transmitting device is within that distance. Thus, signal strength and received messages can be used to determine proximity. Receiving a weak signal and receiving incoherent messages—messages picking up errors from wireless transit—indicate that the transmitter is outside the effective range.

73. As such, it would have been obvious for a POSITA to configure the smartphone to first detect that it is proximate to Jain’s POS device prior to attempting short-range signal communication to reduce wasted time, wasted power, security risks, and miscommunication in transmission and reception.

74. Jain also discloses that device 110’s transaction card 112 may be “powered from an induction magnetic field generated by the POS 114,” which in my opinion discloses both the satisfaction of a proximity criterion and the detection by device 110 of that satisfaction. Jain ¶[0029].

75. ECMA 340 is a well-known communications standard that defined NFC communication. EX1045 is a true and correct copy of the 2nd edition of the ECMA 340 Interface and Protocol Standard for NFC (“ECMA-340”), which was publicly available and known to a POSITA as of its release in December 2004, and which was not updated again until June 2013. *See* <https://ecma-international.org/publications-and-standards/standards/ecma-340/>. This version was also published as the “ISO 18092.” *Id.* In addition, the disclosures of ECMA-340 discussed below are found in both the 1st edition (released December 2002) and the 2nd edition. *See* EX1034 (December 2002 first edition).

76. ECMA-340 explains that an NFC “transaction” requires an “initialization” (described in ECMA-340 section 11) and then a “data exchange” (described in ECMA-340 section 12). EX1045 at §4.26, §10, Figure 5. ECMA-340 specifies two devices (“Initiator” and “Target”) and two communication modes (“Passive” and “Active”). EX1045 §1, §4.1, §4.7, §4.17, §4.23, §7.

77. Regardless of which of the two devices communicating via NFC is the “Initiator” and which is the “Target,” and regardless of what NFC communication mode they use, according to ECMA-340 both the Initiator and the Target detect that a proximity criterion has been satisfied and, after they both perform that detecting, they then establish a short-range link that is used for subsequent communications. Specifically, in both modes, an “Initiator” device “shall activate its RF field” and a

“Target” device then “shall be activated by the RF field of the Initiator.” EX1045 at §10. Then, the “Initiator” sends one or more commands (e.g., ALL_REQ, SENS_REQ, and/or ATR_REQ) and receives one or more responses (e.g., SENS_RES and/or ATR_RES). *See* EX1045 §§11.2.1.16-.17, §11.2.1.23, §11.3.2, §§12.2-.3 , Figure 13, Figures 24-25.

78. In even more detail, in Passive mode, an activated Target enters the SENSE state. EX1045 §11.2.1.8, §11.2.1.9. The “Initiator” then sends commands “to probe the field for Targets” (EX1045 § 11.2.1.16), receives a SENS-RES response from a Target in the SENSE state (EX1045 §11.2.1.17), and then selects that Target “for further communication” (EX1045 §11.2.1.23, Figure 13). *See also* EX1045 §12.2 and Figure 24. In Active mode, after the Target is activated by the RF field of the Initiator, it receives an ATR_REQ message from the Initiator, generates its own RF field, and uses that field to send an ATR_RES message to the Initiator. EX1045 §11.3.2. In response to that message, the Initiator sends a DEP_REQ “to start the data exchange protocol.” EX1045 §11.3.2. *See also* EX1045 §12.3 and Figure 25.

79. Thus, regardless of what mode is used and regardless of whether Jain’s mobile device is the Initiator or the Target, it detects that a ***proximity criterion has been satisfied***: if the Target, by activating in response to a sufficiently strong field from the Initiator and if the Initiator, by receiving a response to a command from the

Target. In addition, this exchange of commands and responses results in the selection of a particular “Target” and attributes/parameters for further communication with the same, thereby establishing a *short-range link*. EX1045 at §7, §§11.2.1.24-25, §12, §12.1, Figure 22, Figure 24-25. After this *link* is established, the Initiator and the Target communicate using ECMA 340’s data exchange protocol. EX1045 Figures 5, 23, and 24. This includes transmission of Jain’s transaction request 117, transaction response 119, and authorization response 120.

80. In my opinion, a POSITA reading Jain would have known the above. For example, Jain teaches that its NFC communication is based on the “ISO 18092/ECMA 340” standards. Jain ¶[0023]. *See also* Jain ¶[0018], ¶[0051]. But at a minimum, it would have been obvious to implement Jain’s NFC communications in this manner, because that is the exchange taught by the NFC standard cited in Jain and because a POSITA would be motivated to implement the standard rather than define a proprietary approach to simplify design, to allow for use of commercially available NFC hardware and software, to minimize the need for trial and error, and to maximize interoperability with standard-compliant reader/POS systems and mobile devices.

81. Patent Owner alleges in its district court infringement contentions that use of NFC is sufficient to show that a *proximity criterion has been satisfied*. EX1016 at 7-11.

82. In my opinion, it also would have been obvious to a POSITA that mobile device 110 first detect such proximity based on a signal from the POS device (e.g., a “request” per Jain ¶[0023], or earlier commands and responses exchanged as part of implementing ECMA-340) prior to communicating with POS 114. This would be done, for example, to ensure communications would be successful and not wasted signaling, and to avoid the security risk of indiscriminately transmitting sensitive financial information. Such implementations were well-known to a POSITA. For example, EX1020 discloses and leverages NFC to limit the range at which communication may take place. EX1020 ¶¶[0041], [0063]. In the context of Wi-Fi, EX1020 discloses using the ability to receive such signals as an indication of proximity. EX1020 ¶[0073] (“The [identifying information] may be used by the device 10 to indicate that the device is located within communication range of the hot spot 169.”). A POSITA would be motivated and able to use Jain’s NFC “request” in the same manner.

83. For all of the above reasons, it is my opinion that Jain discloses or renders obvious that *a proximity criterion has been satisfied between the smartphone and an entity*. I now explain my opinion that it discloses or renders obvious *responsive* to that satisfaction, *communicating between the smartphone and the entity using the first air interface ... to provide information to the entity over a short-range link between the smartphone and the entity*.

84. As I explain above, Jain's POS device (*entity*) and mobile device (*smartphone*) first need to be sufficiently close to go through the NFC initialization process (*responsive to a proximity criterion having been satisfied*) and to select a particular "Target" for further communication (thereby establishing a *short-range link between the smartphone and the entity*). Only after those steps are complete, and after POS device 114 transmits transaction request 117 to mobile device 110, does mobile device 110 send a transaction response 119 containing information associated with a payment account (*information*) over that NFC connection. Jain ¶[0027]. POS device 114 then sends a transaction authorization request 118 to a financial institution 106 (shown as either 106a, 106b, or 106c). Jain ¶[0027]. The financial institution may transmit an authorization response 120 to the POS device 114, which in turn may transmit it to mobile device 110. Jain ¶[0027].

(iii) 1[b]: *refraining from communicating between the smartphone and the entity by the smartphone using the first air interface absent the proximity criterion having been satisfied between the smartphone and the entity; and*

85. In my opinion, Jain discloses this limitation because Jain's device 110 does not communicate with POS 114 over the short-range protocol (*refraining from communicating between the smartphone and the entity by the smartphone using the first air interface*) if the device is not within short-range signal range of the POS

(absent the proximity criterion having been satisfied between the smartphone and the entity).

86. First, if the two are not sufficiently close, short-range communication is not possible. I explain this above re limitation 1[a] and the *proximity criterion*. Jain is clear that device 110 is only “capable of receiving data when in range of a transmitting terminal (e.g., POS 114).” Jain ¶[0030].

87. Second, it would have been obvious to a POSITA that Jain’s mobile device would refrain from communicating with the POS system using the first air interface if the two are not sufficiently proximate. As I explained in my discussion of limitation 1[a], a POSITA would be motivated by the need to ensure the sensitive communications are successful and secure and would have had a reasonable expectation of successful implementation because this was a known implementation option at the time.

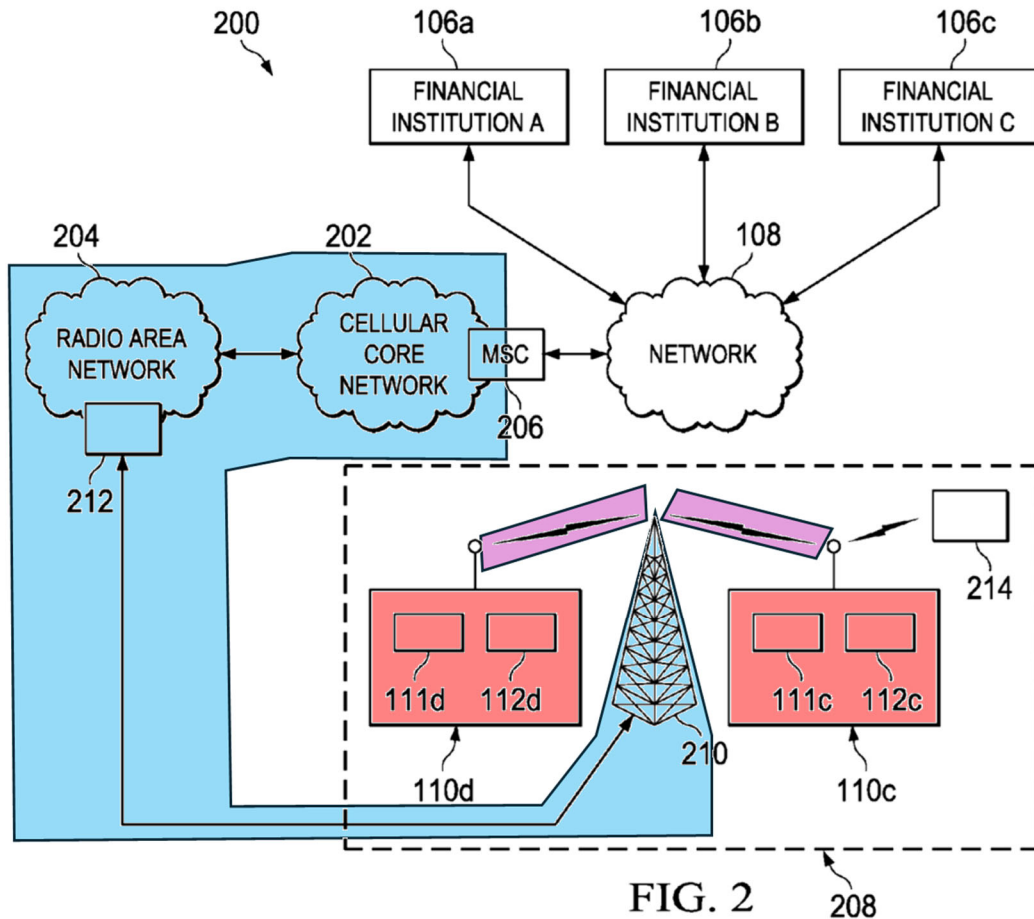
88. My opinions are consistent with Patent Owner’s infringement contentions, where Patent Owner relies on the observation that “NFC is limited to short-range communication” such that “[a] user must be within 3.5 inches (10 cm) of an NFC terminal to process a payment...” EX1016 at 10-11.

