

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Peter Zatloukal, et al.
U.S. Patent No.: 8,127,984 Attorney Docket No.: 50095-0187IP1
Issue Date: March 6, 2012
Appl. Serial No.: 10/560,262
Filing Date: June 10, 2004

Title: EMULATED RADIO FREQUENCY IDENTIFICATION

DECLARATION OF DR. ZHI DING

I currently hold the opinions set expressed in this declaration. But my analysis may continue, and I may acquire additional information and/or attain supplemental insights that may result in added observations.

I hereby declare that all statements made of my own knowledge are true and that all statements made on information and belief are believed to be true. I further declare 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 the Title 18 of the United States Code.

Dated: 28 August 2024

By:  Digitally signed by Zhi Ding
Date: 2024.08.28 10:39:16 -07'00'

Zhi Ding

TABLE OF CONTENTS

I.	ASSIGNMENT.....	4
II.	QUALIFICATIONS.....	4
III.	SUMMARY OF CONCLUSIONS FORMED.....	10
IV.	LEVEL OF ORDINARY SKILL IN THE ART.....	11
V.	LEGAL PRINCIPLES.....	12
	A. Claim Interpretation	12
	B. Priority.....	13
	C. Anticipation.....	13
	D. Obviousness.....	14
VI.	MATERIALS CONSIDERED	16
VII.	TECHNOLOGY OVERVIEW.....	17
	A. RFID Systems.....	17
	1. Transponders	17
	2. Readers	17
	3. Signaling Attributes	18
	B. Smart Card Technology	19
VIII.	OVERVIEW OF THE '984 PATENT	19
	A. Specification.....	19
	B. Prosecution History	24
	C. Claim Interpretation	25
	1. <i>Transceiver</i> (Claims 1, 13)	28
	2. <i>Switch/Switching and State</i> (Claims 1, 32).....	30
IX.	SUMMARY OF RELEVANT PRIOR ART	31
	A. Grounds 1A, 1B.....	31
	1. Overview of Willgert	31
	2. Overview of Mooney	34
	B. Ground 2.....	36
	1. Overview of Holloway	36

2.	Overview of Pitroda	39
C.	Overview of Combinations	40
1.	Willgert-Mooney Combination	40
2.	Willgert Mooney Holloway Pitroda Combination	46
X.	[GROUND 1A] – Claims 1-3, 7-14, 18-22, 27-33 and 37-39 Are Obvious Over Willgert-Mooney	58
A.	Analysis	58
1.	Claim 1	58
2.	Claims 2, 3, 7-12	77
3.	Claim 13	98
4.	Claim 21	106
5.	Claim 28	122
6.	Claim 32	123
7.	Claims 14, 18-20, 22, 27-31, 33, 37-39	126
XI.	[GROUND 1B] – Claims 1, 3, 7-14, 18-20, 27-33 And 37-37-39 Are Obvious Over Willgert	126
A.	Varia’s Statements In The Litigation	127
B.	Analysis	128
1.	Claim 1	128
2.	Claim 3, 7-14, 18-20, 32, 33, And 37-39	134
XII.	[GROUND 2] – Claims 3-9, 15-19, 22-28 And 34-38 Are Obvious Over Willgert-Mooney-Holloway-Pitroda	134
A.	Analysis	134
1.	Claims 3-9	134
2.	Claims 28	148
3.	Claims 15-19, 22-27, 34-38	149
XIII.	CONCLUSION	150

RELEVANT CLAIMS

Claim 1	
[1.pre]	A method for providing a radio frequency identification (RFID) from a switchable mobile communications device capable of RFID communication and voice call communication, the method comprising:
[1.1]	receiving, by the mobile communications device, from an RFID reader external to the mobile device, an instruction to transmit first RFID transponder data in a format compatible with said RFID reader;
[1.2]	switching a transceiver of the mobile communications device from a first state to a second state upon reception of said instruction, the transceiver configured to output voice call signals in the first state and to output RFID transponder signals in the second state; and
[1.3]	outputting the first data by the transceiver in the second state, the transceiver outputting the first data as an RFID transponder signal in the format compatible with said RFID reader.
Claim 2	

[2.1]	The method of claim 1, wherein said transceiver comprises a first signal processing unit configured to process voice call signals and a second signal processing unit configured to process RFID signals,
[2.2]	said switching comprising coupling the second signal processing unit to a transmission path of the transceiver.
Claim 3	
[3]	The method of claim 1, wherein said first RFID transponder data comprises a selected one of a security key and an identifier.
Claim 4	
[4]	The method of claim 3, wherein said security key comprises a selected one of a garage door key, an exterior door key, an interior door key, and a motor vehicle door key.
Claim 5	
[5]	The method of claim 1, wherein said first RFID transponder data comprises an identifier, and said identifier comprises a selected one of a social security number, a driver's license number, an affinity program account number, and a credit card number.
Claim 6	

[6]	The method of claim 1, wherein the method further comprises facilitating the user in selecting the first RFID transponder data from a plurality of RFID transponder data using the mobile communication device.
Claim 7	
[7]	The method of claim 1, wherein the method further comprises facilitating provision of the first RFID transponder data to the mobile communication device.
Claim 8	
[8]	The method of claim 7, wherein said facilitating of the provisioning of the RFID transponder data to the mobile communication device includes facilitating provision of at least a signaling attribute associated with the outputting of the RFID transponder data in the format compatible with said RFID reader.
Claim 9	
[9.pre]	The method of claim 1, wherein the method further comprises:
[9.1]	monitoring for proximal presence of the RFID reader by the mobile communication device; and

[9.2]	on detection of the RFID reader by the mobile communication device, outputting by the transceiver second RFID transponder data as a second radio frequency signal, the outputting emulating output of the second RFID transponder data by an RFID transponder of a passive type.
Claim 10	
[10]	The method of claim 9, wherein said monitoring comprises sensing for a probing radio frequency signal of the RFID reader by the mobile communication device.
Claim 11	
[11]	The method of claim 9, wherein said first RFID transponder data and second RFID transponder data are the same data.
Claim 12	
[12]	The method of claim 1, wherein the mobile communication device is a selected one of a wireless mobile phone and a personal digital assistant equipped with communication capability.
Claim 13	
[13.pre]	A method for providing a radio frequency identifier (RFID), from a switchable mobile communications device capable of RFID

	communication and voice call communication, the method comprising:
[13.1]	monitoring for proximal presence of a proximal RFID reader external to said mobile communication device by said mobile communication device,
[13.2]	the mobile communication device having a transceiver configured, to output, in a first state, RFID transponder data in a format compatible with said RFID reader upon the mobile communications device determining proximal presence of one or more RFID readers,
[13.3]	the transceiver being also configured to output, in a second state, a voice call signal for transmission at least in part over a wireless network; and
[13.4]	on detection of the RFID reader, outputting, by the transceiver, the RFID transponder data as a radio frequency signal, said data being output in said format employed by the RFID reader.
Claim 14	
[14]	The method of claim 13, wherein said monitoring comprises sensing for one or more probing radio frequency signals of the one or more RFID readers by the mobile communication device.

Claim 15	
[15]	The method of claim 13, wherein said data comprises a security key.
Claim 16	
[16]	The method of claim 15, wherein said security key comprises a door key.
Claim 17	
[17]	The method of claim 16, wherein said door key comprises a selected one of a garage door key, an exterior door key, an interior door key, and a motor vehicle door key.
Claim 18	
[18]	The method of claim 13, wherein the method further comprises facilitating provision of the RFID transponder data to the mobile communication device.
Claim 19	
[19]	The method of claim 18, wherein said facilitating of the provisioning of the RFID transponder data to the mobile communication device includes facilitating provision of at least a signaling attribute associated with the outputting of the RFID transponder data in the format employed by the RFID reader.

Claim 20	
[20]	The method of claim 13, wherein the mobile communication device is a selected of a wireless mobile phone and a personal digital assistant equipped with communication capability.
Claim 21	
[21.pre]	A switchable mobile communication device capable of RFID communication and voice call communication, the mobile communication device comprising:
[21.1]	a transmitter configured to transmit a radio frequency signal, the transmitter comprising a first signal processing section and a second signal processing section,
[21.2]	the first signal processing section configured to output voice call signals in a first radio frequency range and
[21.3]	the second signal processing section configured to output RFID transponder signals in a second radio frequency range;
[21.4]	a storage medium to store a first data and instructions to: monitor for proximal presence of one or more RFID readers external to the mobile communication device; and

[21.5]	operate the transmitter to switch between the first and second signal processing sections to selectively: (a) output first RFID transponder data as said RFID transponder signals in a format employed by a proximal RFID reader, in response to detection by the mobile communication device of the proximal RFID reader, and (b) output a voice call signal for transmission over a wireless network; and
[21.6]	a processor coupled to the transmitter and the storage to execute the instructions.
Claim 22	
[22]	The device of claim 21, wherein said first RFID transponder data comprises a selected one of a security key and an identifier.
Claim 23	
[23]	The device of claim 22, wherein said first RFID transponder data comprises a security key, and said security key comprises a door key.
Claim 24	
[24]	The device of claim 23, wherein said door key comprises a selected one of a garage door key, an exterior door key, an interior door key, and a motor vehicle door key.

Claim 25

[25]	The device of claim 22, wherein said first RFID transponder data comprises an identifier, and said identifier comprises a selected one of a social security number, a driver's license number, an affinity program account number, and a credit card number.
------	--

Claim 26

[26]	The device of claim 21, wherein the instructions are further designed to facilitate the user in selecting the first RFID transponder data from a plurality of RFID transponder data, and instructing said output.
------	---

Claim 27

[27]	The device of claim 21, wherein the instructions are further designed to facilitate provision of the first RFID transponder data to the mobile communication device.
------	--

Claim 28

[28]	The device of claim 27, wherein the instructions are further designed to include with said facilitating, provisioning of at least a signaling attribute associated with the outputting of the first RFID transponder data in the form of a radio frequency signal.
------	--

Claim 29

[29]	The device of claim 21, wherein the instructions are further designed to sense for a probing radio frequency signal of the RFID reader.
Claim 30	
[30]	The device of claim 21, wherein said first and second data are the same data.
Claim 31	
[31]	The device of claim 21, wherein the mobile communication device is a selected one of a wireless mobile phone and a personal digital assistant equipped with communication capability.
Claim 32	
[32.pre]	A switchable mobile communication device capable of radio frequency identifier RFID communication and voice call communication, the mobile communication device comprising:
[32.1]	a transmitter configured to transmit a voice call signal in a first operational state and a RFID transponder signal in a second operational state;
[32.2]	a storage medium to store a first data and instructions to switch the transmitter between the first and second operational states to selectively (a) monitor for proximal presence of a proximal RFID

	reader, and on detection of the proximal RFID reader, output RFID transponder data as an RFID signal in a format employed by the RFID reader, and (b) transmit a voice call signal to another user of another communication device at least in part over a wireless network; and
[32.3]	a processor coupled to the transmitter and the storage to execute the instructions.
Claim 33	
[33]	The device of claim 32, wherein said instructions are further designed to sense for a probing radio frequency signal of the RFID reader.
Claim 34	
[34]	The device of claim 32, wherein said RFID transponder data comprises a security key.
Claim 35	
[35]	The device of claim 34, wherein said security key comprises a door key.
Claim 36	

[36]	The device of claim 35, wherein said door key comprises a selected one of a garage door key, an exterior door key, an interior door key, and a motor vehicle door key.
Claim 37	
[37]	The device of claim 32, wherein the instructions are further designed to facilitate provision of the RFID transponder data to the mobile communication device.
Claim 38	
[38]	The device of claim 37, wherein the instructions are further designed to include with said facilitating, provisioning of at least a signaling attribute associated with the outputting of the RFID transponder data in the form of a radio frequency signal.
Claim 39	
[39]	The device of claim 32, wherein the mobile communication device is a selected of a wireless mobile phone and a personal digital assistant equipped with communication capability.

EXHIBITS

APPLE-1001	U.S. Patent No. 8,127,984 to Zatloukal, et al. (“the ’984 Patent”)
APPLE-1002	Excerpts from the Prosecution History of the ’984 Patent (“the Prosecution History”)
APPLE-1004	U.S. Patent Publication No. 2005/0083177 (“Willgert”)
APPLE-1005	U.S. Patent Publication No. 2003/0045235 (“Mooney”)
APPLE-1006	International Pub. No. WO 02/49322 (“Holloway”)
APPLE-1007	U.S. Patent No. 8,429,046 (“Pitroda”)
APPLE-1008	Excerpts from the Prosecution History of U.S. Pat. No. 8,381,974 (“the Prosecution History”)
APPLE-1009	Excerpts from the Prosecution History of U.S. Pat. No. 9,405,947 (“the ’947 Patent Prosecution History”)
APPLE-1010	U.S. Patent No. 5,943,624 (“Fox”)
APPLE-1011	U.S. Patent Publication No. 2003/0187787 (“Freund”)
APPLE-1012	International Pub. No. WO 98/43366 (“Schlang”)
APPLE-1013	Hallberg & Nilsson, “Positioning with Bluetooth, irDA and RFID,” Master’s Thesis, 2002:125 (Jan. 2002) (“Hallberg”)
APPLE-1014	Takikawa, Kumiko, et al. "RF circuits technique of dual-band transceiver IC for GSM and DCS1800 applications." Proceedings of the 25th European Solid-State Circuits Conference. IEEE, 1999 (“Takikawa”)
APPLE-1015	Razavi, Behzad, “A 900-MHz/1.8-GHz CMOS Transmitter for Dual Band Applications,” IEEE Journal of Solid-State Circuits, Vol. 34, No. 5, May 1999 (“Razavi”)

- APPLE-1016 “Cell Phone Use on the Roads in 2002,” Technical Report DOT HS 809 580, National Highway Traffic Safety Administration (Dec. 2004)
- APPLE-1017 Scheiderman, “Bluetooth’s slow dawn,” 2000 IEEE 61-65 (“Scheiderman”)
- APPLE-1018 Tapley, Byron D., “Eshbach’s Handbook of Engineering Fundamentals,” Wiley-Interscience (Edition 4), 1990, IBSN 10: 0471890847 (“Tapley”)
- APPLE-1019 Smart Card Alliance, “Contactless Technology for Secure Physical Access: Technology and Standards Choices” (October 2002)
- APPLE-1020 U.S. Patent No. 5,748,737 (“Daggar”)
- APPLE-1021 Arfwedson & Sneddon, “Ericsson’s Bluetooth modules,” Ericsson Review No. 4, 1999 (“Arfwedson”)
- APPLE-1050 Complaint, *Varia Holdings LLC v. Apple Inc.*, 23-cv-7477, E.D.N.Y (filed October 5, 2023)
- APPLE-1051 Plaintiff Varia’s Preliminary Infringement Contentions, *Varia Holdings LLC v. Apple Inc.*, 23-cv-7477, E.D.N.Y (February 26, 2024)
- APPLE-1052 Appendix A: Claim Chart for U.S. Patent No. 8,127,984, *Varia Holdings LLC v. Apple Inc.*, 23-cv-7477, E.D.N.Y (February 26, 2024)

I, Zhi Ding declare that:

I. ASSIGNMENT

1. I have been retained on behalf of Apple to offer technical opinions related to U.S. Patent No 8,127,984 (“the ’984 patent”) (APPLE-1001). I understand that Apple is requesting that the Patent Trial and Appeal Board (“PTAB” or “Board”) to institute an *inter partes* review (“IPR”) proceeding of the ’984 patent.

2. I have been asked to provide my independent analysis of the ’984 patent based on the prior art publications cited in this declaration.

3. I am not and never have been, an employee of Apple. I received no compensation for this declaration beyond my normal hourly compensation based on my time actually spent analyzing the ’984 patent, the prior art publications cited below, and issues related thereto, and I will not receive any added compensation based on the outcome of any IPR or other proceeding involving the ’984 patent.

