

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,

Petitioner

v.

VARIA HOLDINGS LLC,

Patent Owner

Case No.: IPR2024-01364

U.S. Patent No. 8,127,984

Title: EMULATED RADIO FREQUENCY IDENTIFICATION

**DECLARATION OF MICHAEL I. SHAMOS, PH.D.
IN SUPPORT OF PATENT OWNER'S RESPONSE**

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I. INTRODUCTION

1. My name is Michael Shamos. I have been retained as an expert witness by Patent Owner Varia Holdings, LLC (“Varia” or “Patent Owner”) for this *Inter Partes* Review IPR2024-01364 of U.S. Patent No. 8,127,984 (the “’984 Patent” or the “Patent”) filed by Apple Inc. (“Apple” or “Petitioner”).

2. From the Petition (Paper 2), I understand that Petitioner is challenging the validity of Claims 1-39 (the “Challenged Claims”) of the ’984 Patent (Ex. APPL-1001), constituting all the claims of Patent, on the grounds of obviousness. I have been asked to prepare the present declaration to be submitted with Patent Owner’s Response.

3. This Declaration contains statements of my opinions formed in this case to date and the bases and reasons for those opinions. The statements made and opinions provided in this Declaration are based on my own personal knowledge. I may offer additional opinions based on further review of materials in this case, including opinions and/or testimony of other expert witnesses.

4. In this Declaration, all emphasis in boldface has been added unless otherwise noted.

5. I am aware that the parties are involved in related litigation captioned *Varia Holdings LLC v. Apple Inc.*, 1:23-cv-07477-RPK-RML (E.D.N.Y.) (the “Litigation”).

II. QUALIFICATIONS AND COMPENSATION

6. This section summarizes my educational background, career history, publications, and other relevant qualifications. My curriculum vitae is attached as Patent Owner's Exhibit EX2005, which includes my detailed employment background, professional experience, and list of publications.

7. I have an A.B. degree from Princeton University in Physics, an M.A. degree from Vassar College in Physics, an M.S. degree from American University in Technology of Management, an M.S. degree from Yale University in Computer Science, an M. Phil. from Yale University in Computer Science, a Ph.D. from Yale University in Computer Science, and a J.D. degree from Duquesne University.

8. I currently hold the title of Distinguished Career Professor in the School of Computer Science at Carnegie Mellon University in Pittsburgh, Pennsylvania. I am a member of two departments in that School, the Software and Societal Systems Department and the Language Technologies Institute. I was a founder and Co-Director of the Institute for eCommerce at Carnegie Mellon from 1998-2004 and from 2004-2018 was Director of the eBusiness Technology graduate program in the Carnegie Mellon University School of Computer Science. Since 2018, I have been Director of the M.S. in Artificial Intelligence and Innovation degree program at Carnegie Mellon.

9. I have taught graduate courses at Carnegie Mellon in Electronic Commerce, including eCommerce Technology, Electronic Payment Systems, Electronic Voting, Internet of Things, Ubiquitous Computing, Electronic Payment Systems and eCommerce Law and Regulation, as well as Analysis of Algorithms. Since 2007, I have taught an annual course in Law of Computer Technology. I currently also teach Artificial Intelligence and Future Markets.

10. I am the author and lecturer in a 24-hour video course on Internet protocols and have taught computer networking, wireless communication and Internet architecture since 1999.

11. From 2001-2021, I was a Visiting Professor at the University of Hong Kong, where I taught an annual course in Electronic Payment Systems. This is one of only a handful of graduate courses taught on this subject in the world.

12. I was the Director of Carnegie Mellon's graduate degree program in eBusiness Technology from 1999-2018 and am now a faculty member in the Privacy Engineering degree program at Carnegie Mellon. My course on Law of Computer Technology is required for all students in that program.

13. I am a named inventor on the following six issued patents relating to electronic commerce: U.S. Patent Nos. 7,330,839; 7,421,278; 7,747,465; 8,195,197; 8,280,773; and 9,465,299.

14. From 1979-1987 I was the founder and president of two computer software development companies in Pittsburgh, Pennsylvania, Unilogic, Ltd. and Lexeme Corporation.

15. I am an attorney admitted to practice in Pennsylvania and have been admitted to the Bar of the U.S. Patent and Trademark Office since 1981. I have been asked to render opinions in this declaration as a technical expert. I have not been asked to offer any opinions on patent law in this proceeding.

16. I have previously served as an expert in over 400 cases concerning computer technology. In particular, I have been involved in at least 45 cases involving electronic payment systems.

17. I am being compensated for my work in this case at the rate of \$625 per hour. I am also reimbursed for all reasonable expenses that I incur during the course of this IPR. My compensation does not depend upon the results of my analysis or the substance of my testimony, nor does my compensation depend on the outcome of this or any related proceeding. I have no personal interest in the outcome of this matter. I have no financial interest in Patent Owner or affiliation with any of the real parties in interest, the Patent Owner or the named inventors of the Patent. It is conceivable that I may own mutual funds whose portfolios include stock in Petitioner. If this is the case, the value of such holding would not constitute a material part of my net worth.