(iv) **1[c]: communicating between the smartphone and a base station using the second air interface to receive a communications service from the base station via the second air interface, wherein the smartphone receives the communications service from the base station via the second air interface**

but does not receive the communications service from the entity via the first air interface

89. In my opinion, Jain discloses this limitation. Jain's device 110 (*smartphone*) has a cellular interface (*second air interface*) that allow it to communicate with a *base station* to implement cellular services (*communications service*). Device 110 is able to use GSM, CDMA, UMTS, "and/or any other cellular technology." Jain ¶[0041]. *See also* Jain ¶¶[0042]-[0043] (describing network support for those cellular technologies). Jain refers to these as "radio access networks (RANs)." Jain ¶[0040]. *See also* Jain ¶[0042].

90. Jain FIG. 2 illustrates "an example transaction system 200 for wirelessly communicating transactions information using cellular radio technology." Jain ¶[0041].



91. Jain explains that “cellular core network 202” contains equipment “for providing cellular service” (*a communications service* provided by the infrastructure highlighted in blue) and operates “[i]n accordance with the cellular standards... for processing voice calls and ... for supporting data transfers.” Jain ¶[0042]. Jain also discloses a base station 210 (*base station*, part of cellular infrastructure, in blue) for delivering that cellular service (*communications service*) to devices 110 (*smartphone*, in red) via those devices’ support for cellular connectivity (*second air interface*, in purple). Jain ¶[0044].

92. Jain's device 110 *does not receive the communications service from the entity via the first air interface*. There is no overlap between the cellular service (*communications service*) and devices providing the same, shown in FIG. 2, and the merchant and its POS device (*entity*, with which the *smartphone* communicates via *the first air interface*) (see FIG. 1), neither of which is even shown in FIG. 2. This allows the mobile device to communicate with financial institutions even when the mobile device "is not proximate a retail device, such as the POS device of FIG. 1" and "outside the operating range of a POS terminal" (Jain ¶[0041]), confirming that the cellular service (*communications service*) is provided independent of any POS device or any NFC communication with the same.

93. Patent Owner's infringement contentions assert, without elaboration, that the accused device "does not receive the communications service from the point-of-sale terminal (the entity) via NFC (the first air interface)." EX1016 at 15-16.

- (v) 1[d]: *wherein the communicating between the smartphone and the entity using the first air interface responsive to the proximity criterion having been satisfied between the smartphone and the entity to provide information to the entity over the short-range link between the smartphone and the entity is performed concurrently with the communicating between the smartphone and the base station using the second air interface to receive a communications service from the base station via the second air interface.*

94. The only additional requirement recited in this limitation is that the *communicating using the first air interface* of limitation 1[a] and the *communicating using the second air interface* of limitation 1[b] be done *concurrently*. In my opinion, Jain discloses this limitation.

95. As I address above, Jain's mobile device (*smartphone*) is independently capable of using both NFC communication (*first air interface*) and cellular communication (*second air interface*). There is no disclosure in Jain of ceasing cellular communication when engaging in NFC communication, or vice versa.

96. Jain discloses concurrent use. For example, it discloses that "In some implementations, the transaction card 112 may execute one or more of the following: wirelessly receive a request from the POS device 114 to execute a transaction and/or and provide a response; ... generate and/or transmit wireless-message alerts to the financial institution 106 using the mobile device 110 if cellular capable." Jain ¶[0023]. Jain also discloses a mode in which transaction card 112 can function as a "mobile POS terminal receiving transaction information from a plastic contactless card/FOB" (via the first air interface) and "instructing the POS 114 to prepare a transaction authorization request for the financial institution 106" (via the second air interface). Jain ¶[0030]. Jain repeatedly discloses turning off the antenna of transaction card 112 in response to a message received over the cellular radio of

mobile device 110, meaning that until the antenna is off, both are operating *concurrently*. See, e.g., Jain ¶[0018], ¶[0024], ¶[0052], ¶[0078]. See also Jain ¶[0068].

97. Also, in my opinion a POSITA would have found it advantageous and obvious to maintain such communication (i.e., to concurrently communicate) and disadvantageous to cease it. For example, if the user of device 110 were in the midst of a phone call at the time of transaction, it would be desirable to maintain that call during the transaction. See Jain ¶¶[0042]-[0043]. It would be similarly desirable to avoid premature termination of file transfers or disruption to data-dependent applications, both of which can use the cellular data networks. See Jain ¶[0042]. Also, re-establishing cellular connectivity after it is disabled can entail a noticeable delay that a POSITA would want to avoid.

98. It is my opinion that performing the communications concurrently was well within the abilities of a POSITA, who would have had a reasonable expectation of success when implementing it, not least because cellular communication and NFC communication use different hardware. Also, simultaneous use of cellular networks and other short-range frequencies was well known to a POSITA, as evidenced at least by the common use of Bluetooth to connect to a headset while cellular networking was used to make voice calls. See, e.g., EX1043 (a July 2007 review of

a Bluetooth headset Apple released for use with its iPhone) and EX1044 (an August 2005 review of eight Bluetooth headsets tested with a Treo650 smartphone).

(b) Claim 2

(i) 2[pre]: *The method of claim 1,*

99. As addressed in Sections V.A.1.a, it is my opinion that Jain discloses limitation 2[pre].

(ii) 2[a]: *further comprising detecting that the proximity criterion between the smartphone and the entity is satisfied.*

100. In my opinion, Jain discloses this limitation. The basis for my opinion is set forth above, with respect to limitation 1[a] and Jain's disclosure that the proximity criterion between the smartphone (device 110) and the entity (POS 114) is satisfied. That explanation includes a discussion of Jain's disclosure of device 110 (smartphone) detecting that the proximity criterion is satisfied. For example, and with reference to the discussion of the ECMA-340 NFC standard, it does not matter whether device 110 (smartphone) is the Initiator or the Target (and it must be one or the other), because—as explained above re limitation 1[a]—either way it performs detecting that the proximity criterion between the smartphone and the entity is satisfied.

101. Also, this additional limitation of 2[a] follows from limitations 1[a] and 1[b], whereby device 110's communications with POS 114 are responsive to the *proximity criterion having been satisfied* and, if the criterion is not satisfied, it

refrains from communicating with POS 114. Device 110 therefore only communicates with POS 114 if the proximity criterion is satisfied, and therefore it must know that it is proximate to POS 114 (i.e., by *detecting that the proximity criterion... is satisfied*). At a minimum, as I explain above in connection with limitation 1[a], it would have been obvious to implement the claimed *detecting* on Jain's mobile device 110 (*smartphone*).

102. Patent Owner's district court infringement contentions assert a smartphone's communication with a POS using NFC is itself sufficient of *detecting by the smartphone that a proximity condition is satisfied*. See EX1016 at 22-25.

(c) Claim 3

(i) 3[pre]: *The method according to claim 2:*

103. As addressed in Sections V.A.1.b, it is my opinion that Jain discloses limitation 3[pre].

(ii) 2[a]: *wherein the detecting comprises: detecting that a proximity criterion of less than 10 meters in distance is satisfied between the smartphone and the entity,*

104. In my opinion, Jain discloses this limitation. Jain discloses that the short-range communication between mobile device 110 and POS 114 occurs at a range of "10 cm or less" (Jain ¶[0030]) or between 10 cm and 50 cm (Jain ¶[0045]). Thus, when device 110 detects the proximity criterion is met at those ranges, as I address above with respect to limitations 1[a] and 2[a], it is detecting that a proximity

criterion of less than 10 meters in distance is satisfied between the smartphone and the entity.

- (iii) **3[b]:** *wherein the detecting is performed by the smartphone, by a device that is associated with the entity and/or by a system that is associated with the smartphone.*

105. In my opinion, Jain discloses this limitation. As I set out above for limitations 1[a] and 2[a], the detecting is performed by the smartphone or by a system that is associated with the smartphone (device 110 with transaction card 112).