II. QUALIFICATIONS

4. I am over the age of 18 and am competent to write this declaration. I have personal knowledge, or have developed knowledge of these technologies based upon education, training, or experience, of the matters set forth herein.

5. I presently hold the title of Distinguished Professor in the Department of Electrical and Computer Engineering at the University of California, Davis.

Since my appointment on July 1, 2000, I have held the position of professor for the past 22 years at the present university and have served as a faculty member at several US universities for over 30 years. I am also a private technical consultant on various technologies related to information systems. I have more than three decades of research experience on a wide range of topics related data communications and signal processing.

6. I earned my Bachelor of Science degree in 1982 in wireless engineering from the Nanjing Institute of Technology (later renamed as Southeast University) in Nanjing, China. I earned my Master of Science degree in 1987 in electrical engineering from the University of Toronto in Toronto, Canada. I earned my Ph.D. in 1990 in electrical engineering from Cornell University in Ithaca, New York.

7. My responsibilities as a Professor at University of California, Davis, include classroom instruction on various topics of communication systems and signal analysis, as well as mentoring undergraduate students and supervising graduate students in their research and development efforts on various topics related to digital communications. I have directly supervised such research and development works ranging from signal detection to wireless networking. As the chief academic advisor, I have also directly supervised the completion of over 20 Masters theses and 30 Ph.D. dissertations on various topics related to digital

communications. I have served full time as a faculty member at three major research universities in the United States over the past 30 years, including Auburn University from 1990 to 1998, University of Iowa from 1999 to 2000, and University of California, Davis, from 2000 to present.

8. Since 1990, I have been selected as the principal investigator of multiple highly competitive federal and local research grants, including more than twenty major research projects supported by the National Science Foundation and two research projects funded by the U.S. Army Research Office. These competitive research projects focused on developing more efficient and effective digital communication transceivers, networks, and signal processing tools. I have also participated in several large-scale projects supported by the Defense Advanced Research Projects Agency (DARPA) with teams of researchers. I have applied for, and received support from, other federal, state, and industry sponsors.

9. I have published over 250 peer-reviewed research articles in premier international journals, in addition to over 250 refereed technical articles at top international conferences on communications and information technologies. According to Google Scholar, my published works have been cited by over 20,000 times by peers. I also authored two books on communications technologies. My most recent book, coauthored with B.P. Lathi, is entitled, “Modern Digital and Analog Communication Systems,” 5th edition, and was published by the Oxford

University Press in 2018. The 4th edition of this book (published in 2009) had been widely adopted as an introductory textbook to communication systems.

10. In addition to the over 500 published technical papers that have been cited over 20,000 times according to Google Scholar¹, I am also co-inventor of 7 issued U.S. patents on communication technologies.

11. I am a member of the Institute of Electrical and Electronics Engineers (IEEE) and was elevated to the grade of Fellow in January 2003 for contributions made in signal processing for communication. The IEEE is the world's largest professional society of engineers, with over 400,000 members in more than 160 countries. The IEEE has led the development of many standards for modern digital communications and networking, most notably, the IEEE 802 series of network standards. The IEEE Grade of Fellow is conferred by the Boards of Directors upon a person with an extraordinary record of accomplishments in any of the IEEE fields of interest. The total number selected in any one year does not exceed one-tenth of one percent of the total voting Institute membership.

12. I have served the IEEE in the following capacities:

- Chief Information Officer of the IEEE Communications Society
from Jan. 2018 to present.

¹ <https://scholar.google.com>, as of August 21, 2024.

- Chief Marketing Officer of the IEEE Communications Society
from Jan. 2020 to present.
- General Chair of the 2016 IEEE International Conference on
Acoustics, Speech, and Signal Processing, the flagship conference
of the IEEE Signal Processing Society.
- Chair of the Steering Committee for the IEEE Transactions on
Wireless Communications from 2008 to 2010.
- Distinguished Lecturer of the IEEE Communications Society from
January 2008 to December 2009.
- Technical Program Chair of the 2006 IEEE Globecom, one of two
flagship annual IEEE Communication Society conferences.
- Distinguished Lecturer of the IEEE Circuits and Systems Society
from 2004 to 2005.
- Associate Editor of the IEEE Transactions on Signal Processing
from 1994 to 1997 and from 2001 to 2004.
- Member of the IEEE Statistical Signal and Array Processing for
Communications Technical Committee from 1993 to 1998.
- Member of the IEEE Signal Processing for Communications
Technical Committee from 1998 to 2004.

13. In 2012, I received the Wireless Communications Technical Committee Recognition Award from the IEEE Communications Society, an award given to a person with a high degree of visibility and contribution in the field of “Wireless and Mobile Communications Theory, Systems, and Networks.” I received the 2020 Education Award from the IEEE Communications Society. According to the Society, this award “recognizes distinguished and significant contributions to education within the Society’s technical scope.”

14. I have also served as a technical consultant for the telecommunication industry. For example, in 1995 I consulted for Analog Devices, Inc., on the development of the first generation DOCSIS cable modem systems. I have also consulted for other companies, including Nortel Networks and NEC US Laboratories. I worked as a visiting faculty research fellow at NASA Glenn Research Center in 1992 and at U.S. Air Force Wright Laboratory in 1993. I have served on multiple review panels of the National Science Foundation to evaluate competitive research proposals in the field of communication. I have also reviewed a large number of research proposals at the request of the National Science and Engineering Research Council (NSERC) of Canada as an expert panelist from 2010 to 2013, and also at the request of the Research Grant Council (RGC) of Hong Kong as an external reviewer.

15. I have served as an expert witness or consulting expert on a number of matters related to intellectual property, mostly in the arena of telecommunications, including cellular communications, Wi-Fi technologies, Bluetooth, and optical communications. For example, since 2007, I have been engaged to work on various litigations involving cellular, WiFi, Bluetooth, and optical communication networks.

16. Based on my above-described near three decades of experience in communications technologies, and the acceptance of my publications and professional recognition by societies in my field, I believe that I am qualified to be an expert in wireless communication systems, communication networks, and signal processing.

17. My curriculum vitae, attached as Exhibit A, includes a list of publications on which I am a named author. It contains further details regarding my experience, education, publications, and other qualifications provide to an expert opinion in connection with this proceeding.

III. SUMMARY OF CONCLUSIONS FORMED

18. This Declaration explains the conclusions that I have formed based on my analysis. To summarize those conclusions:

- **Ground 1A:** Based upon my knowledge and experience and my review of the prior art publications in this declaration, I believe

that claims 1-3, 7-14, 18-22, 27-33, and 37-39 of the '984 patent are made obvious by Willgert and Mooney

- **Ground 1B:** I believe that claims 1, 3, 7-14, 18-20, 32, 33, and 37-39 of the '984 patent are made obvious by Willgert.
- **Ground 2:** Based upon my knowledge and experience and my review of the prior art publications in this declaration, I believe that claims 3-9, 15-19, 22-28, and 34-38 of the '984 patent are made obvious by Willgert, Mooney, Holloway, and Pitroda

IV. LEVEL OF ORDINARY SKILL IN THE ART

19. I have been informed that a person of ordinary skill in the art ("POSITA") is a hypothetical person who is presumed to have the skill and experience of an ordinary worker in the field at the time of the alleged invention. The '984 patent was filed June 10, 2004, and claims priority, via several applications, to Application No. 60/478,245 filed June 13, 2003 ("Critical Date"). Because I do not know at what date the invention as claimed was made, if ever, I have used the Critical Date of the '984 patent as the point in time for claim interpretation purposes. My opinion does not change if the invention date is earlier.

20. Based on my knowledge and experience in the field and my review of the '984 patent and file history, I believe that a person of ordinary skill in the art in this matter 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. Based on my experiences, I have a good understanding of the capabilities of a POSITA. Indeed, I have taught, mentored, advised, and collaborated closely with many such individuals over the course of my career.

V. LEGAL PRINCIPLES

21. I am not a lawyer and I will not provide any legal opinions in this IPR. Although not a lawyer, I have been advised that certain legal standards are to be applied by technical experts in forming opinions regarding the meaning and validity of patent claims.

A. Claim Interpretation

22. I understand that claim terms are generally given their plain and ordinary meaning based on the patent's specification and file history as understood by a person of ordinary skill in the art at the time of the purported invention. In that regard, I understand that the best indicator of claim meaning is its usage in the context of the patent specification as understood by a POSITA. I further

understand that the words of the claims should be given their plain meaning unless that meaning is inconsistent with the patent specification or the patent's history of examination before the Patent Office. I also understand that the words of the claims should be interpreted as they would have been interpreted by a POSITA at the time of the invention was made (not today).

B. Priority

23. I understand that a continuation application is a later-filed application that has the same disclosure (specification and figures) as an earlier filed application to which the later-filed application claims priority. A continuation is generally entitled to the same priority date as the later-filed application to which it claims priority.

C. Anticipation

24. I understand that a patent claim is invalid as anticipated if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. I also understand that, to anticipate, the reference must teach all of the limitations arranged or combined in the same way as described in the claim.

25. With respect to inherency, I understand that the fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to

establish the inherency of that result or characteristic. Instead, the inherent characteristic must necessarily flow from the teaching of the prior art.

D. Obviousness

26. I understand that a patent claim is invalid if the claimed invention would have been obvious to a person of ordinary skill in the field at the time of the purported invention, which is often considered the time the application was filed. Even if all of the claim limitations are not found in a single prior art reference that anticipates the claim, the claim can still be invalid.

27. To obtain a patent, a claimed invention must have, as of the priority date, been nonobvious in view of the prior art in the field. I understand that an invention is obvious when the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art.

28. I understand that, to prove that prior art or a combination of prior art makes a patent obvious it is necessary to: (1) identify the particular references that, singly or in combination, make the patent obvious; (2) specifically identify which elements of the patent claim appear in each of the asserted references; and (3) explain a motivation, teaching, need, market pressure or other legitimate reason

that would have inspired a person of ordinary skill in the art to combine prior art references to solve a problem.

29. I also understand that certain objective indicia can be important evidence regarding whether a patent is obvious or nonobvious. Such indicia include:

- Commercial success of products covered by the patent claims;
- A long-felt need for the invention;
- Failed attempts by others to make the invention;
- Copying of the invention by others in the field;
- Unexpected results achieved by the invention as compared to the closest prior art;
- Praise of the invention by the infringer or others in the field;
- The taking of licenses under the patent by others;
- Expressions of surprise by experts and those skilled in the art at the making of the invention; and
- The patentee proceeded contrary to the accepted wisdom of the prior art.

30. To the extent these factors have been brought to my attention, if at all, I have taken them into consideration in providing my opinions and conclusions.

VI. MATERIALS CONSIDERED

31. My analysis and conclusions set forth in this declaration are based on my educational background and experiences in the field (*see* Section II). Based on my knowledge and experience, I believe that I am considered to be an expert in the field. Also, based on my knowledge and experience, I understand and know of the capabilities of persons of ordinary skill in the field during the late 1990s to the early 2000s, and I taught, participated in organizations, and worked closely with many such persons in the field during that time frame.

32. As part of my independent analysis for this declaration, I have considered the following: the background knowledge/technologies that were commonly known to persons of ordinary skill in this art during the time before the earliest claimed priority date for the '984 patent; my own knowledge and experiences gained from my work experience in the field of the '984 patent and related disciplines; and my experience in working with others involved in this field and related disciplines. In addition, I have analyzed the following publications and materials listed on pages 1-2. My analysis and conclusions set forth in this declaration are based on the perspective of a POSITA.

VII. TECHNOLOGY OVERVIEW

A. RFID Systems

1. Transponders

33. In an RFID system, a transponder or tag attached to an object interacts with an RFID reader to communicate identification (ID) data. In some examples the communication facilitates identification and tracking. The reader emits radio waves, creating an electromagnetic field that powers the tag if it is passive, or communicates with an active tag that has its own power source. Once activated by the reader, the tag's integrated circuit (IC) modulates and sends back a radio frequency (RF) signal carrying its unique identification data to the reader. The reader then decodes this signal into identification (ID) data and sends the data to a computer system for processing. RFID systems operate in various frequency bands, each suited for specific applications, ranging from inventory management to access control and asset tracking.

2. Readers

34. In an RFID system, the RFID reader is a critical component that communicates with RFID tags for various data transfer applications, e.g., identify and track objects. The reader emits radio waves through its antenna, generating an electromagnetic field that powers passive tags or communicates with active tags that have their own power sources. When a tag enters the reader's range and

receives the electromagnetic field, it transmits its unique identification data back to the reader. The reader's antenna receives this RF signal, and the reader then decodes the identification (ID) data and sends it to a computer system for further processing. RFID readers can operate in various frequency bands, such as low frequency (LF), high frequency (HF), ultra-high frequency (UHF), and microwave, each suitable for different applications for example, inventory management, access control, and asset tracking.

3. Signaling Attributes

35. The signaling attributes of an RFID system encompass the data, communication protocols, and methods used to transmit data between RFID readers and tags. These attributes include frequency bands, modulation techniques, and data encoding methods. RFID systems operate in various frequency bands such as low frequency (LF), high frequency (HF), ultra-high frequency (UHF), and microwave, each with different range and interference characteristics. Modulation techniques, like amplitude shift keying (ASK), frequency shift keying (FSK), and phase shift keying (PSK), are used to encode data onto the radio waves transmitted by the reader and/or the tag. Data encoding methods can ensure reliable data transfer by defining how such data is represented on the signal. Together, these signaling attributes determine the efficiency, range, and reliability of communication in RFID systems, making them suitable for diverse applications

like various applications, e.g., inventory management, access control, and asset tracking.

B. Smart Card Technology

36. A smart card is a physical card with an embedded microchip that can store data and communicate information. APPLE-1019, 4-7. The microchip can be either a contact chip which requires physical contact with a reader or a contactless chip which uses RFID to communicate with a reader. *Id.* Some cards include multiple technologies on a common plastic card. *Id.* Some cards include a single chip with both communication technologies (contact and contactless). *Id.* These cards allow a single device to implement multiple security policies, transaction methods, and authentication types. *Id.* Some example industries utilizing smart cards include cellular cards, mass transit fare cards, ID cards, health cards, and bank cards. *Id.*

VIII. OVERVIEW OF THE '984 PATENT

A. Specification

37. The '984 patent is focused on a “mobile communication device” that is “equipped with hardware and/or software [] to enable the device to output [] data in a form of a radio frequency signal” using “either an active or a passive RFID

transponder.” APPLE-1001, Abstract. This is referred to as an “emulated RFID method”² using a “mobile communication device.” *Id.*, 2:17-19.