III. MATERIALS CONSIDERED

18. I have reviewed the following documents in forming the opinions expressed in this Declaration and I have considered all the materials cited herein and all materials filed in this IPR up to and including June 3, 2025.

19. I have also relied on my education, skill, training, and experience in the relevant fields of technology in forming my opinions. I have further considered the viewpoint of a person of ordinary skill in the art (“POSITA”) as of the time of the inventions of the Patent.

20. I reserve the right to supplement my opinions as expressed in this Declaration to address any new information obtained in the course of this proceeding, or based on any new positions taken by Petitioner.

IV. SUMMARY OF MY OPINIONS

21. It is my understanding that the following table summarizes the grounds of challenge to the Challenged Claims raised in the Petition:

Ground	Invalidity Challenge	References	Challenged Claims
1A	§ 103	Willgert and Mooney	1-3, 7-14, 18-22, 27-33, 37-39
1B ¹	§ 103	Willgert	1, 3, 7-14, 18-20, 32, 33, 37-39

¹ Petitioner asserts that Ground 1B applies Patent Owner’s claim interpretations asserted in the Litigation, while Ground 1A applies Petitioner’s interpretations.

2	§ 103	Willgert, Mooney, Holloway, & Pitroda	3-9, 15-19, 22-28, 34-38
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22. After a review of the alleged prior art asserted by Petitioner and the Declaration of Dr. Zhi Ding (“Ding Declaration,” EX1003), it is my opinion that Petitioner has not demonstrated that any Challenged Claims are unpatentable under any Grounds of the Petition. My opinions, and the bases therefore, are detailed throughout this Declaration.

V. LEGAL PRINCIPLES

23. Counsel for Patent Owner has informed me of the legal principles that apply in this proceeding.

24. I have been informed that Petitioner has the burden to prove that the claims challenged in the Petition are not patentable by a preponderance of the evidence, which I understand to be just enough evidence to make it more likely than not that Petitioner’s argument is correct.

25. A claim is invalid as obvious under 35 U.S.C. § 103 if the differences between the subject matter sought to be patented and the prior art are such that the subject matter of the claim as a whole would have been obvious at the time of the invention to a person having ordinary skill in the art to which the invention pertains. I have been informed that the following factors are used to determine whether or not the claimed subject matter would have been obvious: (i) the scope

and content of the prior art; (ii) the differences, if any, between the prior art and the claimed invention; (iii) the level of ordinary skill in the field of the invention; and (iv) any relevant objective considerations of non-obviousness.

26. A party asserting obviousness based on a combination of prior art references must demonstrate that one of ordinary skill in the art would have been motivated to combine the teachings of those references to achieve the claimed invention, and that the skilled artisan would have had a reasonable expectation of success in doing so. It is my understanding that it is not enough to show that one skilled in the art could combine elements of multiple references, but instead there must be some reason that would have prompted a person of ordinary skill in the art to combine the elements in the way the claimed invention does. I understand that there must be some reasoned explanation as to why one of ordinary skill in the art would combine the references.

27. I understand that obviousness may be shown by considering more than one item of prior art and by considering the knowledge of a person of ordinary skill in the art, and that obviousness may be based on various rationales including: (i) combining prior art elements according to known methods to yield predictable results; (ii) simple substitution of one known element for another to obtain predictable results; (iii) use of known techniques to improve similar devices in the same way; (iv) applying a known technique to a known device

ready for improvement to yield predictable results; (v) “obvious to try” – choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success; (vi) known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art; and (vii) some teaching, suggestion, or motivation in the prior that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

28. A combination of references would not have been obvious if the alleged modification(s) to be made to the reference(s) would have been inconsistent with the reference’s stated goals or method of operation or would have rendered the combination inoperable for its intended purpose. I further understand that for something to have been obvious, the party asserting obviousness must explain why a POSITA would have selected components for combination in the manner claimed.

29. I further understand that a claim is not obvious over a combination of prior art references if such references “teach away” from the claimed combination, if there is no motivation to combine such references, or if the combination would lead to waste and inefficiencies not present in one or more of the references in isolation.

30. It is my further understanding that obviousness cannot be based on a hindsight combination of components selected from prior art references. For example, the challenged patent itself cannot be used as a basis for combining prior art references absent such a teaching in the patent. I also understand that an invention would not have been obvious simply because all of the elements of the invention may have been known separately in the prior art.

31. Regarding claim construction, I understand that, in IPR proceedings, claims are construed using the Phillips standard, requiring a “construction that stays true to the claim language and most naturally aligns with the patent’s description of the invention.” I further understand that a claim term is to be given its plain and ordinary meaning to a POSITA unless the patentee has acted as his own lexicographer and has defined such term differently.