(d) Claim 4

- (i) **4[pre]:** *The method according to claim 1:*

106. As addressed in Sections V.A.1.a, it is my opinion that Jain discloses limitation 4[pre].

- (ii) **4[a]:** *wherein the entity comprises a first device, wherein the information provided to the entity comprises first information, and wherein the method further comprises: selectively sending, by the smartphone, second information to a second device and receiving, by the smartphone, third information from the second device responsive to the proximity criterion having been satisfied between the smartphone and the entity,*

107. In my opinion, Jain discloses this limitation. Jain's POS 114 (the entity) includes a point-of-sale terminal and thus comprises a first device. And as I explain above re limitation 1[a], Jain discloses information provided to the entity, which is the first information.

108. The remainder of this limitation requires selectively sending, by the smartphone, second information to a second device and receiving, by the smartphone, third information from the second device responsive to the proximity criterion having been satisfied between the smartphone and the entity. In my opinion, Jain discloses this. For example, financial institution 106 (second device) directly communicates with device 110 over the cellular network. Jain ¶[0046]. Financial institution 106 (second device) may send device 110 (smartphone) a request for information, including “a request for transaction history” (third information). Jain ¶[0046]. Device 110 (smartphone) may then respond by sending financial institution 106 (second device) a transaction history (second information). Jain ¶[0046].

109. This exchange is responsive to the proximity criterion having been satisfied. Jain discloses that financial institution 106 may send a request “in response to... an event [that] may include completing a transaction.” Jain ¶[0046]. As I explained above for limitation 1[a], completing a transaction requires that device 110 and POS 114 be in NFC communication that is responsive to the proximity criterion having been satisfied between the smartphone and the entity.

110. In my opinion, it also would have been obvious to a POSITA for financial institution 106 to request a transaction history from device 101 in response to a transaction being completed or submitted for authorization, both of which require communication between device 101 and POS 114 and are therefore

responsive to the proximity criterion having been satisfied between the smartphone and the entity. For example, Jain discloses that financial institution 106 can engage in a variety of activities related to fraud detection and transaction approval. Jain ¶¶[0026], [0032], [0039], [0046]. A POSITA would have recognized that upon completion of a transaction or receipt of a request from POS 114 to approve a transaction, a reasonable security measure would be to request from device 110 a list of recent transactions. This would allow the financial institution to identify discrepancies (and thus potential fraud) in the transaction history.

(iii) 4[b]: *wherein the smartphone does not receive the communications service from the second device.*

111. In my opinion, Jain discloses this limitation. Jain's mobile device 110 (*smartphone*) does not receive cellular service (*communications service*) from financial institution 106 (*second device*). As I explain in the context of limitation 1[c], cellular service is delivered to device 110 from a base station associated with a cellular core network 202.

(e) Claim 5

(i) 5[pre]: *The method according to claim 1,*

112. As addressed in Sections V.A.1.a, it is my opinion that Jain discloses limitation 5[pre].

(ii) 5[a]: *wherein the communicating, over the short-range link, between the smartphone and the entity using the first air interface responsive to the proximity criterion having been satisfied is*

performed over a point-to-point short-range link between the smartphone and the entity using a time division duplex protocol.

113. It is my opinion that Jain discloses this limitation, whose additional requirement compared to limitation 1[a] is that the information provided to the entity be sent over a point-to-point short-range link between the smartphone and the entity using a time division duplex protocol.

114. In Jain, the claimed information is sent “using short range signals such as NFC...” Jain ¶[0023]. See also Jain ¶¶[00018], [0051], [0068]. NFC is a point-to-point short-range link between an Initiator and a Target, and it uses a time division duplex protocol. See EX1032 generally (re point-to-point and short-range) and at 21 (describing NFC as a “half... duplex system”); EX1045 (generally describing NFC as a point-to-point protocol and at §12.6.1.1 explaining it is a “half-duplex protocol”).

115. Also, Patent Owner admits NFC (1) “uses induction coupling to enable communication between two compatible devices that are close” and is therefore a point-to-point short-range link (EX1016 at 36) and (2) is a “half duplex communication technology” and is therefore using a time division duplex protocol (EX1016 at 37).

(f) Claim 6

(i) 6[pre]: *The method of claim 1,*

116. As addressed in Sections V.A.1.a, it is my opinion that Jain discloses limitation 3[pre].

- (ii) **6[a]: *further comprising enabling a function by the smartphone in response to an identity, wherein the identity is communicated between the smartphone and the entity.***

117. It is my opinion that Jain discloses this limitation. According to the specification of the '708 patent, an identity “may comprise a number, a word/name, a location, a Time-of-Day (ToD), a unique code, a region of space and/or time, etc.” EX1001 at 4:8-11. *See also id.* at 8:20-37.

118. In Jain, an intelligent card 400 is an embodiment of transaction card 112 of FIG. 1. Jain ¶[0062]. This embodiment includes a secure memory element that “may store signatures of allowed host devices,” such as wireless device 110. Jain ¶[0064]. Jain explains that this transaction card “may activate” its NFC antenna “when a handshake with the host device is successfully executed.” Jain ¶[0065]. That handshake may comprise device authentication, which “may include ... a signature comparison of a device signature stored in memory... to a run-time signature calculated using, for example, a unique parameter of the host device.” Jain ¶[0065]. The signature of the host device is the claimed identity, and the enabling of the antenna of device 110’s intelligent card 400 is enabling a function by the smartphone in response to an identity.

119. Jain also discloses that “the transaction card 112 may... transmit a host signature [the identity] to POS 114 [the entity] in response to at least a transaction challenge...” Jain ¶[0023]. *See also* Jain ¶[0019] (“The intelligent card in the system 100 may... verify the host device with a financial institution through, for example, a Point Of Sale (POS) using a host signature...”). Thus, the identity is communicated between the smartphone and the entity.

(g) Claim 7

(i) 7[pre]: *The method of claim 6,*

120. As addressed in Sections V.A.1.f, it is my opinion that Jain discloses limitation 7[pre].

(ii) 7[a]: *wherein the enabling the function is performed in response to comparing the identity with one or more identities.*

121. In my opinion, Jain discloses this limitation. As I discussed above with respect to limitation 6[a], device authentication “may include ... a signature comparison of a device signature stored in memory” (one or more identities) “to a run-time signature... of the host device” (the identity). Jain ¶[0065]. Jain thus discloses that the enabling of the function (antenna activation upon a successful handshake with the host device) is performed in response to comparing the identity with one or more identities.

(h) Claim 8

(i) 8[pre]: *The method of claim 6,*

122. As addressed in Section V.A.1.f, it is my opinion that Jain discloses limitation 8

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[pre]
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(ii) 8[a]: *further comprising establishing the short-range link between the smartphone and the entity in further response to the identity.*

123. In my opinion, Jain discloses this limitation. As I stated with regard to limitation 6[a], activation of antenna 402 is dependent on a successful handshake with the host device. Jain ¶[0065]. Antenna 402 is an NFC or other short-range antenna. Jain ¶[0063]. Because a short-range link cannot be established if the antenna is disabled, establishing a short-range link between the intelligent card of device 110 (smartphone) and POS 114 (entity) is in further response to the identity.

(i) Claim 9

**(i) 9

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[pre]
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: *The method of claim 1,***

124. As addressed in Sections V.A.1.a, it is my opinion that Jain discloses limitation 9

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[pre]
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(ii) 6[a]: *further comprising providing a notification at the smartphone in response to receiving a signal from the entity.*

125. In my opinion, Jain discloses this limitation. Jain’s mobile device 110 (the smartphone) “includes a GUI 111 for presenting information associated with financial transactions.” Jain ¶[0019]. “POS device 114 (the entity) may transmit the response 120 to the mobile device’s transaction card 112. The transaction response 120 may include, for example, a receipt presentable to the user through the GUI

111.” Jain ¶[0027]. The latter is providing a notification at the smartphone in response to receiving a signal from the entity.

(j) Claim 10

(i) 10[pre]: *The method of claim 1,*

126. As addressed in Sections V.A.1.a, it is my opinion that Jain discloses limitation 10[pre].

(ii) 10[a]: *wherein the entity comprises a first device to which the smartphone provides the information over the short-range link,*

127. In my opinion, Jain discloses this limitation. Jain’s POS device 114 (entity) is a point-of-sale terminal, which is a device. “POS 114 may be an electronic cash register capable of wirelessly communicating transaction information with the transaction card 112a.” Jain ¶[0036]. Also, Patent Owner, in its infringement contentions, similarly identified first device as “the entity such as a point-of-sale terminal.” EX10016 at 49.

(iii) 10[b]: *and wherein the method further comprises sending the information to a second device responsive to the proximity criterion having been satisfied between the smartphone and the entity.*

128. In my opinion, Jain discloses this limitation. After and in direct response to device 110 (smartphone) sending the account information (the information; part of transaction response 119) to POS 114 (entity), POS 114 sends that information to financial institution 106 (sending the information to a second

device) as part of transaction request 118. Jain ¶[0027]. POS 114 only has this information because, per limitation 1[a], it was proximate to device 110. Thus the sending is responsive to the proximity criterion having been satisfied between the smartphone and the entity.

129. This is consistent with Patent Owner’s theory of infringement, in which it identifies sending the information to a second device as the POS sending tokenized account information “to the payment network.” EX1016 at 49-52.

(k) Claims 11-15

130. In my opinion, claims 11-15 are substantively identical to claims 1-5, and therefore disclosed by Jain. The only difference is that claims 11-15 are directed to “A smartphone comprising a processor that is configured to control the smartphone to perform operations comprising...,” whereas claims 1-5 are directed to “[a] method of operating a smartphone... comprising...” This distinction is immaterial because Jain discloses both methods and systems. *See, e.g.*, EX1017 at Abstract.