38. Figure 1 shows an example of a system:

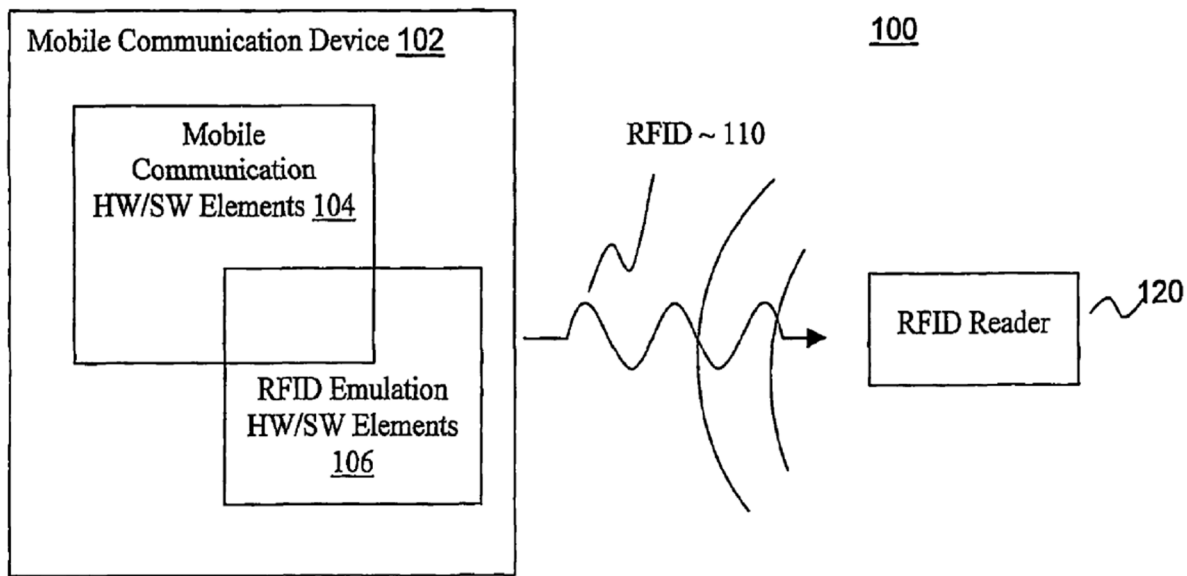


Figure 1

APPLE-1001, FIG. 1

39. Mobile communication device 102 includes hardware and/or software elements 104 for a “primary function” of device 102 to allow a user to “engage in communication with another user of another communication device.” APPLE-1001, 3:24-59. Hardware and/or software elements 106 “facilitate provision or

² Notably, the claims of the ’984 patent do not use the term “emulation” or the phrase “emulated RFID method.”

transfer of a key/identifier in a form of radio frequency signal 110, which may be read, e.g., by a radio frequency identifier (RFID) reader 120.” *Id.* Further, “in preferred embodiments,” “substantial portions of the hardware and/or software elements to provide a RFID, are the same elements employed to facilitate the primary function of device 102, i.e., to facilitate a user in communicating with another user...” *Id.*, 3:44-48. Indeed, these embodiments are described as “advantageously leverag[ing] [] existing elements of mobile communication device 102” to “provide a RFID, emulate[e] a RFID transponder, as well as facilitate[e] user communication.” *Id.*, 3:50-55. RFID 110 may be “any keys,” e.g., “security keys, such as garage door ‘keys’,” or “identifiers,” e.g., “employee numbers, driver’s license numbers, social security numbers, credit card numbers...” *Id.*, 3:60-65.

40. Figure 3 shows components of device 102:

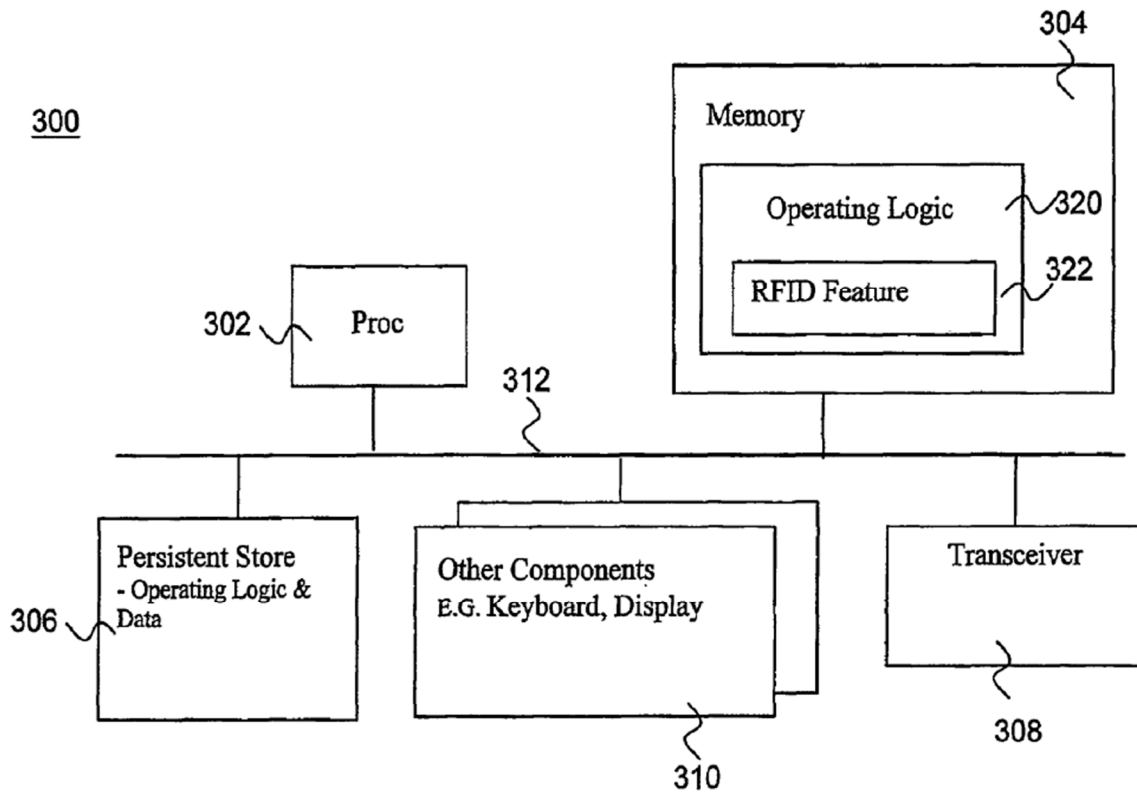
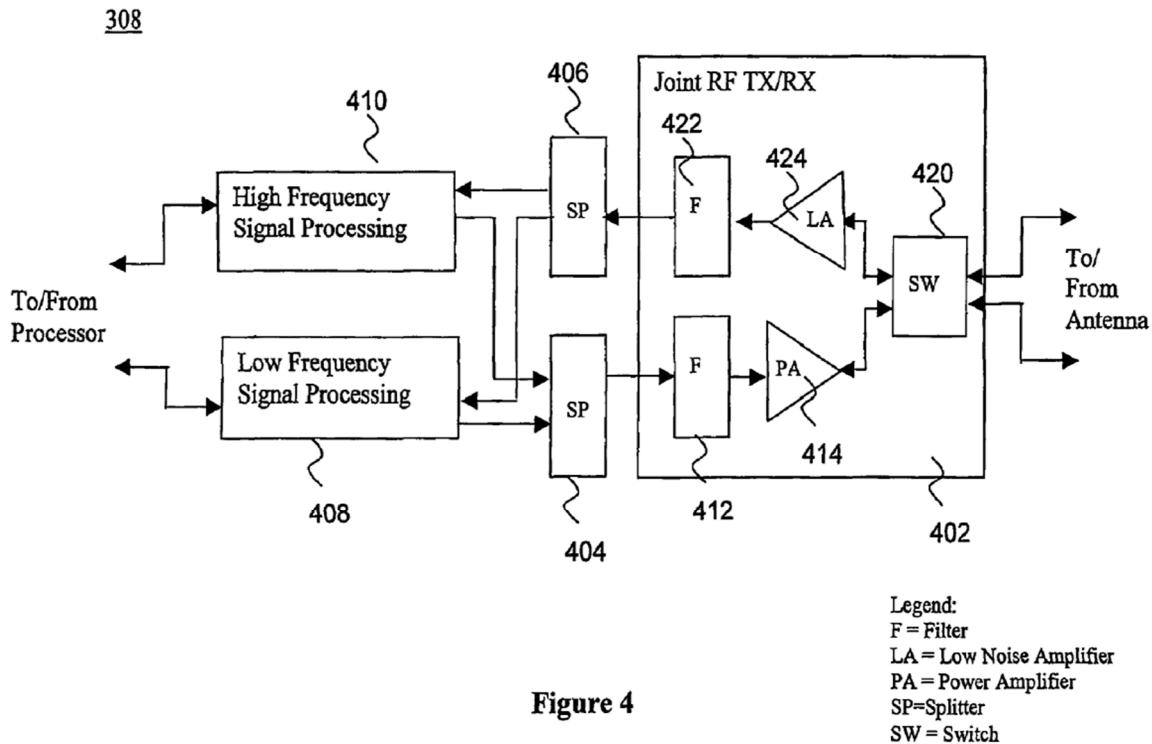


Figure 3

APPLE-1001, FIG. 3

41. Device 102 includes “processor 302, memory 304, persistent store 306, transceiver 308,” as well as “other components 310, coupled to each other via bus 312.” APPLE-1001, 5:8-12.

42. Figure 4 shows elements of transceiver 308:



APPLE-1001, FIG. 4

43. Transceiver 308 “includes a joint radio frequency (RF) transmit/receive (TX/RX) section 402, separate signal processing sections 408 and 410 for a range of higher frequencies and a range of low frequencies, switch 404³ and splitter 406.” APPLE-1001, 6:53-58. Additionally, “[f]or transmission, switch 404 switches between the output of high frequency signal processing 410 and the output of low frequency signal processing 408 to the transmit path of joint RF

³ Figure 4 incorrectly labels the element identified with reference numeral 404 as “SP.” Based on the corresponding description, “SP” 404 in Figure 4 should be identified as “SW” 404. See APPLE-1001, 6:56-7:8.

TX/RX 402.” *Id.*, 7:1-5. High frequency signal processing 410 “performs up and down conversions of the transmit and receive signals of the primary communication function of mobile communication device 102, e.g. the transmit and receive signals of a voice call.” *Id.*, 7:9-16. Low frequency signal processing 408 “performs up and down conversions of the transmit and receive signals of the RFID feature, e.g. the output signal of a RFID to emulate either an active or a passive transponder, and the received probing signal of a RFID reader.” *Id.*, 7:16-23.

B. Prosecution History

44. During prosecution of the '984 patent, the Examiner applied prior art rejections over various references, including U.S. Pat. No. 6,771,981 (“Zalewski”), U.S. Pat. No. 2004/0111360, U.S. Pat. No. 6,164,551 (“Altwasser”), U.S. Pat. App. Pub. No. 2004/0087273 (“Perttila”), and 2002/0123325 (“Cooper”). *See* APPLE-1002, 12-19, 62-73, 161-74, 206-11, 259-64, 283-87. In allowing the claims, the Examiner identified “limitations of the transmitter/transceiver configured to output/transmit voice calls in a first state and RFID transponder signals in a second state wherein the transceiver/transmitter switches states, and outputs the RFID transponder signal/data in the RFID reader compatible format.” *Id.*, 18. As discussed in **Section X.C**, during prosecution, Varia made various

statements characterizing key elements recited in the '984 patent claims (e.g., *transceiver*, *switch[ing]*, *state*). See, e.g., APPLE-1002, 92, 155.

C. Claim Interpretation

45. I understand that, for purposes of my analysis in this *inter partes* review proceeding, the terms appearing in a patent claim should be interpreted according to their “ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” 37 C.F.R. § 42.100(b). In that regard, I understand that the best indicator of claim meaning is its usage in the context of the patent specification as understood by a POSITA. I further understand that the words of the claims should be given their plain meaning unless that meaning is inconsistent with the patent specification or the patent’s history of examination before the Patent Office. I also understand that the words of the claims should be interpreted as they would have been interpreted by a POSITA at the time of the invention was made (not today). Because I do not know at what exact date the invention as claimed was made, if ever, I have used the Critical Date of the '984 patent as the point in time for claim interpretation purposes. My opinion does not change if the invention date is earlier.

46. I also understand from counsel that in a related district court proceeding involving the '984 patent, the parties exchanged proposed claim constructions on 5/2/2024. Counsel has explained to me that the proposed claim

constructions (in the table below) are preliminary, and (as the filing of this Petition) the district court has not issued a claim construction order.

47. The prior art discussed in this Declaration satisfies the claim language under either party's interpretation. This is demonstrated by Ground 1A, which applies prior art based on Apple's interpretations, and Ground 1B, which applies prior art based on Varia's interpretations. Each of these interpretations are summarized in the chart below.

Claim Term	Apple's Proposed Construction	Varia's Proposed Construction
"transceiver"	A single component within the mobile communication[s] device that includes common circuitry for transmitting and receiving both RFID and voice signals to/from an antenna	The components responsible for transmitting and receiving signals in a mobile communications device that are integrated into the electronics of the device
"transmitter"	A single component within the mobile communication[s] device that includes common circuitry for transmitting both RFID and voice signals to an antenna	The components responsible for transmitting signals in a mobile communications device that are integrated into the electronics of the device
"communication circuitry"	A single component within the mobile communication[s] device that includes common circuitry for transmitting and receiving both RFID	The combination of circuits responsible for outputting voice call and RFID signals, and receiving RFID signals, that are integrated into the electronics of the device

	and voice signals to/from an antenna	
“switchable mobile communication[s] device”	Mobile communication[s] device configured to switch between an RFID state and a voice call signal state	To the extent the preamble is limiting: mobile communication[s] device capable of changing states
“proximal presence” / “proximal RFID reader”	Indefinite ⁴	Plain and ordinary meaning
“operational space”	Indefinite	Plain and ordinary meaning
“on detection of the RFID reader...outputting ...second RFID transponder data...”	The [RFID transponder data / RFID signal] is outputted automatically whenever the mobile communication[s] device is within the [operational space / proximal presence] of the RFID reader	Plain and ordinary meaning
“[facilitate / facilitating] the user” / “[facilitate / facilitating] a user”	Indefinite	Plain and ordinary meaning
“u on receipt of the RFID robin signal [sic]”	Corrected to: Upon receipt of the RFID probing signal	

48. In my opinion, the prior art discussed in this Declaration satisfies the claim language under either party’s interpretation. This is demonstrated by

⁴ I understand that indefiniteness is a legal concept, and counsel has explained to me that indefiniteness is outside the scope of IPR proceedings. For this Declaration, my analysis of prior art for certain terms is based on Varia’s application of plain and ordinary meaning.

Ground 1A, which applies the prior art based on Apple's interpretations based on the claim language and prosecution history, and Ground 1B, which applies the prior art based on Varia's interpretations.

1. *Transceiver* (Claims 1, 13)

49. This term has different requirements based on plain meaning of the claim language and characterizations by Varia during prosecution and in a district court litigation involving the '974 patent ("Litigation"). While these requirements are discussed below, the prior art discussed in this Declaration satisfies the claim language when given its plain meaning (and, as characterized as such by Varia in prosecution) and under Varia's own interpretations.

(i) *Claim Language*

50. Claims 1 and 13 each recite a transceiver configuration where the *transceiver* is at least configured to (a) output *voice call signals* in one state, and (b) output *RFID transponder signals/RFID transponder data* in another state.⁵

⁵ Claims 1 and 13 reference a "first" and a "second" state, but assign different transmitting functions (voice call signals, RFID transponder signals) to each. While the use of "first" or "second" as identifiers is different, each claim recites essentially the same two transmitting functions of *voice call signals* and *RFID transponder signals*.

Claim 1 uniquely requires that the transceiver be further configured to be *switch[ed]* from the state of outputting *voice call signals* to the state of outputting *RFID transponder signals upon reception of the instruction* recited in [1.1].

Claim 13 uniquely limits requirement (b) such that the *output* of *RFID transponder data* is *upon the mobile communications device determining proximal presence of one or more RFID readers*.

51. Based on the claim language above, the table below shows the requirements of the transceiver configurations of each of claims 1 and 13:

Claim	Transceiver Configuration
1	(a) output, in one <i>state</i> , <i>voice call signals</i> , (b) output, in another <i>state</i> , <i>RFID transponder signals</i> , and (c) be <i>switch[ed]</i> from the state of outputting <i>voice call signals</i> to the state of outputting <i>RFID transponder signals upon reception of an instruction to transmit first RFID transponder data</i>
13	(a) output, in one <i>state</i> , <i>RFID transponder signals as a radiofrequency signal</i> upon determination of <i>proximal presence of one or more RFID readers</i> , and (b) output, in another <i>state</i> , <i>voice call signals for transmission at least in part over a wireless network</i>

(ii) Varia's Statements in Prosecution

52. The *transceiver* term was characterized by Varia during prosecution of the application. *See, e.g.*, APPLE-1002, 92, 155.