VI. LEVEL OF ORDINARY SKILL IN THE ART

32. I understand that the hypothetical POSITA is considered to have the normal skills and knowledge of a person in a certain technical field, as of the time of the invention at issue. I understand that factors that may be considered in determining the level of ordinary skill in the art include: (1) the types of problems encountered in the art; (2) the prior art solutions to those problems; (3) rapidity with which innovations are made; (4) the sophistication of the technology; and (5) the education level of active workers in the field. I also understand that “the

person of ordinary skill” is a hypothetical person who is presumed to be aware of the universe of available prior art. Therefore, no such person actually exists.

33. The Petition contains no characterization of a POSITA. Dr. Ding proposes that a POSITA for the Patent would have been “someone knowledgeable in mobile communication devices and components used therein, cellular radio systems, and wireless communications, such as those used for voice calling and radio frequency identification (RFID). That person would have at least a Bachelor’s degree in Electrical Engineering, with a background in radio frequency communications as well as approximately two years of experience working with or researching radio frequency communication systems.” (EX1003, ¶ 20.) Dr. Ding offers no explanation for this characterization,

34. I agree substantially with Dr. Ding’s description, which was adopted by the Boards (ID, p. 11), but with the following exceptions. The specification states that the inventive “mobile communication device” contains “hardware and/or software.” EX1001, 2:18-22. The device requires “software implementation” of its functions. *Id.*, 5:13-16. I therefore believe that software training and experience would be needed, so I believe the educational level of POSITA would be someone with “a Bachelor’s degree in Electrical Engineering, Computer Science, or a related field.” I also recognize that knowledge can be obtained either from work or study, so I would characterize a POSITA as follows:

someone knowledgeable in mobile communication devices and components and software used therein, cellular radio systems, and wireless communications, such as those used for voice calling and radio frequency identification (RFID). That person would have at least a Bachelor's degree in Electrical Engineering, Computer Science, or a related field, with a background in radio frequency communications and software development, as well as approximately two years of experience working with or researching radio frequency communication systems. Lack of work experience can be remedied by additional education, and vice versa.

35. Nevertheless, for the purposes of this IPR only, I have applied Dr. Ding's characterization. I do not have a degree in Electrical Engineering, but I have a Bachelor's and a Master's degree in Physics. I therefore consider that I fit Dr. Ding's characterization of a POSITA. I also fit my own characterization of a POSITA.

36. The opinions I express herein are from the viewpoint of such a POSITA as of the Patent's PCT filing date of June 10, 2004, the priority date apparently assumed by Petitioner². Pet., 4.

² Petitioner offers no opinion on a priority date, except that it does not concede that the Patent is entitled to the claimed Provisional filing date of June 13, 2003. Pet., 2. I disagree, noting that the drawings of the Patent and Provisional Application No. 60/478,245 (the "Provisional Application") (EX.2006) are identical and the specifications of the Patent and the Provisional Application are virtually identical.

VII. SUMMARY OF OPINIONS

37. Petitioner misapprehends the claimed invention. It does not comprise a mobile phone plus an RFID transponder. It requires emulation of an RFID signal, not a signal from an actual RFID transponder. This is clear from the title “Emulated Radio Frequency Identification,” and the Abstract, which reads:

A mobile communication device is equipped with hardware and/or Software components to enable the device to output a data in a form of a radio frequency signal, emulating outputting of the data by either an active or a passive RFID transponder. The data may be a security key or an identifier. Emulation of an active RFID transponder includes facilitating selection of the data and instruction to output by a user. Emulation of a passive RFID transponder includes detecting for proximal presence of a RFID reader. Either case, provision of the data to the mobile communication device may include provision of associated signal attribute(s).

38. The requirement of emulation is reinforced by the 16 occurrences of the word “emulated” or other forms of that word in the specification. No embodiment is disclosed that relies on a physical RFID transponder. All of the disclosed embodiments require RFID emulation.

39. Petitioner apparently relies on the fact that the term “emulating” does not literally appear in any independent claim. As shown below, proper claim construction interprets all the claims to require emulation.

40. Petitioner also misapprehends the claim term “voice call signals,” which the specification makes clear are signals carrying voice between a mobile phone and the network of a wireless network service provider. Petitioner has mistakenly taken the Bluetooth signals between a mobile phone and a wireless headset to be “voice call signals” because they carry voice. They may be “voice signals,” a term that does not appear in the Patent, but they are not “voice call signals” as properly construed.

41. Under proper claim construction, none of the cited prior art, alone or in combination, renders obvious any Challenged Claim.

VIII. CLAIM CONSTRUCTION

42. Petitioner asserts that no claim construction needed in this proceeding (Pet., 2), but then proceeds to base its Grounds on its own claim constructions and those propounded by Patent Owner in the Litigation. Petitioner points to “switching/state” (Pet., 65), transceiver (Pet., 68) not does not mention its implicit interpretation of the three critical claim terms listed below.