(l) Claim 16

131. The only limitation in claim 16 not found in and addressed by my explanation regarding claim 1 is that communicating over the first air interface uses “a point-to-point short-range link between the smartphone and the entity using a time

division duplex protocol.” However, that limitation is found in dependent claims 15 and 5, and I address it above with respect to limitation 5[a].

132. Claim 16 also requires that “the entity is not involved in providing the communications service,” but that requirement is met for the same reason that the claimed smartphone “does not receive the communications service from the entity via the first air interface”: a POS (entity) is not a communications service provider. I address this in the context of limitation 1[c], above.

133. In my opinion, Jain discloses claim 16 for the for the reasons I set forth above in connection with claims 1, 5, and 15.

(m) Claim 17

(i) 17[pre]: *The method of claim 16,*

134. As addressed in Section V.A.1.1, it is my opinion that Jain discloses limitation 17[pre].

(ii) 17[a]: *wherein the communicating by the smartphone using the second air interface to receive the communications service via the second air interface comprises communicating between the smartphone and a base station using the second air interface to receive the communications service from the base station via the second air interface.*

135. In my opinion, Jain discloses this limitation. The additional requirement of this limitation is that receiving the communication service via the

second interface is done via a base station. Jain discloses this additional requirement, as I explain in the context of limitation 1[c].

(n) Claims 18-19

136. In my opinion, claims 18-19 are substantively identical to claims 16-17, and therefore disclosed by Jain. The only difference is that claims 11-15 are directed to “A smartphone comprising a processor that is configured to control the smartphone to perform operations comprising...,” whereas claims 1-5 are directed to “[a] method of operating a smartphone... comprising...” This distinction is immaterial because Jain discloses both methods and systems. *See, e.g.*, EX1017 at Abstract.

B. Ground 2: Dua (EX1018)

1. Background

137. Dua is the July 27, 2006, publication of U.S. Patent Application No. 11/040,847, which was filed on January 21, 2005, and is assigned to Samsung Electronics Co., Ltd. EX1018. Dua is prior art to the ’708 patent under at least pre-AIA 35 U.S.C. § 102(b).

138. A PTO examiner considered Dua during prosecution of two later patent applications that directly or indirectly continued from Dua: the applications that issued as the ’015 and ’432 patents. The ’015 patent claims required “detecting by a sensor that a product for purchase has been placed in or on the carrying structure,” which is not found in the ’708 patent claims. EX1008 at 207, 208.

139. In my opinion, the '432 patent claims also differed from the '708 patent claims. For example, the '432 patent claims required “independent of performing said first transaction, receiving by the smartphone a communications service from a wireless network, using a second air interface that differs from the first air interface,” whereas the '172 patent's claims do not contain the “independent of performing said first transaction” limitation (or, indeed, any recitation of a “transaction”). EX1009 at 171. Moreover, it seems to me that the analysis presented herein was never presented to or made by the examiner. During prosecution of the '172 patent, applicant argued, and the examiner agreed, that Dua does not teach or suggest a combination of elements including: “receiving by the smartphone a communications service from a wireless network, using a second air interface that differs from the first air interface, wherein said transmitting by the smartphone first data and said receiving by the smartphone second data are performed over an air interface that differs from the first air interface.” EX1009 at 253, 275-276. But, as I explain herein, in portions of Dua that were seemingly overlooked by the examiner, Dua does disclose receiving by the smartphone a communications service from a wireless network, doing so using a second air interface that differs from a first air interface, and sending and receiving data over both interfaces, as disclosed herein, as cited herein. *See, e.g.*, Dua at ¶[0015], ¶[0016], ¶[0018], ¶[0041], and FIG. 8.

2. Analysis

(a) Claim 1

- (i) **1[pre]:** *A method of operating a smartphone using a first air interface and a second air interface that differs from the first air interface, the method comprising:*

140. In my opinion, Dua discloses this limitation. Dua discloses a wireless device (smartphone) that is a “handheld device, such as a mobile telephone,” “capable of wirelessly connecting to the internet” and running applications like a “wallet application.” Dua Abstract, ¶¶[0041], [0049]-[0051], [0287]-[0288], FIGS. 3, 5, 6(a)-8.

141. Dua explains that “[t]he capability of wireless devices has been augmented by their ability to connect to the Internet and also to exchange data over short ranges with other wireless devices or readers.” Dua ¶[0015]. Dua identifies specific short range protocols (each a first air interface) including various IEEE 802.11 Wi-Fi protocols, Bluetooth, IrDA (infrared), RFID, and NFC. Dua ¶[0016]. See also Dua ¶[0018], ¶[0041] (“Wireless device 200 also preferably has an integrated short-range communication capability...”), and ¶[0383]. Dua thus discloses a smartphone using a first air interface.

142. Dua’s wireless device can make and receive voice calls over a cellular network – that is what mobile telephone did at the time. Dua also discloses that the mobile device uses cellular data communications. Dua ¶[0041] (“connecting to the

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Internet using network protocols such as GSM/GPRS, CDMA2000, W-CDMA, EDGE...”). Both voice and data use the second (cellular) air interface. As can be seen in annotated FIG. 8 (first air interface, yellow; second air interface, purple), the second air interface differs from the first air interface: the short range protocols disclosed by Dua are not cellular protocols.

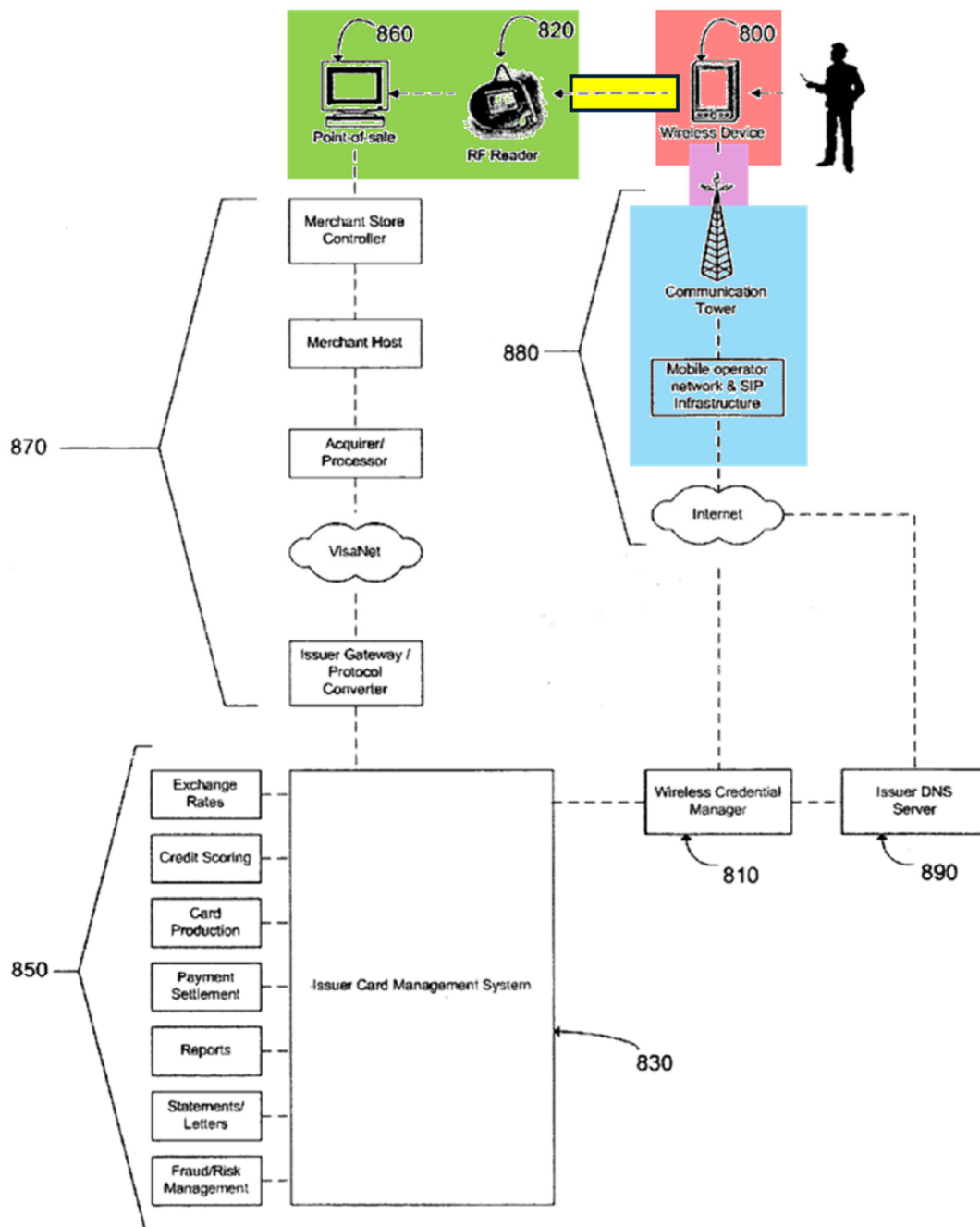
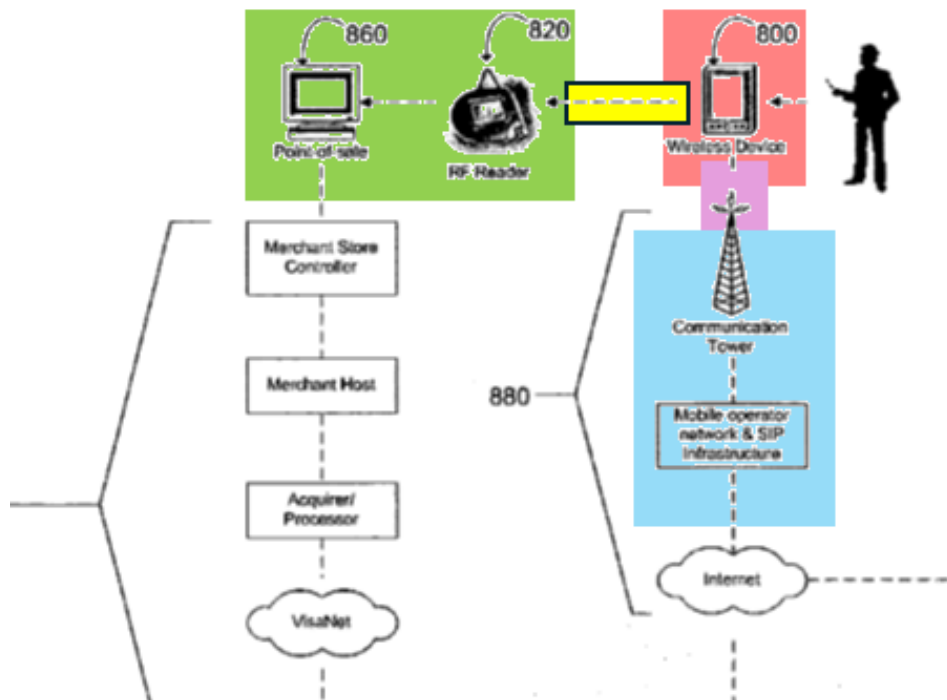