53. For example, Varia stated that the plain and ordinary meaning of the term “transceiver” is “a single component for transmitting and receiving.”

APPLE-1002, 155. Varia also stated the *transceiver* may be met by “a single/package/unit and sharing at least some common circuitry for both transmission and reception located within a mobile communication device.”

APPLE-1002, 92.

(iii) Varia’s Characterizations in Litigation

54. I understand that Varia has interpreted *transceiver* as “collectively” including circuitry elements associated with two wireless signaling capabilities (NFC, LTE). Specifically, I understand that Varia identified internal circuitry and components, including an NXP 67V04 NFC Controller, Qualcomm WTR4905 Multimode LTE Transceiver, and Qualcomm WTR3925 RF Transceiver. I also understand that Varia interprets the *transceiver* as encompassing circuitry of different components within a mobile device that *collectively* enable transmission/reception functionality of the mobile device. This Declaration analyzes prior art consistent with this interpretation. See Section XIII below.

2. ***Switch/Switching*** and ***State*** (Claims 1, 32)

(i) Claim Language

55. Claims 1 and 12 each include limitations ([1.2], [32.2]) reciting a step of ***switch[ing]*** of a transceiver/transmitter in relation to transmitting RFID

transponder signals and voice call signals. Claim 1 recites *switch[ing]* between two *states* of a *transceiver*, while claim 32 recites *switch[ing]* between two *sections* of a *transmitter*.

(ii) Varia's Characterizations in Prosecution

56. The *state* term and the associated *switching* functionality were characterized by Varia in original prosecution of the '984 patent. *See, e.g.*, APPLE-1002, 40-41, 91-94, 133-136, 154-157, 196-200; APPLE-1009, 531. For example, Varia stated that the use of "state" in the claims and specification should be understood such that "the first state is exclusive of the second state, and the second state is exclusive of the first state." APPLE-1009, 531. Varia also characterized the claimed *transceiver* as a "two state (switching required) transceiver." APPLE-1002, 155.

IX. SUMMARY OF RELEVANT PRIOR ART

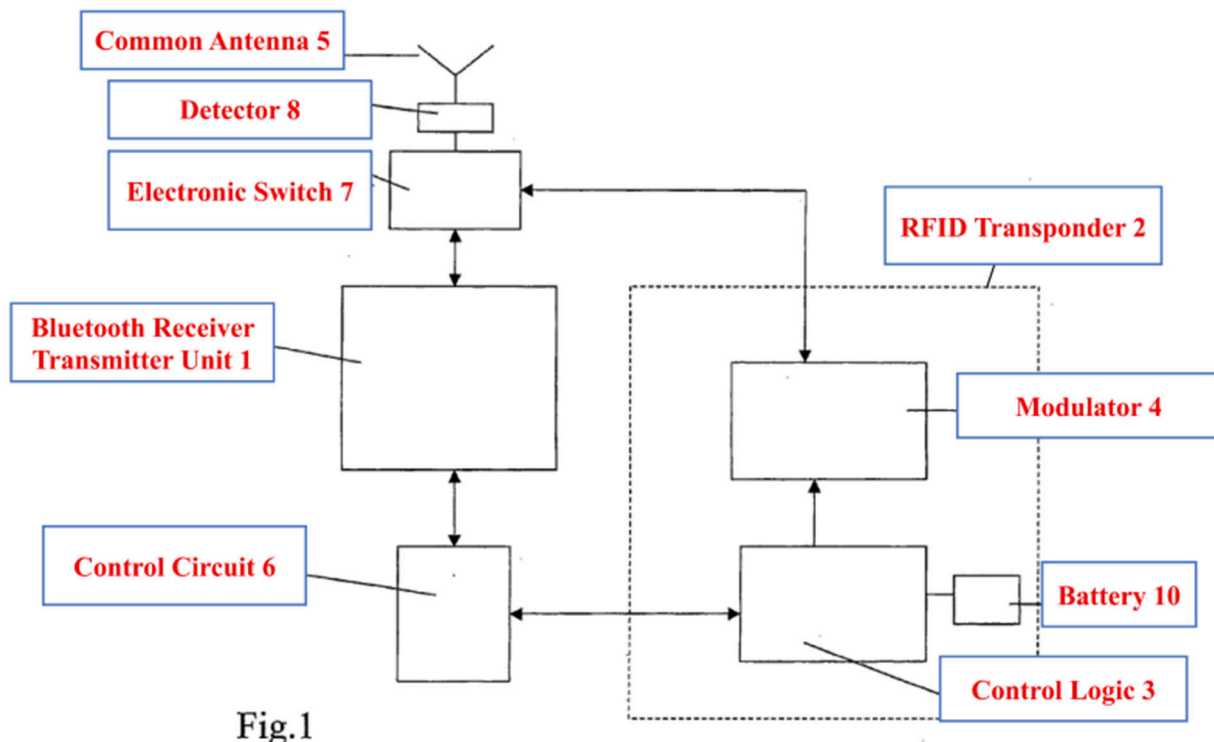
A. Grounds 1A, 1B

1. Overview of Willgert

57. Willgert is generally focused on a "communications unit for identifying objects or persons." APPLE-1004, Abstract. The communications unit includes a "receiver/transmitter unit" operable with a "Bluetooth communications system," as well as a "transponder" operable with an "RFID system." *Id.*

58. In Willgert, “it is often necessary for a user to have access” to Bluetooth and RFID communications for “different applications,” but Willgert also recognizes that such configurations “result[] in higher costs than when only one of the systems is used.” APPLE-1004, [0008]. Its disclosure is also focused on the problem that it is “troublesome for a user to carry two systems on his/her person.” To address this problem, Willgert proposes “provid[ing] a solution...that significantly lowers the costs and affords simpler handling.” *Id.*, [0009]. The solution is embodied in the “communications unit” being “integrated” within a mobile telephone, thereby enabling Bluetooth and RFID transmission by the same mobile telephone. *Id.*, [0010].

59. Figure 1 shows one example of a communications unit:



APPLE-1004, FIG. 1 (annotated)

60. The communications unit may be used for “identifying objects or persons,” e.g., identifying a person uniquely associated with an identifier. APPLE-1004, [0014]. As shown above, the communications unit includes “[Bluetooth] receiver/transmitter unit 1 in accordance with a Bluetooth system[,]” and “also includes a [RFID] transponder 2 in accordance with a so called RFID system.” *Id.* The incorporation of these elements “enable[s] components associated with the receiver/transmitter unit [1] to be used also for operation of the [RFID] transponder 2,” thereby providing “a communications system for communication with both an RFID system and a Bluetooth system.” *Id.*, [0015]-[0016].

61. RFID transponder 2 includes “control logic 3 and an associated memory and modulator 4.” APPLE-1004, [0017]. This transponder is also “adapted to receive a query signal sent from a suitably known communicator...” and “may contain various types of information[,]” e.g., “a unique identity that is sent to the communicator...” *Id.* In some implementations, RFID transponder 2 also includes “modulator 4” and in operation, uses “antenna 5 of the receiver/transmitter unit 1, control circuit 6, and a battery (not shown) belonging to the Bluetooth arrangement 1.” *Id.*, [0019]. In such implementations, “the function of the control logic 3 is included in the function of the control circuit 6.” *Id.*

62. In the example shown in Figure 1, “an electronic switch 7 is included between the common antenna 5 and the specific components of the receiver/transmitter unit 1 as well as the specific components of the [RFID] transponder 2, respectively.” APPLE-1004, [0020]. For transmission of signals, “switch 7 is controlled by the control circuit 6 when transmitting from the communications unit.” *Id.*, [0022]. For reception of signals, switch 7 is “controlled by a detector 8 positioned at the antenna 5, and it functions to detect whether a signal received by the antenna 5 is a Bluetooth signal or an RFID signal intended for the [RFID] transponder 2[,]” and “[u]pon completion of this detection, the signal received is sent either to the Bluetooth receiver/transmitter 1 or, alternatively, to the [RFID] transponder 2.” *Id.*, [0021]. For instance, “[w]hen a transponder signal is received, the signal will either be reflected by the modulator 4 or, if it is a write signal, it will be decoded in the aforesaid manner and entered into the memory, depending on the design of the transponder.” *Id.*, [0024]. Alternatively, “[w]hen the signal received is a Bluetooth signal, a transmitter signal is created in the receiver/transmitter unit 1 and sent to the antenna 5.” *Id.*, [0025].

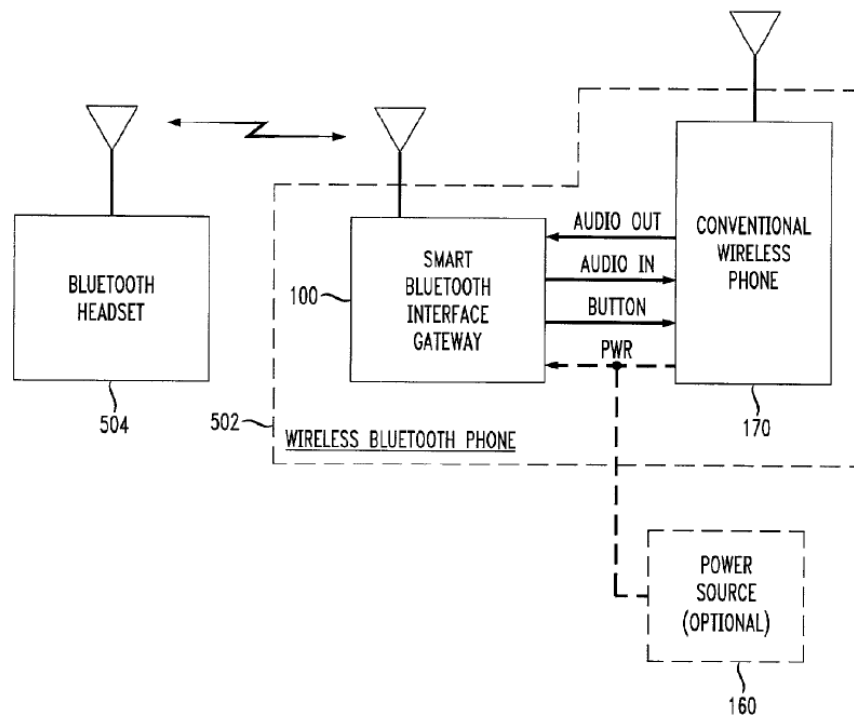
2. Overview of Mooney

63. Mooney describes systems and techniques for enabling an audio connection between a Bluetooth headset and wireless phones, including phones without Bluetooth connectivity. APPLE-1005, Abstract. The audio connection is

established through use of a “Bluetooth interface gateway device” that communicates with a “conventional wireless phone (e.g., a wireless phone that does not have BLUETOOTH installed).” *Id.* Through use of the Bluetooth interface gateway device, a conventional wireless phone may communicate with the Bluetooth headset in the same manner as, for example, a Bluetooth-enabled wireless phone.

64. Figure 1 shows an example of Bluetooth headset 504 paired with a wireless Bluetooth phone 502 via a smart Bluetooth interface gateway 100 enabling Bluetooth functionality to a conventional wireless phone 170:

FIG. 1



APPLE-1005, FIG. 1

65. “[C]onventional Bluetooth headset 504” communicates “with an otherwise conventional wireless phone 170 by adaptation of the wireless phone into a wireless BLUETOOTH phone 502 by the external connection of a smart BLUETOOTH interface gateway 100.” APPLE-1005, [0039]. Further, Bluetooth headset 504 is described as “conventional,” and a POSITA would have understood that the Bluetooth headset 504 is configured to similarly communicate with Bluetooth-enabled mobile telephones without necessarily using the smart Bluetooth interface gateway 100. *Id.* For example, in communicating with a Bluetooth-enabled mobile telephone using a Bluetooth connection, Mooney’s Bluetooth headset 504 is configured to “hear voice and/or tones...generated from the wireless phone [.]” *Id.*, [0048]. Mooney also describes processes for answering phone calls using a Bluetooth headset. *See, e.g., id.*, [0033], [0047]-[0060], FIG. 3.

B. Ground 2

1. Overview of Holloway

66. Holloway is focused on addressing limitations of traditional “RFID smart cards” that are “used across a wide range of applications,” including “mass transit, vending machines, access control and use as an electronic purse.” APPLE-

1006, 2:15-23⁶; *see id.*, Abstr., 11:16-27. These limitations include (1) the inability to “verify that the user of the card is the true owner,” (2) lack of compatibility with devices other than “custom device[s]” that are “located either at special cash points or in the user's home,” and (3) a requirement for a user to carry “[a] large number of cards.” *Id.*

67. In addressing these limitations, Holloway proposes using a mobile telephone that is “fully compatible with existing RFID cards” to replace the use of traditional “RFID smart cards” in the variety of RFID smart card-based transactions. APPLE-1006, 11:16-27; *see id.*, 2:15-23. This is accomplished by “incorporat[ing] the functionality of a number of different cards within the one mobile telephone.” *Id.*, 12:5-18; *see id.*, 8:23-9:4, 9:25-10:2. To improve security, the telephone improves the security of user identity verification through use of “one or more fingerprint scanning means, voice or password recognition means...” *Id.*, Abstr. This allows the telephone to be used “for checking the identity of a user in connection with various transactions.” *Id.*; *see id.*, 2:3-4. For example, to support smart card functionality, the telephone includes “memory” with “sub-divisions corresponding to different smart cards.” *Id.*, Abstr. This functionality

⁶ Citations to APPLE-1006 are to PDF page numbers (and not the page numbers identified in the reference).

coincides with the storage configurations of multiple RFIDs in the '984 patent.

See, e.g., APPLE-1001, 4:54-58; 7:41-50.

68. Figure 1 (annotated below) shows an example of Holloway's mobile telephone.

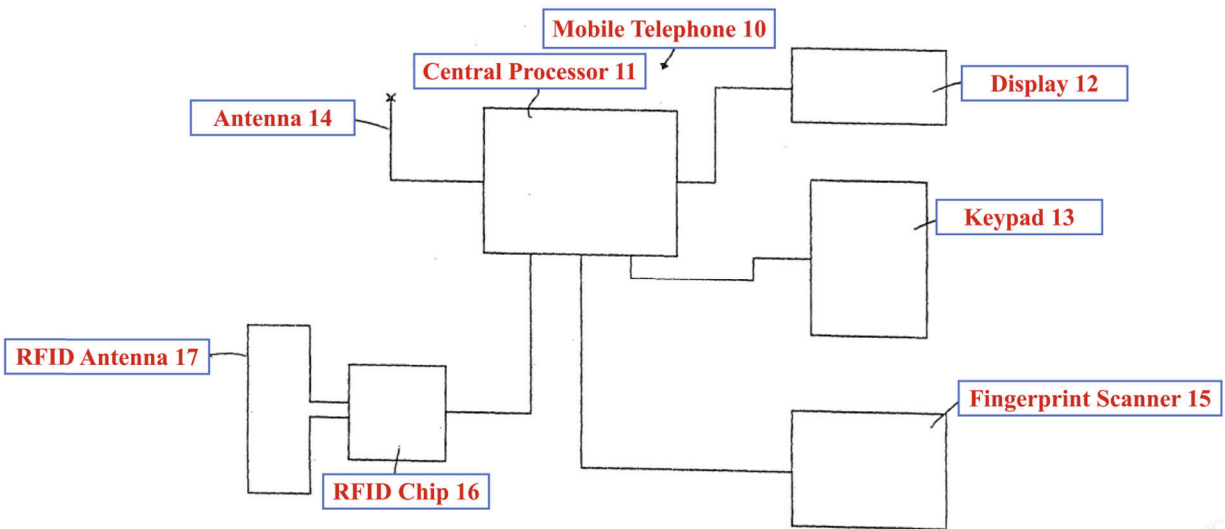


Fig 1

APPLE-1006, FIG. 1 (annotated)

69. RFID smart card functionality of a number of different cards in Holloway's mobile telephone is provided through a "memory" configured to "receive and/or send data via [a] telephone means." APPLE-1006, 3:28-30. The "memory" may be "divided into a plurality of separate secure areas" (*see id.*), which may "correspond[] to different smart cards" (*see id.*, Abstr.). This storage configuration "makes it possible to allocate service providers with individual areas for their particular application[,]" and "incorporate the functionality of a number of

different cards within the one mobile telephone.” *Id.*, 12:11-18. Implementations of this storage configuration may involve use of subdivisions/separations of the “memory.” *Id.*, Abstr. (“memory” may be “divided into a plurality of secure areas”).