A. “wireless mobile phone”

Claim Phrase	Patent Owner’s Construction
“wireless mobile phone” (Claims 12, 20, 31, 39)	“telephony device equipped to facilitate a user in communicating with another user of another communication device, notwithstanding the user's movement around different geographic areas, so long the wireless mobile phone is in contact with a base/service station of a wireless network service

	provider. The other user/communication device may be mobile or land line based”
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43. The specification contains express lexicography for this term:

The term “wireless mobile phone” as used herein, including the specification and the claims, refers to the class of telephony devices equipped to facilitate a user in communicating with another user of another communication device, notwithstanding the user's movement around different geographic areas, so long the wireless mobile phone is in contact with a base/service station of a wireless network service provider. The term includes the analog as well as the digital subclasses. Communication may be voice and/or data, audio, textual and/or visual. The other user/communication device may be mobile or land line based.

Ex. 1001, 4:5-15

44. This lexicography makes clear that a wireless mobile phone requires communication through a base/service station of a wireless network service provider.

45. The language concerning the “other user/communication device” informs a POSITA that if the other user’s device is a mobile phone, telephony signals would be transmitted over the network of a wireless network service provider. If the other user’s device is land line based, telephony signals would be

transmitted in part over the network of a wireless network service provider and in part over the network of the land line based service provider.

B. “voice call signal[s]”

Claim Phrase	Patent Owner’s Construction
“voice call signal[s]” (Claims 1, 2, 13, 21, 32)	“transmit and receive signal[s] of a voice call over a network of a wireless network service provider”

46. The specification teaches a “wireless mobile phone” (see previous construction) that can perform telephony and emulate an RFID transponder. The “primary communication function” of the device is the transmit and receive “signals of a voice call,” which “facilitate a user in communicating with another user of another communication device.” Ex. 1001 at 7:10-13, 3:47-49. Each of the independent claims requires “voice call signal[s].” A POSITA would have understood from the teachings of the Patent and the express definition of “wireless mobile phone” that “voice call signals” are the type of signals capable of carrying a voice call from one user to the user of another device over the network of a wireless network service provider.

47. A POSITA would have understood that, under patentees’ lexicography, a “wireless mobile phone” transmits and receives its telephony signals over a network of a wireless network service provider. A POSITA would have understood that “voice call signals” are the “transmit and receive signals of a voice call over a network of a wireless network service provider.”

C. “RFID transponder signal” limitations

Claim Phrase	Patent Owner’s Construction
“RFID transponder signal[s]” (claims 1, 21, 32)	“RFID signal[s] emulated by a mobile communications device without the use of a physical RFID transponder”
“RFID transponder data as a radio frequency signal” (claim 13)	“RFID transponder data as a radio frequency signal emulated by a mobile communications device without the use of a physical RFID transponder”
“second RFID transponder data as a second radio frequency signal” (claim 9)	“second RFID transponder data as a second radio frequency signal emulated by a mobile communications device without the use of a physical RFID transponder”

48. All of the RFID signals emanated by the mobile communications device are emulated, so “emulated” should be read into the construction of each term that incorporates “RFID transponder” because the Patent does not disclose any physical RFID transponder.

49. The purpose of the invention is to emulate one or more RFID transponders within a mobile communication device by having the device behave as if it were an RFID transponder without the need for an actual physical transponder. A benefit of such emulation is that the device is not tied to the capabilities of one or more physical transponders and can be used flexibly in a variety of environments. The specification explains:

Further, RFID 110 may be any keys and/or identifiers, including but not limited to security keys, such as garage door “keys”, exterior or interior door keys, or identifiers, such as, employee numbers, driver’s license numbers, Social security numbers, credit card numbers (optionally, including expiration dates), affinity program member identifiers, and so forth.

EX1001, 3:60-65.

50. Such capability would be impractical if the device had to possess separate transponders for each of a garage door, other doors, credit cards, or affinity plans. An advantage of the invention is that no physical transponder at all is required, and none is disclosed.

51. None of the Challenged Claims reads on or otherwise requires a physical RFID transponder to that outputs a radio frequency signal.

52. Dependent claim 9 recites a device that outputs “second RFID transponder data as a radio frequency signal,” the “outputting emulating output of the second RFID transponder data by an RFID transponder of a passive type.” This language reaffirms that even a second signal is also emulated. In particular, a POSITA would have understood that “second RFID transponder data as a second radio frequency signal” in claim 9 is an RFID signal emulated by a mobile communications device without a physical transponder.

53. As in claim 9, independent claim 13 recites a device that outputs “RFID transponder data as a radio frequency signal.” The term “RFID transponder data as a radio frequency signal” should be construed in a manner consistent with its usage in claim 9 (“second RFID transponder data as a second radio frequency signal”) to require an emulated RFID signal. A POSITA reading the Patent would have understood that the signal in “RFID transponder data as a radio frequency signal” is an RFID signal emulated by a mobile communications device without a physical transponder.

54. As with claims 9 and 13, claims 1, 21, and 32 recite a device that outputs “RFID transponder signal[s].” The term “RFID transponder signal[s]” should be construed consistently with its usage in claims 9 (“second **RFID transponder** data as a second radio frequency **signal**”) and claim 13 (“**RFID transponder** data as a radio frequency **signal**”) to require an emulated RFID signal. A POSITA would that have understood that “RFID transponder signal[s]” means RFID signal[s] emulated by a mobile communications device without a physical transponder.