FIG. 8

- (ii) 1[a]: *communicating between the smartphone and an entity using the first air interface responsive to a proximity criterion having been satisfied between the smartphone and the entity to provide*

information to the entity over a short-range link between the smartphone and the entity;

143. In my opinion, Dua discloses this limitation. As an initial matter, I observe that the limitation consists of two steps that are recited out of order. First, the claim requires that *a proximity criterion has been satisfied between the smartphone and an entity*. Responsive to the criterion being satisfied, the claim then requires *communicating between the smartphone and the entity using the first air interface ... to provide information to the entity over a short-range link between the smartphone and the entity*. I address these two steps below, in logical sequence. Relevant elements are shown in excerpted and annotated Dua FIG. 8. The *smartphone* (wireless device) is in red. The *entity* (reader/POS) is in green. The *short-range link* over the *first air interface* is in yellow.



144. First, I discuss Dua's disclosure that *a proximity criterion has been satisfied between the smartphone and an entity*. Dua discloses two "environments" in which a wireless device communicates over a short range point-to-point connection with a reader/POS to perform a transaction. In the "local environment" (also "proximity environment"), the wireless device "is in the vicinity of a reader device that is connected to a point-of-sale (POS) terminal." Dua ¶[0315]. In a "personal environment," the wireless device and the reader/POS also "establish secure connectivity" but there may be a "a bi-directional exchange of data." Dua ¶¶[0318]-[0319]. In both environments, the wireless device and the reader/POS may communicate using RF protocols. Dua ¶[0315] and ¶[0319]. Dua discloses that NFC is one such protocol. Dua ¶[0016].

145. In my opinion, a POSITA would have understood that Dua's NFC communications can only occur if the reader/POS and the wireless device are sufficiently close (*a proximity criterion has been satisfied between the smartphone and an entity*). EX1045 at §§10-11; *see also* EX1036 at 220. Specifically, Dua's NFC protocol is only effective if an underlying signal of sufficient strength is detected such that the device and the reader/POS can communicate using that protocol. EX1035 at 4, 36; EX1037 at 3. That signal strength rapidly deteriorates as distance increase. EX1035 at 4, 36; EX1037 at 3. Dua itself recognizes that the wireless device and reader/POS must be "in close proximity" and that this may be

within “two to three inches.” Dua ¶[0009]. *See also* Dua ¶[0383], disclosing embodiments in which, after a “wallet button” on the wireless device (*smartphone*) is pressed, the wireless device responds according to whether it is or is not “in proximity of the reader,” which requires the device (*smartphone*) *detecting* that it is proximate to the reader/POS (*entity*)).

146. A POSITA would also understand that Dua renders this obvious. NFC and other short range wireless communication protocols require satisfying a proximity condition because such wireless communication protocols are only effective within a short range. The communication signals between the device and terminal must be strong enough to engage in communication with that protocol. The strength of the signal is dependent on distance between device and terminal, where signal strength increasingly attenuates as the distance gets greater.

147. Without a reaching a certain signal strength or otherwise satisfying a *proximity condition*, both devices are sending unnecessary communication signals guaranteed to be lost. This wastes time and processing. Especially for communications executing financial transactions, either device indiscriminately transmitting sensitive financial information without ensuring communication to the correct device is a security risk. Either device is sending communications that will likely to subject to errors, like packet loss, due to transmission past an effective range, increasing the risk of miscommunication. And devices trying to read wireless

communications with weak signal strength are also likely to misinterpret noise or other small unintended wireless signals as communications.

148. Implementing NFC to determine whether a proximity condition is satisfied and communicating based on that condition's satisfaction, were well-known to a POSITA. For example, EX1020 discloses using NFC to limit the range at which communication may take place. EX1020 ¶¶[0041] ("In certain embodiments, the communication may occur within a range of approximately 2 to 4 cm. The close range communication with the NFC device 44 may take place via magnetic field induction, allowing the NFC device 44 to communicate with other NFC devices or to retrieve information from tags having radio frequency identification (RFID) circuitry."), [0063] ("The device 10 may be configured to communicate with the transaction terminal 120 using a short range wireless communication protocol, when positioned over the box 124. ... In some embodiments, the wireless communication device 126 may be a near field communication (NFC) device and the device 10 may be configured to initiate NFC communications with the terminal 120."). Further, EX1020 discloses using other wireless signals to determine proximity. EX1020 ¶[0073] ("The [identifying information] may be used by the device 10 to indicate that the device is located within communication range of the hot spot 169."). This makes common sense. Where a particular wireless signal is restricted to a particular distance (e.g., "2 to 4

cm” or “10 cm or less” for NFC (EX1017 ¶[0030]; EX1020 ¶[0041])), a device receives messages at a certain signal strength and generally without errors when the transmitting device is within that distance. Thus, signal strength and received messages can be used to determine proximity. Receiving a weak signal and receiving incoherent messages—messages picking up errors from wireless transit—indicate that the transmitter is outside the effective range.

149. As such, it would have been obvious for a POSITA to configure the smartphone to first detect that it is proximate to Dua’s wireless device prior to attempting short-range signal communication to reduce wasted time, wasted power, security risks, and miscommunication in transmission and reception. For example, a POSITA would know that the wireless device could use a reader/POS’s transmission of a reader-key in this manner. *See, e.g.*, EX1017 ¶[0353] and ¶[0318].

150. ECMA 340 is a well-known communications standard that defined NFC communication. EX1045 is a true and correct copy of the 2nd edition of the ECMA 340 Interface and Protocol Standard for NFC (“ECMA-340”), which was publicly available and known to a POSITA as of its release in December 2004, and which was not updated again until June 2013. *See* <https://ecma-international.org/publications-and-standards/standards/ecma-340/>. This version was also published as the “ISO 18092.” *Id.* In addition, the disclosures of ECMA-340

discussed below are found in both the 1st edition (released December 2002) and the 2nd edition. *See* EX1034 (December 2002 first edition).

151. ECMA-340 explains that an NFC “transaction” requires an “initialization” (described in ECMA-340 section 11) and then a “data exchange” (described in ECMA-340 section 12). EX1045 at §4.26, §10, Figure 5. ECMA-340 specifies two devices (“Initiator” and “Target”) and two communication modes (“Passive” and “Active”). EX1045 §1, §4.1, §4.7, §4.17, §4.23, §7.

152. Regardless of which of the two devices communicating via NFC is the “Initiator” and which is the “Target,” and regardless of what NFC communication mode they use, according to ECMA-340 both the Initiator and the Target detect that a proximity criterion has been satisfied and, after they both perform that detecting, they then establish a short-range link that is used for subsequent communications. Specifically, in both modes, an “Initiator” device “shall activate its RF field” and a “Target” device then “shall be activated by the RF field of the Initiator.” EX1045 at §10. Then, the “Initiator” sends one or more commands (e.g., ALL_REQ, SENS_REQ, and/or ATR_REQ) and receives one or more responses (e.g., SENS_RES and/or ATR_RES). *See* EX1045 §§11.2.1.16-.17, §11.2.1.23, §11.3.2, §§12.2-.3, Figure 13, Figures 24-25.

153. In even more detail, in Passive mode, an activated Target enters the SENSE state. EX1045 §11.2.1.8, §11.2.1.9. The “Initiator” then sends commands

“to probe the field for Targets” (EX1045 § 11.2.1.16), receives a SENS-RES response from a Target in the SENSE state (EX1045 §11.2.1.17), and then selects that Target “for further communication” (EX1045 §11.2.1.23, Figure 13). *See also* EX1045 §12.2 and Figure 24. In Active mode, after the Target is activated by the RF field of the Initiator, it receives an ATR_REQ message from the Initiator, generates its own RF field, and uses that field to send an ATR_RES message to the Initiator. EX1045 §11.3.2. In response to that message, the Initiator sends a DEP_REQ “to start the data exchange protocol.” EX1045 §11.3.2. *See also* EX1045 §12.3 and Figure 25.