70. Holloway envisions incorporating RFID technology with a mobile phone such that, in some implementations, a shared memory exists for RFID and telephone communications. APPLE-1006, 2:28-30. For example, the telephone may “undertak[e] a local communication [(RFID communication)] using said communications means substantially simultaneously with, before or subsequent to a telephone communication.” APPLE-1006, 4:15-18. A user can securely interact with RFID data within the phone using various devices, e.g., external readers, RFID smart cards, another mobile phone, the inputs of the mobile phone, or software within the phone connected to external entities, e.g., a bank. APPLE-1006, 3:1-2, 3:20-27, 6:11-20, 8:1-6.

2. Overview of Pitroda

71. Pitroda is directed to “methods of administering a plurality of client accounts for an electronic transaction device...” APPLE-1007, 1:6-12. An “electronic transaction device” can communicate with “point of sale computers” so that “a person may use a single electronic transaction device to conduct financial transactions to several credit, debit, or deposit accounts, such as accounts normally

associated with...banking transactions.” *Id.*, 1:13-42. The “electronic transaction device” may be a “general purpose hand held computers” that are “programmed to conduct electronic transactions[,]” e.g., those that run “Palm OS or Microsoft Windows CE.” *Id.*, 1:43-52. For example, in performing an electronic financial transaction, a user can “select a credit card account” on an electronic transaction device 12 and then “transmit the account information” to a payment processing device. *Id.*, 7:18-29.

C. Overview of Combinations

72. For the reasons articulated in detail below, and based on my review of the '984 patent, the file history, and the prior art references cited here, it is clear that a POSITA would have readily understood that the teachings of Willgert and Mooney make the elements of claims 1-3, 9-14, 20-22, 29-33 and 39 obvious.

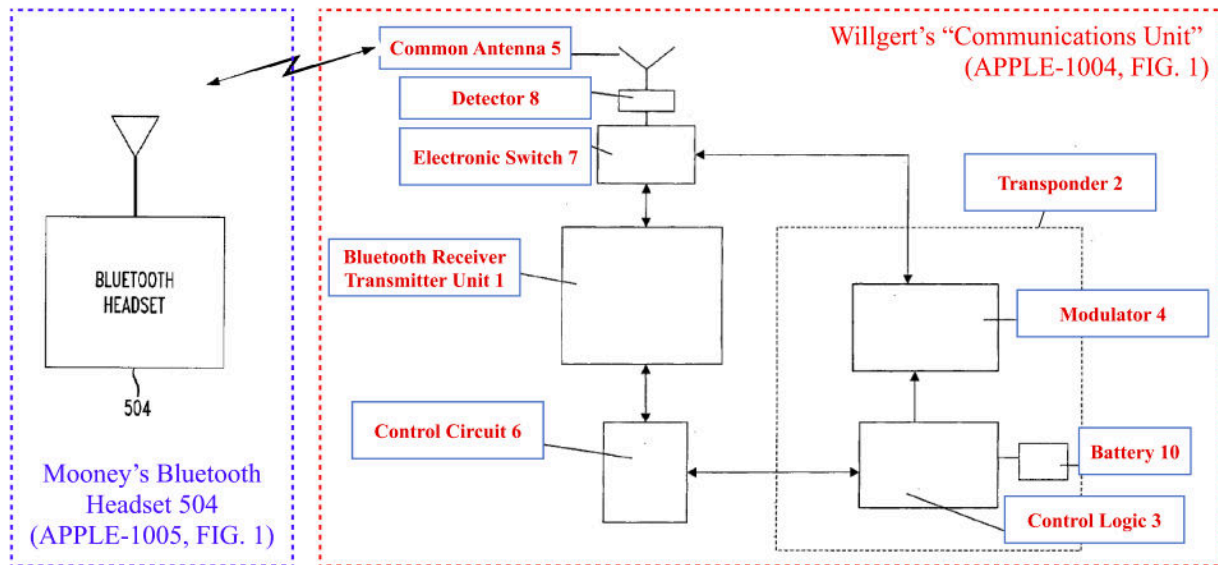
1. Willgert-Mooney Combination

73. Willgert contemplates embodiments in which an RFID transponder is “included in a mobile telephone designed for Bluetooth communication.” APPLE-1004, [0030]. In one example, Willgert discloses “[a] design in which Bluetooth and [an RFID] transponder are both integrated in a mobile telephone,” which “mak[es] use of Bluetooth communication possible” via the mobile phone. *Id.*, [0032]. A POSITA seeking to implement a mobile telephone having both Bluetooth and RFID communication capabilities as taught by Willgert would have

looked to available configurations for mobile telephones that advantageously leverage the “design in which Bluetooth and transponder are both integrated in a mobile telephone . . . for making use of Bluetooth communication.” *Id.*, [0032].

74. In seeking these configurations, a common use of Bluetooth was through headsets enabling hands free phone calls. *See generally* APPLE-1006 (Sony Ericson BT headset from 1994). In seeking to implement this functionality in Willgert’s telephone, a POSITA would have looked to Mooney, which discloses implementation detail related to the use of Bluetooth connectivity for a mobile telephone and advantages of doing so. Mooney teaches that Bluetooth technology has “permitted the addition of BLUETOOTH functionality and communication between a wireless phone and a wireless headset.” *Id.*, [0007]. As discussed in Section IX.A.2, Mooney describes a Bluetooth headset 504 providing an audio gateway with an associated Bluetooth phone 502 that allows the Bluetooth headset 504 to “provide a hands free connection for a wireless phone” and to “hear voice and/or tones...generated from [a] wireless phone...” *Id.*, [0034], [0048]. Mooney further discloses a process (in Figure 3) by which “an incoming call is answered using a BLUETOOTH headset and wireless BLUETOOTH phone including a smart BLUETOOTH interface gateway as shown in FIGS. 1 and 2.” *Id.*, [0046]; *see also id.*, [0047]-[0060], FIG. 3.

75. As combined, Willgert-Mooney would have provided a system that includes a mobile telephone (incorporating Willgert’s “communications unit”) and an associated Bluetooth headset that enables a user of the telephone to conveniently receive and respond to voice calls through use of the wireless headset. *See* APPLE-1004, [0030]-[0032]; APPLE-1005, [0039]. Such a configuration would have been well-known by the Critical Date because the use of Bluetooth headsets for hands free phone communications was conventional by 1994. *See generally* APPLE-1006. A POSITA would have also been motivated to implement this configuration since Willgert describes “a transponder [being] included in a mobile telephone designed for Bluetooth communication” as a “highly user-friendly application.” APPLE-1004, [0030]. Through incorporation of Mooney’s teaching, the Willgert-Mooney telephone would have provided an audio connection to a Bluetooth headset, enabling it to “hear voice and/or tones” generated from the telephone, as shown in a modified version of Willgert’s Figure 1 below. APPLE-1005, [0048].



Willgert-Mooney

76. A POSITA would have readily recognized that Mooney’s headset was a technical implementation of a well-known concept (use of Bluetooth headsets for voice communications with other Bluetooth-enabled devices, such as a mobile telephone) and thereby can be connected as a compatible companion device to Willgert’s Bluetooth-enabled mobile telephone. APPLE-1004, [0008], [0030]; *See generally* APPLE-1006; *see* APPLE-1016. Mooney explains such well known concept in terms of a Bluetooth network technology. “A plurality of piconet networks may be interconnected through a scatternet connection, in accordance with BLUETOOTH™ protocols BLUETOOTH network technology may be utilized to implement a wireless piconet network connection (including scatternet).” “BLUETOOTH technology has permitted the addition of

BLUETOOTH functionality and communication between a wireless phone and a wireless headset.” APPLE-1005, [0006]-[0007].

77. Such a connection configuration would have improved the use of Willgert’s mobile telephone since a user would enjoy greater freedom when engaged in audio phone calls (i.e., calls that do not use the phone’s internal speaker or microphone) by no longer requiring that the user be manually holding the mobile telephone up during these calls. Bluetooth headsets were also widely available and used for phone calls in this manner before the Critical Date. *See, e.g.*, APPLE-1006, 2 (describing a “practical headset that connects to a mobile phone by a radio link instead of a cable,” which is “the first hands-free accessory to incorporate Bluetooth technology” and “available on the market in mid-2000”); APPLE-1017, 1 (describing a “triple-band GSM phone capable of working in the 900-, 1800-, and 1900-MHz bands” that is “Bluetooth enabled” and can connect to the headset...without needing wires of any sort”). And, Willgert recognizes, such a mobile telephone configuration would have allowed “a user to have access to both systems for different applications” (Bluetooth, RFID) without the “higher costs” associated with having an ID system different from a Bluetooth system and without having to “trouble[] ... a user to carry two systems on his/her person.” APPLE-1004, [0008].

78. As discussed above, Willgert-Mooney would have involved incorporating prior art elements according to known methods in a vehicle to yield predictable results. Each of Willgert's mobile telephone and Mooney's Bluetooth headset were well-known by the Critical Date, and their combination would have predictably improved user convenience while using a mobile telephone as a multi-purpose device (e.g., telephony, identification). APPLE-1004, [0010]. Further, the combination would have involved use of known aspects of the Bluetooth protocol for a Bluetooth-enabled mobile telephone. *See* APPLE-1006, 2; APPLE-1017, 3.

79. Finally, a POSITA would have reasonably expected to succeed in combining the teachings of Willgert and Mooney. Implementation of the combination would have required only routine knowledge because the addition of Mooney's Bluetooth headset connection to a mobile telephone incorporating Willgert's communications unit would have involved, for example, "[t]he Headset Profile of the BLUETOOTH specification, version 1.1, Part K:6," which "provides the framework for conventional BLUETOOTH communications between a wireless BLUETOOTH phone and a wireless BLUETOOTH headset." APPLE-1005, [0008]. Further, use of Bluetooth protocol to enable the hands-free communication of voice and data between a Bluetooth headset and a cellphone was conventional by the Critical Date. *See, e.g.,* APPLE-1006, 2 (a "Bluetooth Headset" is a "hands-free accessory to incorporate Bluetooth technology"); *see*

also APPLE-1017, 3 (Bluetooth connectivity enables “hands-free communications between a Bluetooth-enabled headset”).

2. Willgert Mooney Holloway Pitroda Combination

80. As combined, Willgert-Mooney-Holloway-Pitroda would have incorporated the teachings of Holloway and Pitroda relating to RFID smart cards to further improve Willgert-Mooney (discussed in §IX.C.1). A POSITA would have been motivated to seek these improvements because Willgert and Holloway each similarly express a desire to improve user convenience when using a similar type of device—a mobile telephone with RFID signaling capabilities. *Compare* APPLE-1004, [0009] (discussing benefits of “simpler handling), *and* APPLE-1006, 6:4-16 (discussing “greater flexibility and convenience”). Like Willgert and Holloway, Pitroda also focuses on user action, and does so by specifically discussing a usage scenario involving the same type of mobile telephone in one of the RFID smart card transactions contemplated in Holloway. *See* APPLE-1007, 7:18-40 (describing a RFID-capable mobile telephone being used in a financial transaction).

81. Given the overlaps in their disclosures, a POSITA would have sought to improve the RFID capabilities of Willgert-Mooney by incorporating the teachings of Holloway and Pitroda. Specifically, the POSITA would have looked to Holloway’s teaching of using a mobile telephone for use in an RFID smart

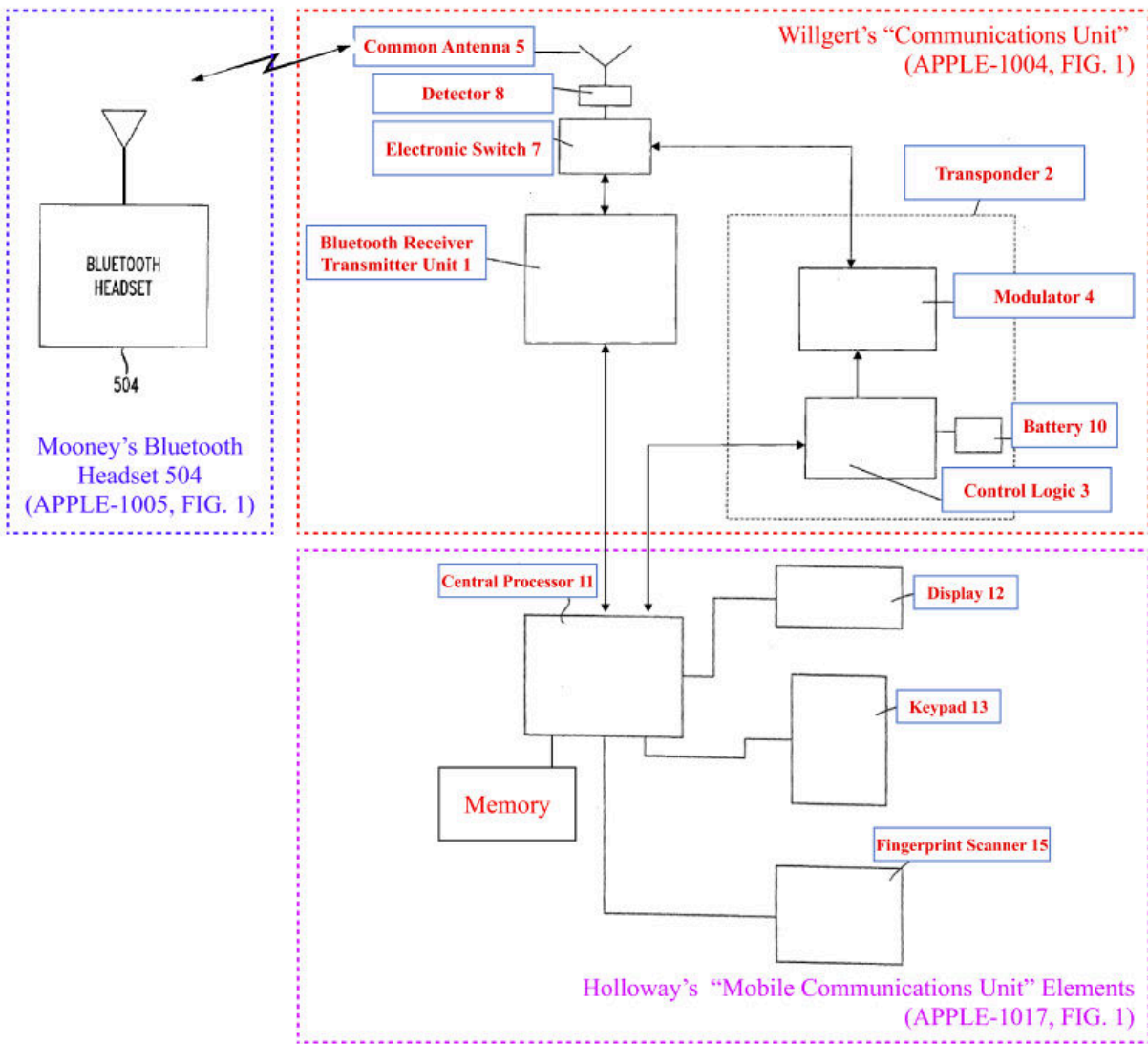
transaction. APPLE-1006, 10:4-15. The POSITA would have also looked to Pitroda's teaching of enabling a user to select a particular RFID smart card (from among multiple available RFID smart cards stored) for use in the RFID smart card transaction. APPLE-1007, 7:18-40. By combining these teachings, a POSITA would have realized the "real benefit" to the user described in Holloway—a mobile device configuration where the user "no longer has to carry in his wallet a collection of cards that he may rarely use." APPLE-1006, 12:11-18. By combining these features, a POSITA would have understood and found obvious that the features describing multiple RFID smart cards and the selection of those RFID smart cards in Holloway and Pitroda further enable the capabilities of Willgert's transponder that already possess the ability to have RFID transponder data "written into the transponder memory, so that said information can be read-out from the memory later on." APPLE-1004, [0018].