IX. THE PETITION FAILS TO DEMONSTRATE THAT THE CHALLENGED CLAIMS ARE UNPATENTABLE

55. Under the proper claim constructions, all the Grounds fail for at least the following reasons, as explained in detail below:

1. No cited reference teaches emulation of an RFID signal. This is applicable to all Grounds.

2. Bluetooth does not carry “voice call signals.” This is also applicable to all Grounds.

A. Ground 1A: Willgert and Mooney Both Fail to Teach or Suggest Required Claim Elements

1. No “voice call signals”

56. Per the above constructions, all Challenged Claims require “voice call signals” that are carried over the network of a wireless network service provider. The Willgert-Mooney combination contains no such disclosure or suggestion.

57. The Petition maps the claimed “voice call signals” to Bluetooth communication signals between Willgert’s communication unit and a Bluetooth headset. Pet., 25. Petitioner asserts, incorrectly, that a Bluetooth signal from a mobile phone to a nearby headset meets the required “voice call signal” limitation of all the Challenged Claims. Not only does Bluetooth fail to meet the construction of “voice call signals,” the Petition itself acknowledges that “Bluetooth signals” are distinct from “voice call signals” at 66 in stating that “some implementations of Willgert’s ‘communications unit,’ involve use of a single, common processor . . . for processing all wireless signals (RFID, Bluetooth, voice calls.”). Petitioner’s expert Dr. Ding also recognizes this

distinction. EX1003 at 145 (“this would have removed the need for redundant circuitry for Bluetooth and voice call signals with a mobile telephone.”)

58. A POSITA would have recognized that a Bluetooth communication signal, such as the one disclosed in Willgert/Mooney, is not a “voice call signal,” because it is not carried over the network of a wireless network service provider.

59. Further, a POSITA would have understood that (1) a Bluetooth communication signal is carried only between a mobile phone and a nearby headset over a short-range Personal Area Network (PAN), and not over a network of a wireless network service provider; and (2) is not carried over the network of a wireless network service provider to call a user of another communications device.

60. Re PAN, see EX1013 at 21-22 (“Bluetooth is a low cost, low power, short range radio technology originally developed as a cable replacement to connect devices such as mobile phones, headsets, PDA’s and portable computers. By enabling a standard way for these accessories to communicate, Bluetooth has created the expression Personal Area Network (PAN). PAN is a close range network that connects your personal electronic equipment.”) Therefore, Bluetooth is not capable of carrying the claimed “voice call signal” to another user of another communication device.

61. A Bluetooth signal may allow a headset to “hear voice and/or tones . . . generated from [a] wireless phone” via an “audio gateway” (Pet. at 17 (citing Ex. 1003 at [0048])), but such a signal is not carried over a network of a wireless network service provider, or otherwise capable of making or initiating a voice call to a user of another communication device.

62. Therefore, Willgert-Mooney’s Bluetooth headset signal does not enable the “primary communication function of the device,” which is to transmit and receive the “signals of a voice call” to another user of another communication device.

63. As properly construed, “voice call signals” are carried over the network of a wireless network service provider. A POSITA would have understood that any “voice call signals” sent and received from the Willgert-Mooney telephone to call the user of another device (i.e., the signals carried over the network of a wireless network service provider), are separate and distinct from the Bluetooth signals used to hear voice or tones generated from the phone call.

64. The “voice call signal” issue was taken up by the Patent Office and resolved in Patent Owner’s favor during prosecution. In response to a rejection based on US2002/0123325 (“Cooper”) (EX2007), the applicants overcame the reference successfully by pointing out that Cooper outputs voice data from a Bluetooth headset to a telephone terminal, and does not output voice call signals.

EX1008, 38-39. The same argument applies to Willgert: there are no voice call signals as claimed.

65. Petitioner's reading of "voice call signal" on a Bluetooth headset signal, suffers the same defect as Cooper discussed in ¶ 64. Bluetooth simply does not carry a "voice call signal."

2. No Emulation

66. As properly construed, all Challenged Claims require "RFID signals emulated by a mobile communications device without the use of a physical RFID transponder." Willgert, alone or with Mooney, fails to teach or suggest RFID signals emulated by a mobile communication device without the use of a physical RFID transponder.

67. Willgert is completely devoid of any suggestion of RFID emulation.

68. Mooney discloses emulation only of an audio port on a mobile phone. EX1005 [0013]-[0014], but never even hints that RFID would be emulated.

69. Willgert, alone or in combination with Mooney, has no ability to emulate an RFID signal because its device outputs RFID signals exclusively from RFID transponder 2, a physical transponder. Therefore, neither Willgert nor Mooney, separately or together, renders obvious any Challenged Claim.