154. Thus, regardless of what mode is used and regardless of whether Dua’s wireless device is the Initiator or the Target, it detects that a ***proximity criterion has been satisfied***: if the Target, by activating in response to a sufficiently strong field from the Initiator and if the Initiator, by receiving a response to a command from the Target. In addition, this exchange of commands and responses results in the selection of a particular “Target” and attributes/parameters for further communication with the same, thereby establishing a ***short-range link***. EX1045 at §7, §§11.2.1.24-25, §12, §12.1, Figure 22, Figure 24-25. After this ***link*** is established, the Initiator and the Target communicate using ECMA-340’s data exchange protocol. EX1045 Figures 5, 23, and 24. This includes Dua’s NFC communications between the wireless device and the reader/POS that I discuss herein.

155. In my opinion, a POSITA reading Dua would have known the above because of the public availability of ECMA-340 and the amounts of publicity around NFC. But at a minimum, it would have been obvious to implement Jain's NFC communications in this manner. Dua already tells a POSITA to look to the "ISO/IEC 14443" RF proximity standard (Dua ¶[0013]), which would motivate a POSITA to also look to the standard for NFC. A POSITA would be motivated to implement the standard rather than define a proprietary approach to simplify design, to allow for use of commercially available NFC hardware and software, to minimize the need for trial and error, and to maximize interoperability with standard-compliant reader/POS systems and mobile devices.

156. Patent Owner alleges in its district court infringement contentions that use of NFC is sufficient to show that a *proximity criterion has been satisfied*. EX1016 at 7-11.

157. In my opinion, it also would have been obvious to a POSITA for Dua's wireless device to first detect such proximity based on a signal from the reader/POS (e.g., a "reader key" transmitted from the reader/POS per Dua ¶[0353], or earlier commands and responses exchanged as part of implementing ECMA-340) prior to communicating with the reader/POS. This would be done, for example, to ensure communications would be successful and not wasted signaling, and to avoid the security risk of indiscriminately transmitting sensitive financial information. Such

implementations were well-known to a POSITA. For example, EX1020 discloses and leverages NFC to limit the range at which communication may take place. EX1020 ¶¶[0041], [0063]. In the context of Wi-Fi, EX1020 discloses using the ability to receive such signals as an indication of proximity. EX1020 ¶[0073] (“The [identifying information] may be used by the device 10 to indicate that the device is located within communication range of the hot spot 169.”). A POSITA would be motivated and able to use Jain’s NFC “request” in the same manner.

158. For all of the above reasons, it is my opinion that Dua discloses or renders obvious that *a proximity criterion has been satisfied between the smartphone and an entity*. I now explain my opinion that it discloses or renders obvious *responsive* to that satisfaction, *communicating between the smartphone and the entity using the first air interface ... to provide information to the entity over a short-range link between the smartphone and the entity*.

159. As I explain above, Dua’s reader/POS (*entity*) and wireless device (*smartphone*) first need to be sufficiently close to go through the NFC initialization process (*responsive to a proximity criterion having been satisfied*) and to select a particular “Target” for further communication (thereby establishing a *short-range link between the smartphone and the entity*). Only after those steps are complete can “credentials” (information) be provided from the wireless device (smartphone) to a reader/POS (entity) via an NFC connection (over a short-range link between the

smartphone and the entity). *See, e.g.*, Dua ¶[0026] (“credentials [issued by, e.g., issuers] are ultimately supplied to a handheld device such as a mobile telephone... [t]he user holding the credential may then use the handheld device to conduct the authorized transaction or set of transactions via, for example, a short range wireless link with a point-of-sale (POS) terminal.”), ¶[0315] (similar), ¶[0404] (similar), ¶[0016] (the RF communication may be NFC).

(iii) 1[b]: *refraining from communicating between the smartphone and the entity by the smartphone using the first air interface absent the proximity criterion having been satisfied between the smartphone and the entity; and*

160. In my opinion, Dua discloses this limitation because Dua’s wireless device does not communicate with the reader/POS over the short-range connection (*refraining from communicating between the smartphone and the entity by the smartphone using the first air interface*) if the device is not within short-range signal range of the reader/POS (*absent the proximity criterion having been satisfied between the smartphone and the entity*).

161. First, if the two are not sufficiently close, short-range communication is not possible. I explain this above re limitation 1[a] and the *proximity criterion*. For example, Dua discloses an embodiment of the wireless device that includes a “wallet button” that provides additional security. Dua ¶[0383]. After the button is pressed, the device will communicate with the reader/POS only if the two become

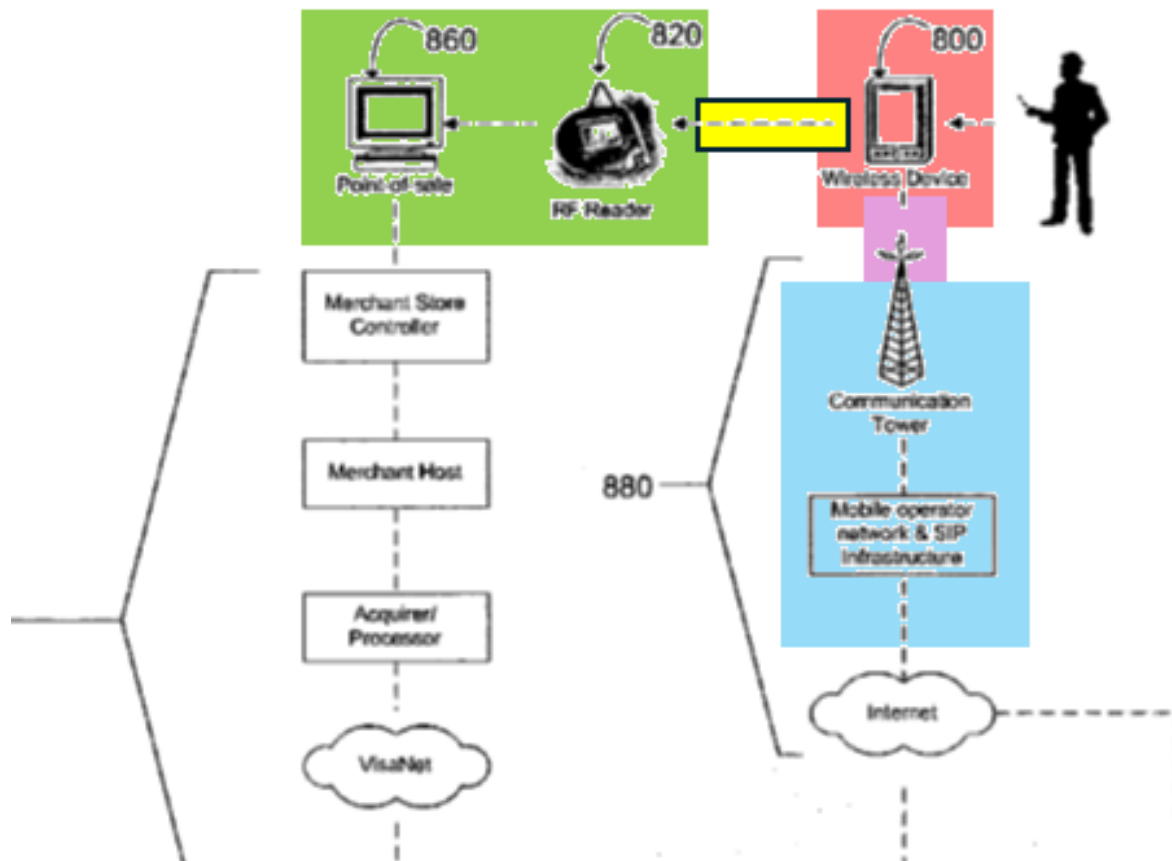
proximate during a set period of time. *Id.* “In the event that the device is not placed in proximity of the reader” during that period (absent the proximity criterion having been satisfied between the smartphone and the entity), “the application will disable RF communication” (refraining from communicating between the smartphone and the entity by the smartphone using the first air interface). *Id.*

162. Second, it would have been obvious to a POSITA that Dua’s wireless device would refrain from communicating with the reader/POS using the first air interface if the two are not sufficiently proximate. As I explained in my discussion of limitation 1[a], a POSITA would be motivated by the need to ensure the sensitive communications are successful and secure and would have had a reasonable expectation of successful implementation because this was a known implementation option at the time.

163. My opinions are consistent with Patent Owner’s infringement contentions, where Patent Owner relies on the observation that “NFC is limited to short-range communication” such that “[a] user must be within 3.5 inches (10 cm) of an NFC terminal to process a payment...” EX1016 at 10-11.

- (iv) ***1[c]: communicating between the smartphone and a base station using the second air interface to receive a communications service from the base station via the second air interface, wherein the smartphone receives the communications service from the base station via the second air interface but does not receive the communications service from the entity via the first air interface***

164. In my opinion, Dua discloses this limitation. Dua refers to a cellular network as a “mobile operator network.” *See, e.g.*, Dua ¶¶[0044], [0051], [0409]; FIG. 8. Dua’s wireless device (smartphone) has cellular communications capabilities (second air interface) that allow it to communicate with a cell tower (base station) to receive cellular services (receive a communications service). *See* Dua ¶¶[0015], [0044], [0051], [0409]; FIG. 8 (showing the wireless device connecting via second air interface (purple) to the mobile operator network via a cell tower (base station)).



165. Dua’s wireless device does not receive the communications service from the entity via the first air interface. There is no overlap between reader/POS

(green) and the devices (blue) providing the cellular service (communications service). *See* Dua FIG. 8.

166. Patent Owner's infringement contentions assert, without elaboration, that the accused device "does not receive the communications service from the point-of-sale terminal (the entity) via NFC (the first air interface)." EX1016 at 15-16.