82. To provide the improvements discussed above, a POSITA would have implemented the Willgert-Mooney-Holloway-Pitroda phone to incorporate an improved RFID transponder/tag. This (1) enables the functionality of multiple RFID smart cards (as contemplated in each of Holloway and Pitroda) and (2) enhances the capabilities of Willgert's telephone. *See* APPLE-1004, [0015]; APPLE-1006, 3:1-5; *see id.*, 3:10-12. The phone would also have included logic (e.g., implemented through Holloway's central processor 11 and/or Willgert's

control circuit 6) to provide management of RFID transponder data (e.g., a plurality of RFID smart cards) for various RFID implementations. APPLE-1004, [0019]; APPLE-1006, 3:24-26.

83. The phone would also have included logic (e.g., implemented through Holloway's central processor 11 and/or Willgert's control circuit 6) to provide management of RFID transponder data (e.g., a plurality of RFID smart cards) for various RFID implementations. APPLE-1004, [0019]; APPLE-1006, 3:24-26. In this way, the Willgert-Mooney-Holloway-Pitroda phone would have provided a "real benefit" to the user since "he no longer has to carry in his wallet a collection of cards that he may rarely use." APPLE-1006, 12:11-18.

84. One example of Willgert-Mooney-Holloway-Pitroda is shown below:



Willgert-Mooney-Holloway-Pitroda⁷

85. Because Willgert, Holloway, and, Pitroda each describe employing RFID technology through mobile devices, a POSITA would have understood and

⁷ Figure component labels have been added in black font. See APPLE-1006, Abstr., 5:21-28.

found obvious that Pitroda's organization of memory storage for each RFID smart card and the input capabilities of the mobile phone could be utilized to improve the user's experience and achieve the goals stated by Holloway. In implementing Willgert-Mooney-Holloway-Pitroda, a POSITA would have utilized hardware elements described in Willgert and Holloway, while leveraging the software enhancements described in Pitroda, e.g, the employment of multiple different RFID smart cards through the Willgert transponder using Pitroda's disclosure of user selection.

86. Specifically, Willgert and Holloway each describe RFID transponder hardware being incorporated into a mobile telephone. APPLE-1004, FIG. 1 (RFID transponder 2), [0017]; APPLE-1006, FIG. 1 (RFID chip 16), 5:21-28. And, for reasons discussed in detail below, a POSITA would have found it obvious to improve the mobile phone of Willgert-Mooney using the RFID smart card functionality contemplated in Holloway (and taught as providing advantages to the Holloway telephone).

87. A POSITA would have been motivated to seek and combine the teachings of Holloway with Willgert-Mooney because Willgert and Holloway each seek to simplify a user's RFID transponder operations by incorporating a user's RFID devices into a mobile phone, reducing the number of devices carried by the user. For example, Willgert recognizes that "it is often necessary for a user to have

access to [multiple] systems for different applications[,]” which is “troublesome for [the] user to carry two systems.” APPLE-1004, [0008]. Holloway similarly recognizes that “users are irritated by the large number of [items] that they are [] obliged to carry[,]” (APPLE-1006, 2:15-23), and addresses this challenge by “incorporat[ing] the functionality of a number of different cards within [] one mobile telephone...” (*id.*, 12:11-18). Holloway’s management of RFID transponder data within a mobile device would have advanced Willgert’s desire for “simpler handling” (APPLE-1004, [0009]), thereby addressing the criticisms of other prior art systems mentioned by Willgert. *Id.*, [0009] (prior art systems are “troublesome for a user” because they require the user “to carry [multiple] systems on his/her person”).

88. In implementing Willgert-Mooney-Holloway, a POSITA would have understood and found obvious that RFID smart card functionality is a well-known implementation and utility of traditional RFID transponders. *See* APPLE-1006, 5:21-28, 7:22-26, 9:4-15); *see also* APPLE-1006, 2:15-23 (“**For some time** RFID smart cards have been used across a wide range of applications...RFID smart cards provide both a quick and convenient means for users to carry out such transactions”); *see also* APPLE-1022, 12:32-41 (filed 1994, describing “a radio frequency transceiver 230” that “provides extremely fast interactive communication between an electronic wallet 100 and an radio frequency

communications device,” which “allows tasks such as cash payments to be performed automatically...”). And, while Holloway describes its innovation as providing this functionality within a mobile telephone, it does so through use of an “RFID chip 16 [that] is connected to an RFID antenna 17.” APPLE-1006, 4:21-28. Holloway teaches the function of a mobile telephone with RFID chip as an RFID smartcard: “mobile telephone 10 comprises a central processor 11 connected to a display 12, a keypad or keyboard 13 and an antenna 14 for telephonic signals. A fingerprint scanner 15 is also connected to the central processor 11 and is physically mounted at the foot of the keypad 13. Also connected to processor 11 is an RFID (radio frequency identity) chip 16 corresponding to the chips found in RFID smart cards”. APPLE-1006, 4:21-26. “Having established correct identity, the mobile telephone is enabled and the user is permitted access to the full range of features. One of these features is the ability of the mobile telephone to function as an RFID smart card.” APPLE-1006, 9:7-11. “Advantageously, the RFID smart telephone can be fully compatible with existing RFID cards.” APPLE-1006, 10:16-17. Because Willgert also teaches a mobile telephone incorporating an RFID transponder, a POSITA would have perceived the extension of Holloway’s RFID smart card functionality to the RFID transponder within the Willgert-Mooney telephone as providing a known functionality to a known system. APPLE-1006, 10:16-27; APPLE-1004, [0014]-[0019].

89. To enable RFID smart card functionality within Willgert-Mooney, a POSITA would have configured RFID transponder 2 to communicate with memory for storing RFID smart card data. APPLE-1006, 11:5-18. Consistent with Willgert's desire to enable a user to conduct RFID communication, Holloway provides methods to store, organize, and authorize the use of certain RFID smart card transactions. APPLE-1006, 10:16-27, 11:5-18, 2:20-23. This configuration would have allowed the user to use a single device (the Willgert-Mooney-Holloway-Pitroda phone) to incorporate the functionality of a number of different within the one telephone, thereby achieving an advantage described in Holloway (e.g., the user "no longer has to carry in his wallet a collection of cards that he may rarely use"). *See* APPLE-1004, [0017]; *see also* APPLE-1006, 11:11-18; *see id.*, 2:1-13, 11:5-18. This would have also extended the use of RFID functionality to the different usage scenarios described in Holloway (e.g., mass transit, credit/debit, identification, access applications).

90. Willgert-Mooney-Holloway-Pitroda would have allowed a user to "perform all conventional credit and debit card transactions" using a single mobile telephone. APPLE-1006, 10:4-15. This functionality would have involved selection from multiple available RFID smart card functionalities (e.g., credit card, debit card) for use as a payment method in a particular transaction. APPLE-1006, 10:4-15 ("By presenting the telephone to a reader, the user is able to perform all

conventional credit and debit card transactions”). Holloway’s suggestion of using a mobile telephone to “provide[] a means to carry out normal day to day credit/debit purchases,” would have motivated a POSITA to seek practical solutions for implementations to allow a user to select between a credit card and a debit card for use in an RFID smart card transaction. *Id.*, 7:28-32.

91. A POSITA would have found relevant solutions within Pitroda (filed four years before the Critical Date), and would have expected success in incorporating Pitroda’s solutions into Willgert-Mooney-Holloway. As discussed in Section X.B.4, Pitroda teaches electronic payment methods by enabling a user to “select a credit card account on the client's electronic transaction device 12 and transmit the account information....” APPLE-1007, 7:18-29. By incorporating the teachings of Pitroda into the Willgert-Mooney-Holloway-Pitroda phone, a user would have been able to choose which RFID smart card data to present, so that a user would be able to select an RFID smart card as a default smart card that will be outputted whenever the mobile device detects a proximal RFID reader.

92. Specifically, when interacting with an electronic device (as described in Pitroda), a user would have been able to use the phone’s inputs for the “select[ion of] a credit card account on the client's electronic transaction device 12” for the intended transaction and the subsequently “transmit the account information” to an external RFID reader... *Id.*; APPLE-1006, 7:11-29, 7:28-8:4,

9:1-2, 9:5-6, 12:11-19. This selection (“authori[zation of] such transactions”) is similarly expressed in Holloway through examples of transactions “for any payment application” and for “[o]ccasions . . . in which authorities wish to verify the identity of a person.” APPLE-1006, 6:22-26; 9:25-32. These examples would have included a user’s ability to choose a credit card “for any payment application” and later choose to present identification for “checks on the holders of driving licenses.” *Id.* If Holloway were interpreted to exclude selection functionality, a user would not have the choice of “passport control points” or “high security buildings,” instead Holloway describes how a user can “authorise such transactions” and choose to present the passport RFID information and not credit card RFID information. *Id.*, 3:24-26.

93. An example implementation of Willgert-Mooney-Holloway-Pitroda would have involved modifying Willgert’s RFID transponder 2 to provide RFID smart card functionality described in Holloway while preserving functionality of “reflect[ing] and modulat[ing]” a received query/transponder signal. APPLE-1004, [0015]. In this example, a POSITA would have modified Willgert’s RFID transponder 2 to provide conditional responses upon receiving query/transponder signals based on Holloway’s teachings of “checking the identity of a user” of a mobile telephone in relation to a RFID smart card transaction. APPLE-1006, 3:1-5; *see id.*, 3:10-12.

94. As discussed above, Willgert-Mooney-Holloway-Pitroda would have involved incorporating prior art elements according to known methods in a mobile telephone to yield predictable results. Each of Willgert's mobile telephone and Holloway's "RFID smart telephone" were well-known by the Critical Date, and their combination would have predictably improved user convenience while using a mobile telephone as a multi-purpose device (e.g., telephony, identification). APPLE-1006, 2:1-23 ("For some time RFID smart cards have been used across a wide range of applications . . ."), 11:11-27 ("Advantageously, the RFID smart telephone can be fully compatible with existing RFID cards."); APPLE-1004, [0010], [0030]-[0032] ("A design in which Bluetooth and transponder are both integrated in a mobile telephone. . .").

95. Finally, a POSITA would have had a reasonable expectation of success in combining the teachings of Willgert-Mooney, Holloway, and Pitroda in the manner discussed above. Implementation of the combination would have required only routine knowledge available to a POSITA at the time of the Critical Date because Holloway and Willgert both teach similar types of devices (mobile telephones) for enabling similar types of communication functionality (RFID communication, telephone communication). APPLE-1004, [0014]-[0019]; APPLE-1006, 4:20-5:15. The incorporation of multiple types of RFID smart card functionality into a mobile device (e.g., Willgert-Mooney telephone) also

represented a well-known configuration by 12/11/2000 (i.e., Holloway's filing date). *See, e.g.*, APPLE-1006, 2:15-23 (“**For some time** RFID smart cards have been used across a wide range of applications”); *see also id.*, 2:6-13 (“It seems probable that the trend to include yet more functionality within the mobile telephone will continue,” e.g., “it would be advantageous to provide secure proximity operation using a mobile telephone”). For example, by at least 2002, combining RFID technology implementations into a single device was practiced in “hybrid cards,” which are “a physical medium on which several technologies coexist . . . [to] support different external systems and applications.” *Id.* Specifically, the hybrid cards could incorporate “[m]ultiple contactless technologies (125 kHz, 13.56 MHz)” and “both contact and contactless technologies are in the early stages of market deployment.” *Id.*

96. Providing RFID technology for multiple applications (e.g., mass transit, credit/debit transactions, and access control, as described in Holloway) was similarly well-known by October 2002 (before the Critical Date).). *Id.*; *see also* APPLE-1006, 2:15-23. Specifically, “[a]pplications such as logical access to computer networks, electronic payment, electronic ticketing and transit can be combined with physical access to offer a multi-application and multi-technology ID credential [(smart card)].” APPLE-1006, 2.

97. Additionally, various systems were known to have been capable of simultaneously providing RFID smart card functionality complying with multiple standards, e.g., through backward compatibility. For example, by October 2002, the Smart Card Alliance published a paper indicating that “125 kHz technology” as a “secure and proven technology for access control applications” and “newer contactless technologies,” and teaching that “it is possible to include both contactless technologies on a single card” at operating frequency 125 kHz and at operating frequency 13.56 MHz. APPLE-1019, 13, 14, 21-22. Additionally, the “multiple standards” could include the “three primary contactless technologies considered for physical access control applications: 125 kHz, ISO/IEC 14443, and ISO/IEC 15693 technologies.” APPLE-1006, 2. The implementation of Willgert-Mooney-Holloway-Pitroda would have been within the skill level of a POSITA without invention. APPLE-1019, 13, 19, 21-22.

X. [GROUND 1A] – Claims 1-3, 7-14, 18-22, 27-33 and 37-39 Are Obvious Over Willgert-Mooney

A. Analysis

1. Claim 1

[1.pre] A method for providing a radio frequency identification (RFID) from a switchable mobile communications device capable of RFID communication and voice call communication, the method comprising:

98. Willgert-Mooney renders [1.pre] obvious through disclosure of a Bluetooth-enabled mobile telephone (*mobile communications device*). APPLE-

1004, [0030], [0032]. As discussed in §X.A.1, Willgert’s “communications unit” includes a “receiver/transmitter unit” operable with a “Bluetooth communications system” (Bluetooth transmitter) and a “transponder” operable with an “RFID system” (RFID transponder). APPLE-1004, Abstract.

99. As explained in §III.A.1(iii), in Willgert-Mooney, the Bluetooth-enabled mobile telephone is capable of transmitting (a) RFID signals (***RFID communication***) to a communicator, and (b) Bluetooth voice communication between a mobile telephone (***voice call communication***) and a Bluetooth headset. *See* [1.1]-[1.3]. A POSITA would have understood and found obvious that the communicator to at least provide the functionality of an RFID reader since it is configured to receive an RFID signal transmitted by an RFID transponder and decode the received signal to identify a unique identity associated with the RFID transponder. APPLE-1004, [0017], [0018].