70. The Petition attempted to finesse this issue with respect to claim 9 by arguing that “the outputting of identity information by the Willgert-Mooney phone emulate[s] output of the second RFID transponder data by the RFID transponder 2 (implemented as a passive RFID transponder) (RFID transponder of a passive type).” Pet., 40. That stands the concept of emulation on its head, essentially arguing that every device emulates itself when it operates. According to Petitioner’s erroneous argument, an RFID transponder emulates an RFID transponder. This makes as much sense as saying that a banana emulates a banana.

71. A POSITA would have understood that “emulating” requires “RFID signals emulated by a mobile communications device without the use of a physical RFID transponder.” Therefore Willgert’s physical RFID transponder 2 cannot satisfy any limitation of the Challenged Claims.

72. The emulation issue was taken up by the Patent Office and resolved in Patent Owner’s favor. In response to a rejection based on Zalewski U.S. Patent 6,771, 981 (EX2001), the applicants overcame the reference successfully by pointed out that Zalewski outputs RFID signals using a physical RFID transponder, and does not perform emulation. Ex. 1008, 236, 277. The same argument applies to Willgert: no emulation, no RFID transponder signals as claimed.

3. No “instruction[s]” to switch, as claimed

73. Challenged Claim 2 requires a “second signal processing unit configured to process RFID signals” and “coupling the second signal processing unit to a transmission path of the transceiver.” The processing involves both transmission and receipt of RFID signals. Received signals come from sourced outside the mobile device, and may or may not be emulated. RFID signals transmitted by the device are emulated because the device does not possess a physical RFID transponder. As discussed with respect to claim construction at ¶¶ 48ff, “RFID transponder signals” are RFID signals emulated by a mobile communications device without the use of a physical RFID transponder.

74. Challenged Claims 21-22 and 27-31, expressly or by dependency, require a “second signal processing section configured to output RFID transponder signals.” Accordingly, Challenged Claim 2, as construed, requires a second signal processing unit configured to output emulated RFID signals, and Challenged Claims 21-22 and 27-31, as construed, require a second signal processing section configured to output emulated RFID signals.

75. Challenged Claims 1-3, and 7-12, expressly or by dependency, each require “switching a transceiver . . . the transceiver configured to output voice call signals in the first state and to output RFID transponder signals in the second state.” As explained above at ¶¶ 48ff, “RFID transponder signals” are RFID

signals emulated by a mobile communications device without the use of a physical RFID transponder. Accordingly, Challenged Claims 1, 3, and 7-12, as construed, each require switching a transceiver from a voice call signal state to a state in which emulated RFID signals are output.

76. Challenged Claims 21-22 and 27-31, expressly or by dependency, each require “a transmitter configured to output voice call signals and ... configured to output RFID transponder signals ...” Challenged Claims 32-33, and 37-39, expressly or by dependency, each require “a transmitter configured to transmit a voice call signal in a first operational state and a RFID transponder signal in a second operational state.” As explained above at ¶¶ 48ff, “RFID transponder signals” are RFID signals emulated by a mobile communications device without the use of a physical RFID transponder. Therefore, Challenged Claims 21-22, 27-31, 32-33, and 37-39, as construed, each require a transmitter configured to transmit a voice call signal and transmit an emulated RFID signal, without the use of a physical transponder.

77. Challenged Claims 1-3 and 7-12, expressly or by dependency, each require an “instruction to transmit first RFID transponder data,” “switching a transceiver of the mobile communications device from a first state to a second state,” and to output RFID transponder signals in the second state. Challenged Claims 21-22, and 27-31, expressly or by dependency, each require “to switch

between the first and second signal processing sections” of “a transmitter . . . comprising . . . the first signal processing section configured to output voice call signals . . . and the second signal processing section configured to output RFID transponder signals.” Challenged Claims 32-33, and 37-39, expressly or by dependency, each require “instructions to switch the transmitter between the first and second operational states.” Therefore, as explained above at ¶¶ 48ff, Challenged Claims 1-3, 7-12, 21-22, 27-31, 32-33, and 37-39, as construed, each require transmitting an emulated RFID signal, without the use of a physical transponder. Accordingly, Challenged Claims 1-3, 7-12, 21-22, 27-31, 32-33, and 37-39, as construed, require “instructions[s]” to switch a transceiver/transmitter to the second state/section to transmit an emulated RFID signal.

78. As discussed at ¶¶ 66ff, Willgert, alone or in combination with Mooney, has no ability to emulate an RFID signal, and thus no ability to output emulated RFID signals. Willgert, alone or in combination with Mooney, fails to teach or suggest a second signal processing unit/section configured to output emulated RFID signals. Willgert, alone or in combination with Mooney, fails to teach or suggest a transmitter configured to transmit an emulated RFID signal. Because Willgert, alone or in combination with Mooney, fails to disclose or suggest emulation of RFID signals, these references also fail to disclose or suggest the claimed “second state,” “second operational state” or “second signal

processing section.” Without such a state/section, the alleged transmitter/transceiver of Willgert and Mooney cannot switch to this non-existent state/section. Accordingly, the claimed switching and “instruction[s]” are also not disclosed or suggested by Willgert, alone or in combination with Mooney. Willgert, alone or in combination with Mooney, fails to teach or suggest a transceiver configured to output an emulated RFID signal, or “switching a transceiver” from a voice call signal state to a state in which emulated RFID signals are output.