- (v) **1[d]: *wherein the communicating between the smartphone and the entity using the first air interface responsive to the proximity criterion having been satisfied between the smartphone and the entity to provide information to the entity over the short-range link between the smartphone and the entity is performed concurrently with the communicating between the smartphone and the base station using the second air interface to receive a communications service from the base station via the second air interface.***

167. The only additional requirement recited in this limitation is that the *communicating using the first air interface* of limitation 1[a] and the *communicating using the second air interface* of limitation 1[b] be done *concurrently*. In my opinion, Dua discloses this limitation.

168. As I address above, Dua's wireless device (*smartphone*) is independently capable of using both NFC communication (*first air interface*) and cellular communication (*second air interface*). There is no disclosure in Dua of ceasing cellular communication when engaging in NFC communication, or vice versa.

169. Also, in my opinion a POSITA would have found it advantageous and obvious to maintain such communication (i.e., to concurrently communicate) and disadvantageous to cease it. For example, if the user of the wireless device were in the midst of a phone call at the time of transaction, it would be desirable to maintain that call during the transaction. *See* Dua ¶¶[0015], [0026]. It would be similarly desirable to avoid premature termination of file transfers or disruption to data-dependent applications, both of which can use the cellular data networks. *See* Dua ¶[0041] and FIG. 8 (showing that wireless devices can access the internet through the mobile operator network). Also, re-establishing cellular connectivity after it is disabled can entail a noticeable delay that a POSITA would want to avoid.

170. It is my opinion that performing the communications concurrently was well within the abilities of a POSITA, who would have had a reasonable expectation of success when implementing it, not least because cellular communication and NFC communication use different hardware. Also, simultaneous use of cellular networks and other short-range frequencies was well known to a POSITA, as evidenced at least by the common use of Bluetooth to connect to a headset while cellular networking was used to make voice calls. *See, e.g.*, EX1043 (a July 2007 review of a Bluetooth headset Apple released for use with its iPhone) and EX1044 (an August 2005 review of eight Bluetooth headsets tested with a Treo650 smartphone).

(b) Claim 2

(i) 2[pre]: *The method of claim 1,*

171. As addressed in Sections V.B.1.a, it is my opinion that Dua discloses limitation 2[pre].

(ii) 2[a]: *further comprising detecting that the proximity criterion between the smartphone and the entity is satisfied.*

172. In my opinion, Dua discloses this limitation. The basis for my opinion is set forth above, with respect to limitation 1[a] and Dua's disclosure that the proximity criterion between the smartphone (Dua's wireless device) and the entity (Dua's reader/POS) is satisfied. That explanation includes a discussion of Dua's disclosure of the wireless device 110 (smartphone) detecting that the proximity criterion is satisfied. For example, and with reference to the discussion of the ECMA-340 NFC standard, it does not matter whether the wireless device (smartphone) is the Initiator or the Target (and it must be one or the other), because—as I explain above re limitation 1[a]—either way it performs detecting that the proximity criterion between the smartphone and the entity is satisfied.

173. Also, this additional limitation of 2[a] follows from limitations 1[a] and 1[b], whereby wireless device's communications with the reader/POS are responsive to the *proximity criterion having been satisfied* and, if the criterion is not satisfied, it refrains from communicating with the reader/POS. The wireless device therefore only communicates with reader/POS if the proximity criterion is satisfied, and

therefore it must know that it is proximate to the reader/POS (i.e., by *detecting that the proximity criterion... is satisfied*). At a minimum, as I explain above in connection with limitation 1[a], it would have been obvious to implement the claimed *detecting* on Dua's wireless device (*smartphone*).

174. Patent Owner's district court infringement contentions assert a smartphone's communication with a POS using NFC is itself sufficient of *detecting by the smartphone that a proximity condition is satisfied*. See EX1016 at 22-25.

(c) Claim 3

(i) 3[pre]: *The method according to claim 2:*

175. As addressed in Sections V.B.1.b, it is my opinion that Dua discloses limitation 3[pre].

(ii) 2[a]: *wherein the detecting comprises: detecting that a proximity criterion of less than 10 meters in distance is satisfied between the smartphone and the entity,*

176. In my opinion, Dua discloses this limitation. Dua discloses that the effective range of unpowered smartcards is "typically two to three inches" for unpowered cards. Dua ¶[0009]. These cards may be included in Dua's wireless device. Also, that range is consistent with what a POSITA knows about NFC: it has an effective range of about 10 cm. See, e.g., EX1032 §8. Thus, when Dua's wireless device detects the proximity criterion is met at those ranges, as I address above with

respect to limitations 1[a] and 2[a], it is detecting that a proximity criterion of less than 10 meters in distance is satisfied between the smartphone and the entity.

- (iii) **3[b]:** *wherein the detecting is performed by the smartphone, by a device that is associated with the entity and/or by a system that is associated with the smartphone.*

177. In my opinion, Dua discloses this limitation. As I set out above for limitations 1[a] and 2[a], the detecting is performed by the wireless device (the claimed smartphone) or by a system that is associated with the wireless device.

(d) Claim 4

- (i) **4[pre]:** *The method according to claim 1:*

178. As addressed in Sections V.B.1.a, it is my opinion that Dua discloses limitation 4[pre].

- (ii) **4[a]:** *wherein the entity comprises a first device, wherein the information provided to the entity comprises first information, and wherein the method further comprises: selectively sending, by the smartphone, second information to a second device and receiving, by the smartphone, third information from the second device responsive to the proximity criterion having been satisfied between the smartphone and the entity,*

179. In my opinion, Dua discloses this limitation. Dua's reader/POS (the entity) is a point-of-sale terminal including an RF reader, and thus comprises a first device. And as I explain above re limitation 1[a], Dua discloses "information provided to the entity," which is the first information.

180. The remainder of this limitation requires selectively sending, by the smartphone, second information to a second device and receiving, by the smartphone, third information from the second device responsive to the proximity criterion having been satisfied between the smartphone and the entity.

181. In my opinion, Dua discloses this. Dua's wireless device (the smartphone) communicates with both the reader/POS (the entity) and, via cellular connection to the internet, wireless credential manager 810 ("WCM," second device). *See* Dua FIG. 8. These two connections are deployed in support of PIN verification, whereby "[c]ertain credential issuers such as financial institutions may require that users validate their identify during a transaction by providing a PIN." Dua ¶[0397]. In one embodiment, a reader/POS "can be used to capture and transmit an electronic credential from a wireless device for online authorization" while the WCM also receives a PIN directly from the wireless device over the Internet (selectively sending, by the smartphone, second information to a second device) in response to a "PIN request" sent from the WCM to the wireless device (receiving, by the smartphone, third information from the second device). Dua ¶[0405]; FIG. 8.

182. This communication between the wireless device (smartphone) and the WCM (second device) occurs only in the context of a transaction between the device and the reader/POS (entity). As I explain above re limitation 1[a], it is thus

responsive to the proximity criterion having been satisfied between the smartphone and the entity.

183. Dua also discloses the issuer's WCM (second device) sending the wireless device (smartphone) a request for information such as a "transaction history" (receiving, by the smartphone, third information from the second device). Dua ¶[0180]. The request is displayed on the wireless device, allowing the user to authorize the wireless device to respond (sending, by the smartphone, second information to a second device). *See id.*

184. In my opinion, it also would have been obvious to a POSITA for an issuer to request a transaction history in response to transaction communication between the wireless device and the reader/POS (which, again, is responsive to the proximity criterion having been satisfied between the smartphone and the entity). Dua discloses a broad concern with potential fraud. *E.g.*, Dua ¶¶[0012]-[0019], [0414]. A POSITA would have recognized that upon completion of a transaction or receipt of a request to approve a transaction, a reasonable security measure would be to request from the wireless device a list of recent transactions so that the issuer could identify discrepancies (and thus potential fraud) in the transaction history.

(iii) 4[b]: wherein the smartphone does not receive the communications service from the second device.

185. In my opinion, Dua discloses this limitation. Dua's wireless device (smartphone) does not receive cellular service from the issuer's WCM (second

device). Rather, as I explain above regarding limitation 1[c], cellular service is delivered to the device from a base station associated with a mobile operator network.

(e) Claim 5

(i) 5[pre]: *The method according to claim 1,*

186. As addressed in Sections V.B.1.a, it is my opinion that Dua discloses limitation 5[pre].

(ii) 5[a]: *wherein the communicating, over the short-range link, between the smartphone and the entity using the first air interface responsive to the proximity criterion having been satisfied is performed over a point-to-point short-range link between the smartphone and the entity using a time division duplex protocol.*

187. It is my opinion that Dua discloses this limitation, whose additional requirement compared to limitation 1[a] is that the information provided to the entity be sent over a point-to-point short-range link between the smartphone and the entity using a time division duplex protocol.

188. In Dua, one technology for “short-range... device-to-device communication” (communicating ... over a point-to-point short-range link) is NFC. Dua ¶[0016]. NFC is a point-to-point short-range link between an Initiator and a Target, and it uses a time division duplex protocol. *See* EX1032 generally (re point-to-point and short-range) and at 21 (describing NFC as a “half... duplex system”);

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EX1045 (generally describing NFC as a point-to-point protocol and at §12.6.1.1 explaining it is a “half-duplex protocol”).

189. Also, Patent Owner admits NFC (1) “uses induction coupling to enable communication between two compatible devices that are close” and is therefore a point-to-point short-range link (EX1016 at 36) and (2) is a “half duplex communication technology” and is therefore using a time division duplex protocol (EX1016 at 37).