100. A POSITA would have understood and found obvious that the Bluetooth-enabled telephone of Willgert-Mooney is also a ***switchable*** mobile communications device in that the telephone is configured to use Willgert’s switch

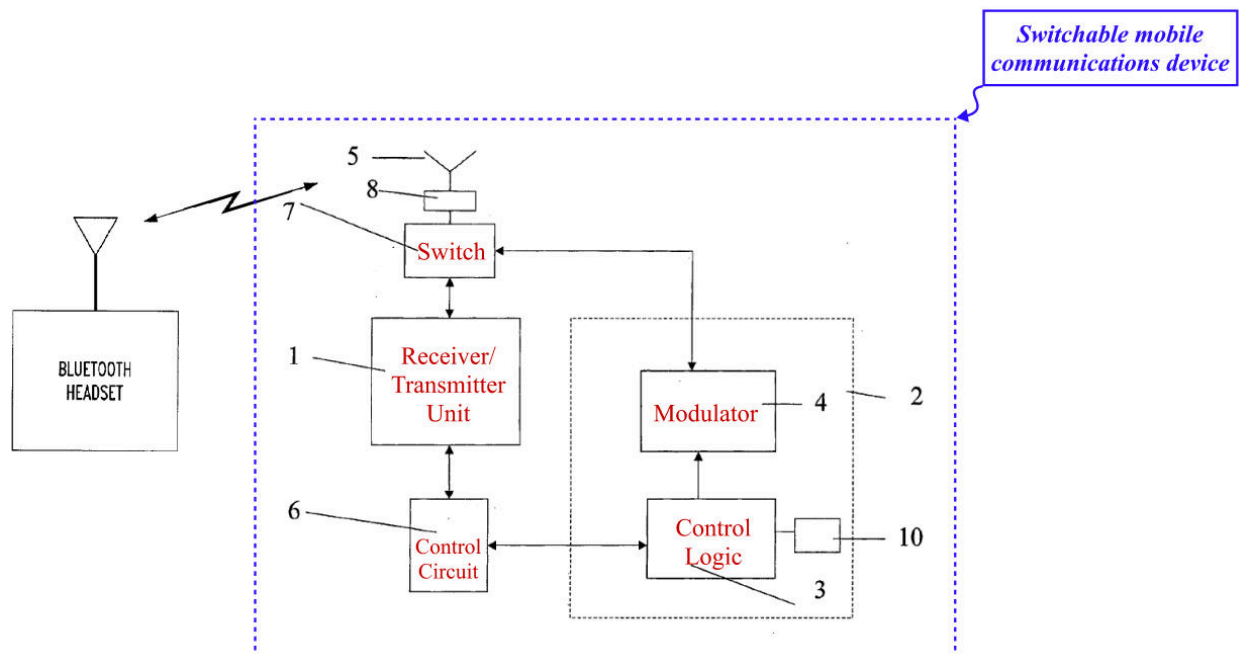
7⁸ to **switch** between an RFID state (e.g., signal output by RFID transponder 2) and a Bluetooth voice communication state (e.g., signal output by Bluetooth transmitter/receiver 1). APPLE-1004, [0020], [0022].

101. Specifically, switch 7 is “controlled by [a] control circuit 6 when transmitting from the communications unit” to enable different functionality depending on the type of signal received by the Bluetooth-enabled mobile telephone. APPLE-1004, [0022]. For example, when in an RFID state, the Bluetooth-enabled mobile telephone utilizes switch 7 to enable communication between RFID transponder 2 and the antenna. In this state, “[w]hen a transponder signal is received,” RFID transponder 2 is configured to “reflect” a received signal by modulator 4 (if the received signal is a read transponder signal) or “decode” the signal and enter the decoded signal “into memory” (if the received signal is a write transponder signal). *Id.* [0023].

102. Alternatively, when in Bluetooth voice communication state, “[w]hen the signal received is a Bluetooth signal,” the Bluetooth-enabled mobile telephone

⁸ Like the switch 404 described in the '984 patent, switch 7 of Willgert-Mooney is configured to switch from one state (for transmitting voice call signals, via Bluetooth voice communication) to another state (for transmitting RFID signals). APPLE-1004, [0022]-[0024]. *See also* [1.2].

utilizes switch 7 to enable communication between Bluetooth receiver/transmitter 1 and the antenna. In this state, the Bluetooth receiver/transmitter 1 creates a “transmitter signal” (e.g., relating to a Bluetooth voice communication), which is then “sent to the antenna” and ultimately to the Bluetooth headset to allow a user to participate in a voice call through the headset. *Id.*, [0024].



Willgert-Mooney

[1.1] receiving, by the mobile communications device, from an RFID reader external to the mobile device, an instruction to transmit first RFID transponder data in a format compatible with said RFID reader;

103. As explained in §X.C.1, in Willgert-Mooney, a Bluetooth-enabled *mobile* telephone (*communications device*) includes an RFID transponder 2 and associated functionality to “*receive* a signal sent by a communicator [(*from an RFID reader external to the mobile device*)]...” APPLE-1004, [0004]. RFID

transponder 2 includes “control logic 3 and an associated memory and modulator 4” and is “adapted to receive a query signal sent from a suitably known communicator.” *Id.*, [0017]; *see id.*, [0023]. Using RFID transponder 2, the Bluetooth-enabled mobile telephone (*mobile communications device*) is configured to *receive* a query/transponder signal from a communicator of an RFID system.

104. A POSITA would have understood and found obvious that *instruction* recited in [1.1] encompasses the query/transponder signal of Willgert-Mooney under the plain meaning of the term “instruction.” Commonly in the context of computer science, the term “*instruction*” may refer to a command or operation given to a computing device to perform a specific action. A computing device, in response to the type of the received signal (i.e., “instruction”), perform a specific action, typically from among a set of pre-defined actions, each corresponding to an information state contained within the instruction. In RFID technology, a POSITA would have considered an RFID probing signal received by an RFID transponder to be an “*instruction*” because when such a probing signal is received, the transponder interprets the probing signal as a command to perform a particular action, such as responding to the query signal by transmitting its stored data and/or its unique identifier, or by enabling received information from the query to be

written into the transponder memory. APPLE-1004, [0017]-[0018]; *see also* APPLE-1018 (describing the plain meaning of “instruction”).

105. In Willgert-Mooney, the query/transponder signal includes information (e.g., signal type, such as read signal and write signal) that, once received, enables the RFID transponder 2 to perform a responsive action (e.g., reflect the received signal or store data for a write signal). APPLE-1004, [0017], [0023]. The RFID transponder 2 “includes control logic 3 and an associated memory and modulator 4[]” and is “adapted to receive a query signal sent from a suitably known communicator.” *Id.*, [0017]. Upon receiving the query/transponder signal, RFID transponder “modulat[es] the signal with a pulse train” and “[i]nformation relating to the pulse train is stored in the memory. *Id.* The query/transponder signal includes signal information (*instruction*) enabling control logic 3 of the RFID transponder 2 to identify a signal type (read, write) and *to transmit first RFID transponder data*. Additionally, the query/transponder signal is used by the communicator to obtain, from the RFID transponder 2, information to determine the “identity” of RFID transponder 2 and also causes the RFID transponder 2 to provide a responsive signal such that the query/transponder signal is an *instruction to transmit* identity information (*first RFID transponder data*). APPLE-1004, [0005].

106. The query/transponder signal of Willgert-Mooney is also an example of an *instruction* based on the '984 patent's intrinsic record. In prosecuting the '984 patent (U.S. Pat. No. 8,127,984), Varia claimed "receiving...from an RFID reader external to [a] mobile device, an instruction to transmit first RFID transponder data in a format compatible with [an] RFID reader," establishing that, like the query signal of Willgert-Mooney (which is provided to a transponder by an RFID reader), an *instruction* is similarly received from an RFID reader. *See, e.g.*, APPLE-1002, 12 (authorizing Examiner's amendment to replace claim 1 with such language). Further, the only examples of information received by a transponder from an external RFID reader described in the '984 patent specification are "probing signals," (i.e., the same type of signal as Willgert's query/transponder signal). *See* APPLE-1001, 4:66-5:2; *see also id.*, 7:17-21. Further, in Willgert-Mooney, data sent in response to receipt of the query/transponder signal is identity information (*RFID transponder data*), further confirming that functionality of the query/transponder signal is similar to that of the recitation of *instruction* in [1.1]. APPLE-1004, [0017]. A POSITA would have understood and found obvious that the *instruction* recited in [1.1] encompasses the query/transponder signal described in Willgert because the query/transponder signal enables RFID transponder 2 to communicate (*to transmit*) with a "suitably known communicator." APPLE-1004, [0015], [0017].

107. Additionally, Willgert teaches that when an RFID signal is received that the switch 7 would align to allow the mobile communication device to reflect the signal. APPLE-1004, [0021]-[0022]. Willgert teaches that when an RFID signal is received the logic circuit 6 will issue *instructions* to allow switch 7 to permit the reception and transmission of RFID to “reflect” the signal. *Id.*

108. In Willgert-Mooney, RFID transponder 2 of the “communications unit” is configured to receive at least two different types of RFID signals from a communicator—a query/transponder (read) signal or a write signal. APPLE-1004, [0023]. This technique enables the well-known ability “to read and write other information from and into the ID tag, respectively, with the said of the communicator [(RFID reader)].” APPLE-1004, [0005]. Specifically, Willgert teaches that “the transponder may also be designed to enable information [(*RFID transponder data*)] to be written into the transponder memory, so that said information can be read-out [(*transmit[ted]*)] from the memory later on, in the aforesaid manner [(responding to a query/probing signal)] [(*in the format compatible with said RFID reader*)].” APPLE-1004, [0018]. A POSITA would have understood and found obvious that when writing into the transponder’s memory for the purpose of later reading out in response to a query/probing signal, that the RFID transponder data from transponder 2 in response to the RFID

reader's query signal is in *a format compatible with said RFID reader*, so that the RFID transponder data can be “read-out from the memory.” APPLE-1004, [0018].

109. Further, because the query/transponder signal is used by the communicator to obtain, from the RFID transponder 2, information to determine the “identity” of RFID transponder 2 and also causes the RFID transponder 2 to provide a responsive modulated signal, the query/transponder signal is an *instruction to transmit* identity information (*first RFID transponder data*). *Id.*, [0005]. The modulated signal (which includes identity information) transmitted by RFID transponder 2 is also capable of being “decoded” by a communicator and is *in a format compatible with said RFID reader*. *Id.*, [0017]; *see id.*, [0005] (“[t]he identity can be read by a communicator at a given short distance”).

[1.2] *switching a transceiver of the mobile communications device from a first state to a second state upon reception of said instruction, the transceiver configured to output voice call signals in the first state and to output RFID transponder signals in the second state; and*

110. The transmission functionality of the “communications unit” within a Bluetooth-enabled telephone of Willgert-Mooney renders each aspect of this limitation obvious. The discussion below addresses two aspects of [1.2] in relation to Willgert-Mooney—(1) functionality relating to *switching* of *state[s]*, and (2) attributes of the *transceiver*. Because these aspects were also characterized by

Varia in prosecution of the '984 patent and related applications, each discussion also addresses the claim language and Varia's statements.

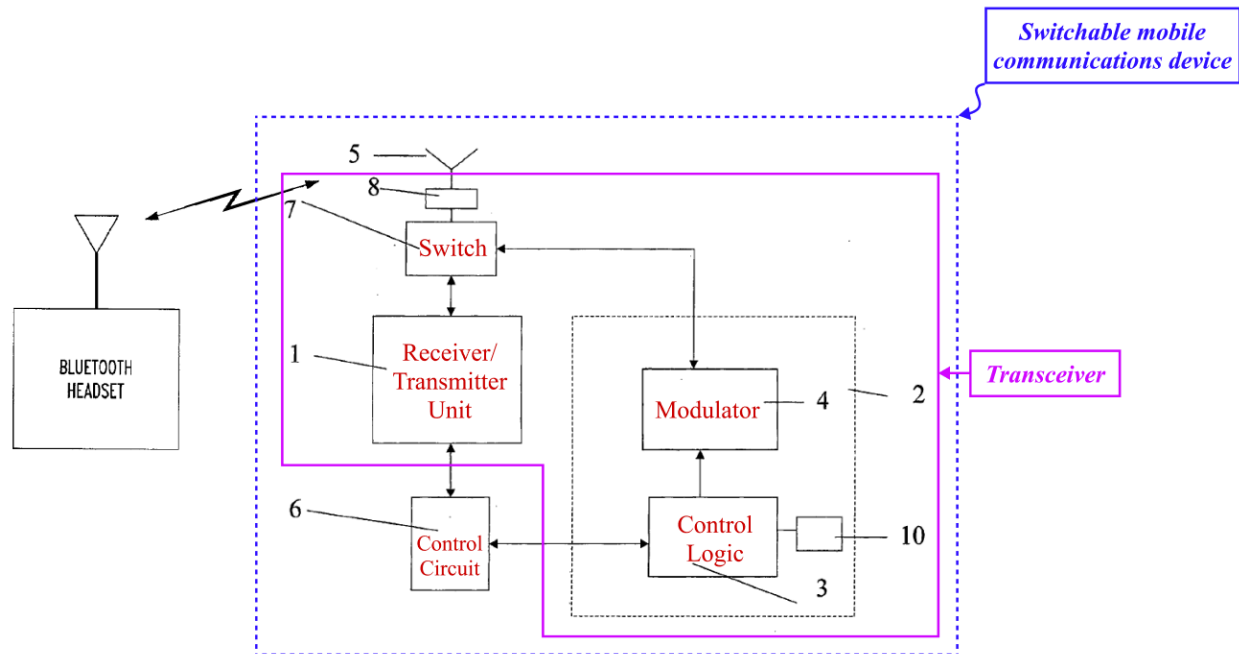
(i) Switching Between **States** Functionality

i. Claim Language

111. First, as noted above, [1.2] recites a step of **switch[ing]** between two **state[s]** of a **transceiver**. Willgert-Mooney discloses and/or renders obvious the **state[s]** because the Bluetooth-enabled mobile telephone provided by the combination includes elements, e.g., switch 7, detector 8, configured to operate in a Bluetooth voice communication state (**first state**) and, alternatively, in a RFID state (**second state**). This configuration is analogous to '984 patent specification's disclosure of a "switch 404 switch[ing] between the outputs" of a transmitter. APPLE-1001, 7:1-5. Like the '984 patent, Willgert teaches a "switch 7" configured to control "transmitting from the communications unit." APPLE-1004, [0022]. Both the '984 patent specification and Willgert-Mooney teach the same means of switching (i.e., through use of a switch to change transmission output of a transceiver). *compare* APPLE-1001, 9:32-36, 10:29-39 *and* APPLE-1004, [0020]-[0024].

112. In Willgert-Mooney, the "communications unit" is configured for Bluetooth voice communication (e.g., Bluetooth transmitter 1) and RFID (e.g., RFID transponder 2) which, in the FIG. 1 embodiment, includes a common switch

7 and detector 8.



Willgert-Mooney

ii. Prosecution

113. Varia characterized the terms *state* and associated *switching* functionality in various ways during prosecution of related applications. *See, e.g.*, APPLE-1002, 40-41, 91-94, 133-136, 154-157, 196-200; APPLE-1009, 531. For example, Varia asserted that the use of “state” in the claims and specification should be understood such that “the first state is exclusive of the second state, and the second state is exclusive of the first state.” APPLE-1009, 531. Varia also characterized the claimed *transceiver* as a “two state (switching required) transceiver.” APPLE-1002, 155. As discussed above, the “communications unit” of Willgert-Mooney satisfies these articulations of *state* and *switch[ing]* because

both the '984 patent specification and Willgert-Mooney teach the same functionality resulting from the switching (i.e., through use of a switch to enable transmission of two different outputs (RFID signals and voice call signals)).

Compare APPLE-1004, [0022] *and* APPLE-1001, 7:5-7.