4. No teaching or suggestion of selection, as claimed

79. Challenged Claim 3 requires outputting the first RFID transponder data as an RFID transponder signal where the “first RFID transponder data comprises a selected one of a security key and an identifier.” Challenged Claims 21-22 and 27-31 each require, expressly or by dependency, to selectively” “output first RFID transponder data as said RFID transponder signals.” Challenged Claims 32, 33, and 37-39 each require, expressly or by dependency, “to selectively” “output RFID transponder data as an RFID signal.”

80. As explained above at ¶¶ 48ff, Challenged Claims 3, 21-22, 27-31, 32, 33, and 37-39, as properly construed, require “RFID transponder signal[s]” that are emulated RFID signal[s], without the use of a physical transponder.

81. As discussed at ¶¶ 66ff, Willgert, alone or in combination with Mooney, has no ability to emulate an RFID signal, and thus no ability to output emulated RFID signals. A POSITA would have understood that, without the ability to transmit an emulated RFID signal at all, Willgert, alone or in combination with Mooney, cannot disclose or suggest a device that **selectively** emulates an RFID signal.

82. Consequently, a POSITA would have understood that Willgert, alone or in combination with Mooney, does not disclose or suggest any selection to make the device send an emulated RFID signal without the physical presence of a transponder.

B. Ground 1B: Willgert Fails to Teach or Suggest Required Claim Elements

83. In Ground 1B, Petitioner relies on Willgert alone for obviousness based on its own misunderstanding of Patent Owner’s supposed claim construction positions from the Litigation. These alleged positions involve the terms “transceiver” (Pet., 64, 68) and “switching/state” (Pet., 65). My arguments above with respect to Ground 1A do not depend on the constructions of these terms but are based on the constructions in ¶¶ 43ff, namely of “wireless mobile phone,” “voice call signals,” and the “RFID transponder” terms.

84. Even if Petitioner’s characterization of Patent Owner’s claim construction in the Litigation were taken as accurate, that would not change the

fact that Willgert does not disclose or suggest emulation of RFID signals.

Therefore, as shown with respect to Ground 1A, Willgert, alone or in combination with Mooney, does not disclose or suggest emulation of RFID signals. Therefore, Willgert alone cannot do so, and Petitioner has not shown in Ground 1B that any Challenged Claim would have been obvious over Willgert.

C. Ground 2

85. Here Petitioner combines four references: Willgert, Mooney, Holloway, and Pitroda to challenge claims 3-9, 15-19, 22-28, and 34-38. These claims all depend from either independent claims 1, 13, 21, or 32. Petitioner relies only on Willger and Mooney for claims 1, 13, 21, and 32 in Grounds 1A and 1B. As I have shown, the combination of Willgert and Mooney does not render either claim 1, 13, 21, or 32 obvious, so Ground 2 must fail in its entirety.

86. Even assuming that a POSITA would have been motivated to combine these references, nowhere is there any teaching or suggestion of RFID emulation, which is required in all Challenged Claims. Holloway discloses RFID communication, but all RFID transmission and reception is by means of RFID chips, i.e., physical transponders Pitroda, for its part, does not mention RFID at all, although it discloses radio frequency communication by a credit card. Therefore, Holloway and Pitroda do not remedy any of the deficiencies of Willgert and Mooney with respect to emulated RFID transponder signals.

1. Willgert, Mooney, Holloway, and Pitroda do not teach or suggest an emulated RFID signal, as claimed

87. All Challenged claims, as properly construed, require RFID signals to be emulated by a mobile communications device without the use of a physical RFID transponder. In ¶¶ 66-72 above I explained in detail why Willgert, alone or in combination with Mooney, fails to disclose emulation.

88. Holloway employs “an RFID (radio frequency identity) chip 16 corresponding to the chips found in RFID smart cards, or combi cards. The chip 16 is connected to an RFID antenna 17 which is tuned to 13.56 MHz by means of its inductance and the capacitance built into the input of the RFID chip 16.” EX1006, 4:24-28. “Similarly chips for combi cards are also manufactured in high volumes and are therefore available at a relatively low price. By incorporating existing RFID technology, conformity to the ISO standards for proximity cards is ensured.” *Id.*, 9:20-23. It is therefore evident that Holloway’s chip is a physical transponder. Even Petitioner’s drawing at Pet. 70 shows a physical “RFID Chip 16.”