(f) Claim 6

(i) 6[pre]: *The method of claim 1,*

190. As addressed in Sections V.B.1.a, it is my opinion that Dua discloses limitation 3[pre].

(ii) 6[a]: *further comprising enabling a function by the smartphone in response to an identity, wherein the identity is communicated between the smartphone and the entity.*

191. It is my opinion that Dua discloses this limitation. Dua discloses that when an issuer provides a credential to a wireless device, the credential may include a reader key (the claimed identity). Dua ¶¶[0353], [0356]. A reader key identifies a reader/POS as being affiliated with, e.g., a particular merchant, store, or organization. Dua ¶¶[0353]-[0355]. As such, it strongly resembles the “identity” disclosed in the ’708 specification. *See* EX1001 3:63-4:11.

192. Dua also discloses that when a wireless device (smartphone) is used for a proximity payment in a store, a reader/POS (entity) in that store may transmit a reader key to the wireless device (the identity is communicated between the smartphone and the entity), causing the wireless device to automatically send back credentials that include that reader key. Dua ¶¶[0353]-[0355]. Dua also describes “PIN-less transactions” wherein the wireless device’s receipt of a reader key causes the wireless device to transmit an associated credential without first prompting the user for a wallet PIN. Dua ¶¶[0367]-[0370]. Only credentials with reader-keys can be sent in response to a received reader key or used for PIN-less transactions (enabling a function by the smartphone in response to an identity). Dua ¶¶[0367], [0371].

193.

(g) Claim 7

(i) 7[pre]: *The method of claim 6,*

194. As addressed in Sections V.B.1.f, it is my opinion that Dua discloses limitation 7[pre].

(ii) 7[a]: *wherein the enabling the function is performed in response to comparing the identity with one or more identities.*

195. In my opinion, Dua discloses this limitation. As I discuss above with respect to limitation 6[a], automatic sending of credentials and PIN-less transactions (the functions enabled in response to a reader key (identity)), are performed in

response to comparing the identity with one or more identities: the reader key received from the reader/POS is used “as a search string for locating the linked credential” on the wireless device (smartphone) and “[i]f a matching key is found” then the associated credential is transmitted. Dua ¶[0354]. *See also* Dua ¶[0353].

(h) Claim 8

(i) 8[pre]: *The method of claim 6,*

196. As addressed in Section V.B.1.f, it is my opinion that Dua discloses limitation 8[pre].

(ii) 8[a]: *further comprising establishing the short-range link between the smartphone and the entity in further response to the identity.*

197. In my opinion, Dua discloses this limitation. Dua discloses that the reader key (identity) “may also be included as part of a ‘handshake’ message and/or ‘challenge’ message (associated with challenge/response technology that is frequently used with RFID) transmitted from the reader to the wireless device” and “could also be transmitted before or immediately after a “handshake” and/or “challenge” message.” Dua ¶[0356]. This is a disclosure that establishing the short-range link between the smartphone and the entity, which requires a successful handshake or challenge, is in further response to the identity.

(i) Claim 9

(i) 9[pre]: *The method of claim 1,*

198. As addressed in Sections V.B.1.a, it is my opinion that Dua discloses limitation 9

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- (ii) **6[a]: *further comprising providing a notification at the smartphone in response to receiving a signal from the entity.***

199. In my opinion, Dua discloses this limitation. Dua discloses that a PIN-less transaction occurs when the wireless device sends a credential in response to receipt of a “reader key” from a reader/POS (receiving a signal from the entity). Dua ¶¶[0354], [0367]-[0370]. Dua also discloses embodiments in which in response to this (“[i]f a PIN-less transaction takes place” during a pre-set period of time) “the device alerts the user ... through sound/vibration and messaging” (providing a notification at the smartphone) Dua ¶[0384]. *See also* Dua ¶[0369].

(j) **Claim 10**

- (i) **10

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]: The method of claim 1,
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200. As addressed in Sections V.B.1.a, it is my opinion that Dua discloses limitation 10

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- (ii) **10[a]: *wherein the entity comprises a first device to which the smartphone provides the information over the short-range link,***

201. In my opinion, Dua discloses this limitation. Dua’s reader/POS (entity) is a point-of-sale terminal coupled to or including an RF reader, and is a device. Dua ¶[0013] (“merchants can easily add a contactless RF reader to their existing POS systems”). *See also* Dua ¶[0354]. And as I explained re limitation 1[a], the wireless

device (smartphone) provides credentials to the reader/POS over an NFC connection (to which the smartphone provides the information over the short-range link). *See* Dua ¶¶ [0016], [0026], [0315], [0404].

202. Patent Owner, in its infringement contentions, similarly identified first device as “the entity such as a point-of-sale terminal.” EX10016 at 49.

(iii) 10[b]: *and wherein the method further comprises sending the information to a second device responsive to the proximity criterion having been satisfied between the smartphone and the entity.*

203. In my opinion, Dua discloses this limitation. After and in direct response to the wireless device (smartphone) sending a credential (the information) to a reader/POS (entity), the reader/POS then sends an “authorization request” to an issuer’s infrastructure for transaction approval (sending the information to a second device). *E.g.*, Dua ¶[0417] (“the credential information is transmitted to a reader via RF... [t]he POS at the grocery store will switch the transaction to its central host, which [eventually] switches the authorization request to ... the card issuer, [which] ... passes the transaction to its card management system for approval.”). *See also* Dua ¶¶[0404]-[0408] and FIG. 8. The authorization request sent to the issuer’s infrastructure (which includes a second device) contains the same credential (the information) that was sent from the wireless device (smartphone) to the reader/POS (entity). Dua ¶[0404].

204. And because a proximity transaction causes the request for issuer authorization, consistent with my explanation above regarding limitation 1[a] the sending is responsive to the proximity criterion having been satisfied between the smartphone and the entity.

205. This is consistent with Patent Owner's theory of infringement, in which it identifies sending the information to a second device as the POS sending tokenized account information "to the payment network." EX1016 at 49-52.

(k) Claims 11-15

206. In my opinion, claims 11-15 are substantively identical to claims 1-5, and therefore disclosed by Dua. The only difference is that claims 11-15 are directed to "A smartphone comprising a processor that is configured to control the smartphone to perform operations comprising..." whereas claims 1-5 are directed to "[a] method of operating a smartphone... comprising..." This distinction is immaterial because Dua discloses both methods and systems. *See, e.g.,* Dua at Abstract.

(l) Claim 16

207. The only limitation in claim 16 not found in and addressed by my explanation regarding claim 1 is that communicating over the first air interface uses "a point-to-point short-range link between the smartphone and the entity using a time

division duplex protocol.” However, that limitation is found in dependent claims 15 and 5, and I address it above with respect to limitation 5[a].

208. Claim 16 also requires that “the entity is not involved in providing the communications service,” but that requirement is met for the same reason that the claimed smartphone “does not receive the communications service from the entity via the first air interface”: a POS (entity) is not a communications service provider. I address this in the context of limitation 1[c], above.

209. In my opinion, Dua discloses claim 16 for the for the reasons I set forth above in connection with claims 1, 5, and 15.

(m) Claim 17

(i) 17[pre]: *The method of claim 16,*

210. As addressed in Section V.B.1.1, it is my opinion that Dua discloses limitation 17[pre].

(ii) 17[a]: *wherein the communicating by the smartphone using the second air interface to receive the communications service via the second air interface comprises communicating between the smartphone and a base station using the second air interface to receive the communications service from the base station via the second air interface.*

211. In my opinion, Dua discloses this limitation. The additional requirement of this limitation is that receiving the communication service via the

second interface is done via a base station. Dua discloses this additional requirement, as I explain in the context of limitation 1[c].

(n) Claims 18-19

212. In my opinion, claims 18-19 are substantively identical to claims 16-17, and therefore disclosed by Dua. The only difference is that claims 11-15 are directed to “A smartphone comprising a processor that is configured to control the smartphone to perform operations comprising...,” whereas claims 1-5 are directed to “[a] method of operating a smartphone... comprising...” This distinction is immaterial because Dua discloses both methods and systems. *See, e.g.*, Dua at Abstract.

VI. Secondary Considerations of Non-Obviousness

213. I understand that so-called “secondary considerations” are legally relevant to an obviousness analysis. It is my opinion that the secondary considerations I consider here further weigh in favor of obviousness.

214. In my opinion, there is a lack of commercial success for any product practicing the '708 patent because the Patent Owner has not practiced the claimed invention (at any point in time) and because I am not aware of any other successful commercial deployments in the United States that are proven to embody the asserted claims. Even if such evidence existed, it would not undermine the strong showing of invalidity. Moreover, any difference between the claims of the '708 patent and the

prior art is minimal, and any secondary considerations would have minimal impact on the invalidity analysis.

215. In my opinion, there was no long-felt, unresolved need met by the '708 patent. It is my opinion that at the time of the alleged invention there were no technical barriers to wide-scale deployment of contactless payment with mobile devices, let alone technical barriers requiring disclosure of the alleged novelties of the '708 patent. To the extent wide-scale deployment in the United States post-dated the '708 patent, my understanding is that this was for reasons other than technical feasibility, such as industry and market barriers. Further, a vast number of contactless payment systems and trials of those systems existed before the '708 priority date. *See, e.g.*, Section IV. In my opinion, this indicates that many within the market observed the desirability of such systems and were concurrently working towards implementing them. In sum, I'm not aware of any of the factors for secondary considerations being present, but even if they existed, it would not impact the invalidity analysis.

VII. Conclusion

216. In signing this declaration, I recognize that the declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I also recognize that I may be subject to cross-examination in the case and that cross-examination will take place within the

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United States. If cross-examination is required of me, I will appear for cross-examination within the United States during the time allotted for cross-examination.

* * *

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on the 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.

Respectfully submitted,

Date: May 21, 2025



Kevin C. Almeroth, Ph.D.