89. All of Holloway’s embodiments depend on physical chips:

Advantageously, the RFID smart telephone can be fully compatible with existing RFID cards. In the modification of Figure 3, an RFID reader/writer device 46 is incorporated in a mobile phone 40 and connected to central processor 11. Device 46 is connected to RFID antenna 47 which is in communication with a separate RFID card 45

having its own 20 internal antenna (not shown). Provided card 45 is sufficiently near antenna 47, communications and transactions can be undertaken therewith. This arrangement enables the invention to be used with existing RFID cards. Another version of the telephone may incorporate a slot in which it is possible to insert a removable RFID combi card so that pads on the card conductively engage electrical conducts [sic] in the slot. The card is thus 25 connected via its pads and the internal contacts of the telephone 10 to central processor 11. This arrangement allows an existing RFID combi card fully to replicate all of the features provided by RFID chip 16 and antenna 17.

Id., 10:16-27

90. A POSITA would have understood that Holloway's RFID chip 16 would need to be replaced to output a different RFID signal. This inflexibility is remedied by the emulation disclosed in the '984 Patent.

91. The Petition conflates the telephone and RFID capabilities of Holloway's phone, making reference to Holloway's sub-divided memory in this paragraph:

The memory within the telephone 10 maybe [sic] sub-divided into a number of mutually secure areas partitioned by firewalls. This makes it possible to allocate service providers with individual areas for their particular application. As a consequence it becomes possible to incorporate the functionality of a number of different cards within the one mobile telephone.

EX1006, 11:11-18

92. However, a POSITA would have understood that Holloway's statements about "incorporat[e/ing] the functionality of a number of different cards within the one mobile device" does not relate to any RFID signals, but instead refers to sub-dividing the memory within Holloway's telephone 10 for transactions that do not rely on the RFID chip and antenna. The cited passage does not suggest emulation.

93. A POSITA would not find any teaching or suggestion in Holloway of incorporating the functionality of a number of different cards within one mobile device that can be accessed or used via RFID signals, and in particular, via RFID signals without the use of a physical RFID transponder as required by all Challenged Claims as properly construed.

94. Pitroda refers at 7:66-67 to "radio frequency wireless" data connections to a transaction device, but contains no disclosure of RFID or any sort of emulation at all.

95. Pitroda discloses that "the client may select a credit card account on the client's electronic transaction device 12 and transmit the account information to the restaurant server's electronic transaction device 12." EX1007, 7:26-29. A POSITA would have understood that Pitroda does not teach or suggest outputting RFID signals, and surely not emulated RFID transponder signals without a

physical RFID transponder, nor any capability to emulate one or more RFID transponders within a mobile communication device.

2. Willgert, Mooney, Holloway, and Pitroda do not teach or suggest “instruction[s]” to switch, as claimed

96. As described above at ¶¶77ff, Challenged Claims 3-9, 22-28, and 34-38 as construed, require, by dependency, “instruction[s]” to switch a transceiver/transmitter to the second state/section to transmit an emulated RFID signal. Because none of Willgert, Mooney, Holloway, or Pitroda teach or suggest emulated RFID signals, they also do not teach or suggest the claimed “second state,” “second operational state,” or “second signal processing section.” Without such a state/section, the alleged transmitter/transceiver cannot switch to this non-existent state/section. Accordingly, the claimed switching and “instruction[s]” are also not disclosed or suggested by Willgert, Mooney, Holloway, or Pitroda, alone or in combination.

3. Willgert, Mooney, Holloway, and Pitroda do not teach or suggest selection, as claimed

97. As stated many times previously, a POSITA would have understood that all Challenged Claims, as construed, require RFID signals emulated by a mobile communications device without the use of a physical RFID transponder. Further, Challenged Claims 3-6, 17, 22-25, 26, and 36 require **selection** of transponder data to be transmitted by an emulated RFID signal. Because none of

Willgert, Mooney, Holloway, or Pitroda teach or suggest emulated RFID signals, they also do not teach or suggest any selection of transponder data to be transmitted by an emulated RFID signal.

4. Petitioner does not rely on Holloway or Pitroda for “voice call signals”

98. All Challenged Claims, properly construed, require “voice call signals” carried over the network of a wireless network service provider. See ¶¶ 46-47, above. In Ground 2, the Petition does not rely on any arguments other than its Ground 1A arguments to address the “voice call signals” limitations of all Challenged Claims. Therefore, Ground 2 does not remedy the deficiencies of Ground 1A with respect to “voice call signals.”

X. CONCLUDING STATEMENT

99. Relying on my education, experience, skill, and training in the relevant field of art, and after reviewing the materials identified above, it is my opinion that Petitioner has not demonstrated a reasonable likelihood of success on any of the Grounds in the Petition with respect to any Challenged Claim.

100. I hereby declare that all statements made herein of my knowledge are true, and that all statements made on information and belief are believed to be true, and 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.

101. I reserve the right to supplement my opinions in the future to respond to any arguments that Petitioner raises and to take into account new information as it becomes available to me.

102. In signing this Declaration, I understand 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 acknowledge that I may be subject to cross examination in the case and that cross examination will take place within the United States. If cross examination is required of me, I will appear for cross examination remotely within the United States during the time allotted for cross examination.

Executed June 4, 2025 at Pittsburgh, Pennsylvania.


Michael I. Shamos, Ph.D.