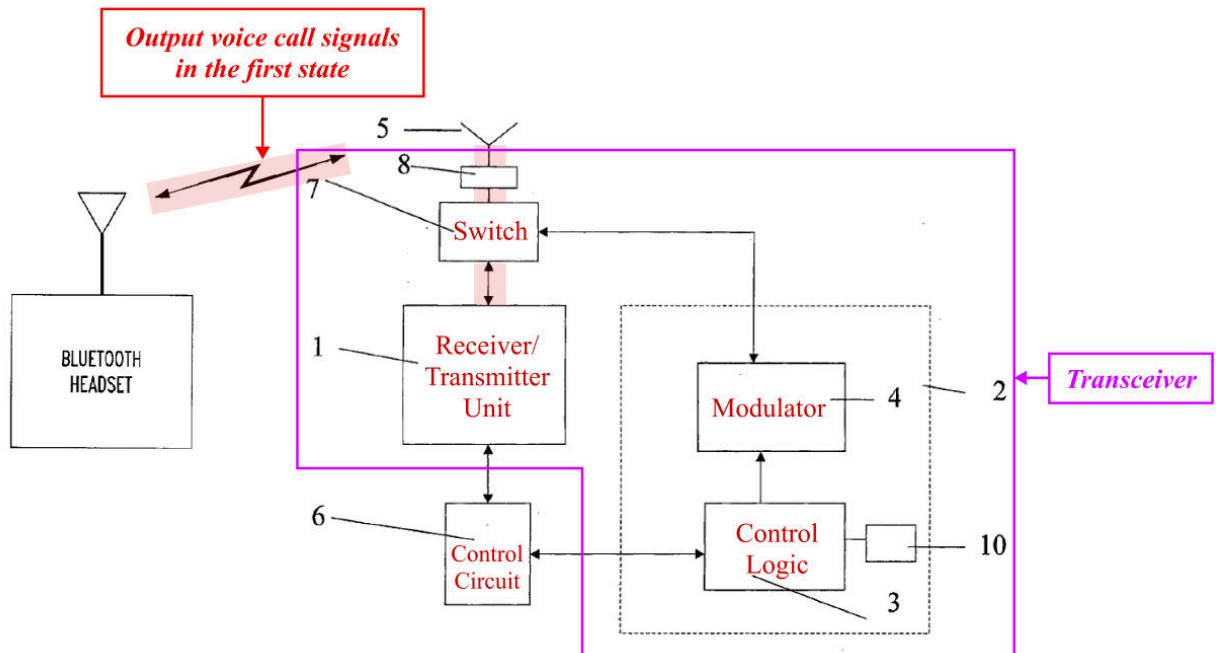
(ii) **Transceiver Configuration**

i. Claim Language

114. Limitation [1.2] also recites a **transceiver** configuration with three attributes: (a) outputting **voice call signals**, (b) outputting **RFID transponder signals**, and (c) **switching** of states **upon reception of** the **instruction** recited in [1.1]. The “communications unit” of Willgert-Mooney satisfies each of these attributes and thereby renders the **transceiver** configuration obvious.

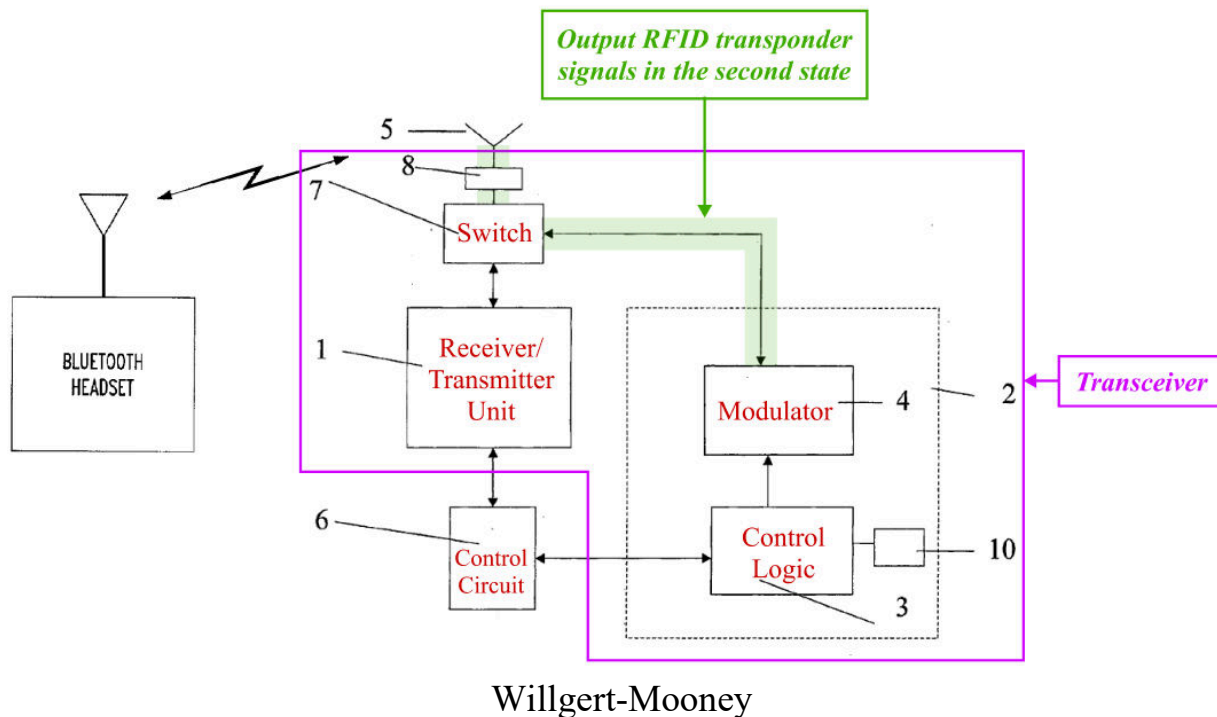
115. As to attribute (a), in a first state, the “communications unit” is configured to transmit (i.e., **output**) Bluetooth voice communications (**voice call signals**) to a Bluetooth headset. APPLE-1004, [0030]; APPLE-1005, [0048], FIG.

3. For example, switch 7, like switch 404 of the '984 patent, allows for transmitting voice communications. APPLE-1004 [0022]-[0024]. As discussed in §X.C.1, the Bluetooth voice communication would have enabled the Bluetooth headset to “hear voice and/or tones” generated from the telephone, as shown below. APPLE-1005, [0048]; *see* APPLE-1004, [0024], [0030].



Willgert-Mooney

116. As to attribute (b), in a second state, the “communications unit” is configured to transmit (i.e., **output**) RFID signals (**RFID transponder signals**) to a communicator of an RFID system. APPLE-1004, [0023], [0030]. For example, switch 7, like switch 404 of the ’984 patent, allows for transmitting RFID communications. APPLE-1004 [0022]-[0024]. As discussed in §III.A.1(i), in response to receiving a “query signal,” RFID transponder 2 “send[s] a signal in response to the signal received.” *Id.*, [0025]. The transmission of the responsive signal enables a communicator (i.e., RFID reader) to read the “identity” of RFID transponder 2, e.g., “at a given short distance,” such as “five meters.” *Id.*, [0005]; *see also id.*, [0017] (“[e]ach transponder typically have a unique identity that is sent to the communicator...”).



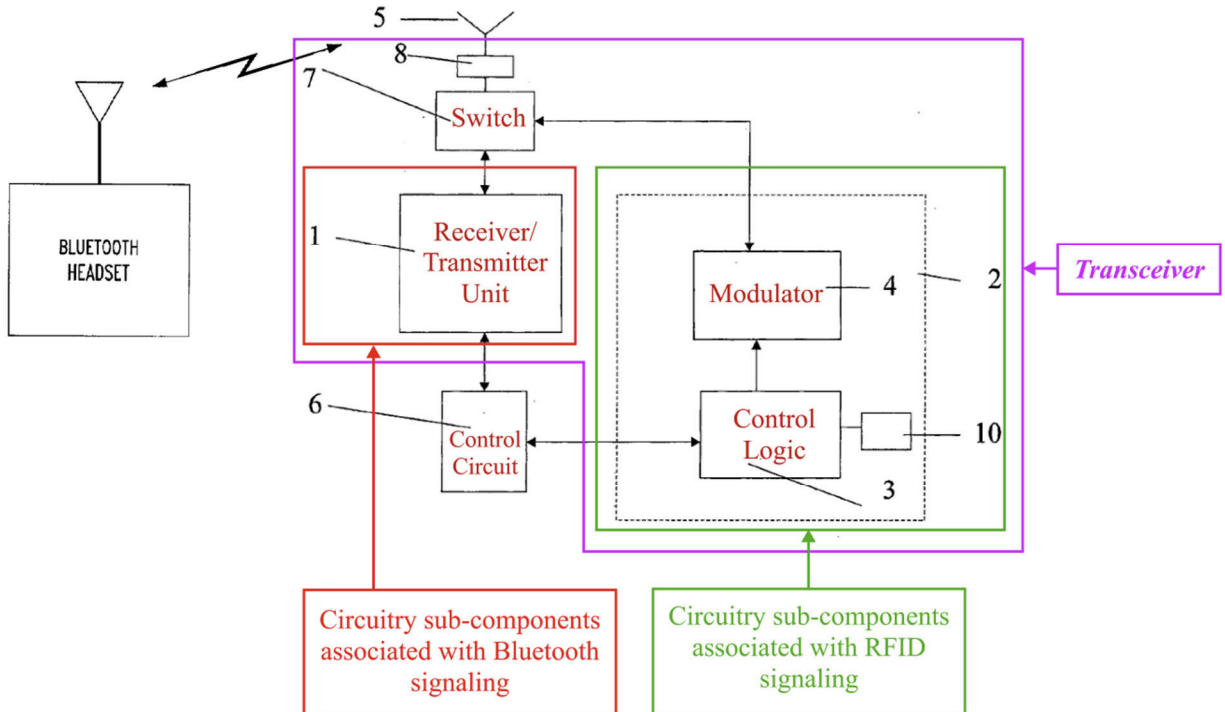
117. As to attribute (c), in Willgert-Mooney, switch 7 is controlled by the detector 8 when receiving transmissions at the communications unit and by control circuit 6 when transmitting from the communications unit. APPLE-1004, [0020]-[0022]. Given that the “communications unit” of Willgert-Mooney (*transceiver*) is a dual-mode transceiver, signal transmission by the “communications unit” is *switch[ed]* from a state of transmitting Bluetooth voice communication (*first state*) to a state of transmitting RFID signals (*second state*) upon receiving a query signal from a communicator (i.e., RFID reader) (*upon reception of [an] instruction to transmit [] RFID transponder data*).

118. Indeed, like '984 patent specification's disclosure of a “switch 404” “switch[ing] between the outputs” of a transmitter (APPLE-1001, 7:1-5), in

Willgert-Mooney, a “switch 7” is controlled by detector 8 such that when receiving signals, “the signal received is sent either to the Bluetooth receiver/transmitter or, alternatively, to the transponder 2” or when transmitting, switch 7 controls alignment for “transmitting from the communications unit” (APPLE-1004, [0002], [0020]-[0022]). As discussed for [1.pre], this indicates that switch 7 enables the Willgert-Mooney telephone to switch between an RFID state (e.g., signal output by RFID transponder 2) and a Bluetooth voice communication state (e.g., signal output by Bluetooth transmitter/receiver 1). Both the '984 patent specification and Willgert-Mooney describe the same functionality of switching (i.e., switching to change transmission and reception path of a transceiver).

119. Moreover, in Willgert-Mooney, a configuration of switch 7, like that of switch 404 of the '984 patent, switches between transmitting voice signals (e.g., Bluetooth voice communication) and RFID signals, e.g., by switching between the output of Bluetooth transmitter 1 and the output of RFID transponder 2 depending on either the type of signal received through antenna 5 or the desired transmission. APPLE-1004, [0022]-[0024]. From this disclosure, a POSITA would have understood and found obvious that if the “communications unit” transmitted a Bluetooth voice communication using antenna 5 before receiving a query/transponder signal from a communicator of an RFID system, then a

configuration of switch 7 would have *switch[ed]* to enable RFID transponder 2 to transmit a responsive signal. APPLE-1004, [0030].



Willgert-Mooney

ii. Prosecution

120. In prosecution, Varia characterized the *transceiver* in several ways. See, e.g., APPLE-1002, 92, 155. For example, Varia stated that the plain and ordinary meaning of the term “transceiver” is “a single component for transmitting and receiving.” APPLE-1002, 155. Further, according to Varia, the *transceiver* may be met by a circuitry configuration “combined in a single/package/unit and sharing at least some common circuitry for both transmission and reception located within a mobile communication device.” APPLE-1002, 92. To the extent that

these statements should apply to the scope of the *transceiver* configuration recited in [1.2], the “communications unit” of Willgert-Mooney still satisfies the attributes associated with these statements.

121. For instance, the “communications unit” in Willgert-Mooney includes switch 7 and detector 8 (“common circuitry for both transmission and reception”) and are located within a Bluetooth-enabled telephone. *See* APPLE-1002, 92; APPLE-1004, [0021], [0024], [0030]. By including this common circuitry for transmitting and receiving Bluetooth and RFID signals, the “communications unit” represents an example of Varia’s characterization of *transceiver* being “a single component for transmitting and receiving.” APPLE-1002, 155; APPLE-1004, [0021]-[0024]. Similarly, the “communications unit” is an example of single component that includes common circuitry (e.g., switch 7, detector 8) for transmitting and receiving both RFID and voice call signals to/from an antenna (e.g., antenna 5). *See* APPLE-1002, 92, 93, 134-157; APPLE-1004, [0021]-[0024], [0028]. Further, “the specific implementation of Willgert’s ‘communications unit’ within a single component would have been an obvious design choice that would have been known to a POSITA based on Willgert’s disclosure of transmission functionality.” APPLE-1004, [0010], [0014]-[0019].

[1.3] outputting the first data by the transceiver in the second state, the transceiver outputting the first data as an RFID transponder signal in the format compatible with said RFID reader.

122. As discussed above, the “communications unit” (*transceiver*) of Willgert-Mooney includes an RFID transponder 2 configured to communicate with a communicator (i.e., RFID reader). APPLE-1004, [0023], [0030]. In response to receiving a query/transponder signal, RFID transponder 2 generates and sends a responsive signal by using modulator 4 to “reflect[]” the received signal or otherwise “send a signal in response to the signal received.” *Id.*, [0022-0025]. The transmission (i.e., *outputting*) of the responsive signal (*RFID transponder signal*) enables the communicator to determine the “identity” of RFID transponder 2 and includes information representing the *first* RFID transponder *data*. *Id.*, [0005]; *see also id.*, [0017] (“[e]ach transponder typically have a unique identity that is sent to the communicator...”).

123. Further, a POSITA would have understood and found obvious that Willgert’s switch 7 allows RFID communication *in the second state*, such that the modulated signal (which includes identity information) transmitted by RFID transponder 2 is also capable of being “decoded” by a communicator (*in the format compatible with said RFID reader*). APPLE-1004, [0017]; *see id.*, [0005] (“[t]he identity can be read by a communicator at a given short distance”).

124. Finally, in the context of RFID-based identification systems where a mobile telephone incorporates both an RFID transponder and a Bluetooth transmitter unit (such as the Willgert system), a POSITA would have recognized that it was obvious to configure at least three types of “switching.” One type of switching is logic switching, which involves software-based control, where the mobile phone's processor uses logical conditions or algorithms to determine when to switch between the RFID and voice call functionalities. For example, the phone may automatically prioritize an RFID signal when the user is near an RFID reader, switching back to voice calls when the RFID interaction is complete. This is managed through programming logic without altering the hardware setup.

125. Another example of switching is physical switching, where the phone may use hardware mechanisms, such as relays or electronic switches, to physically change the circuit paths that connect the transceiver to either the RFID system or the voice call system. This might involve rerouting signals or changing connections within the phone's circuitry to switch between the two functions.

126. Another example of switching is functional switching, which involves changing the operating mode of the transceiver to handle different types of signals. The same hardware could function in different functional modes, e.g., one functional mode for RFID signal transmission and another for voice calls. Functional switching enables the device to alternate between these functions based

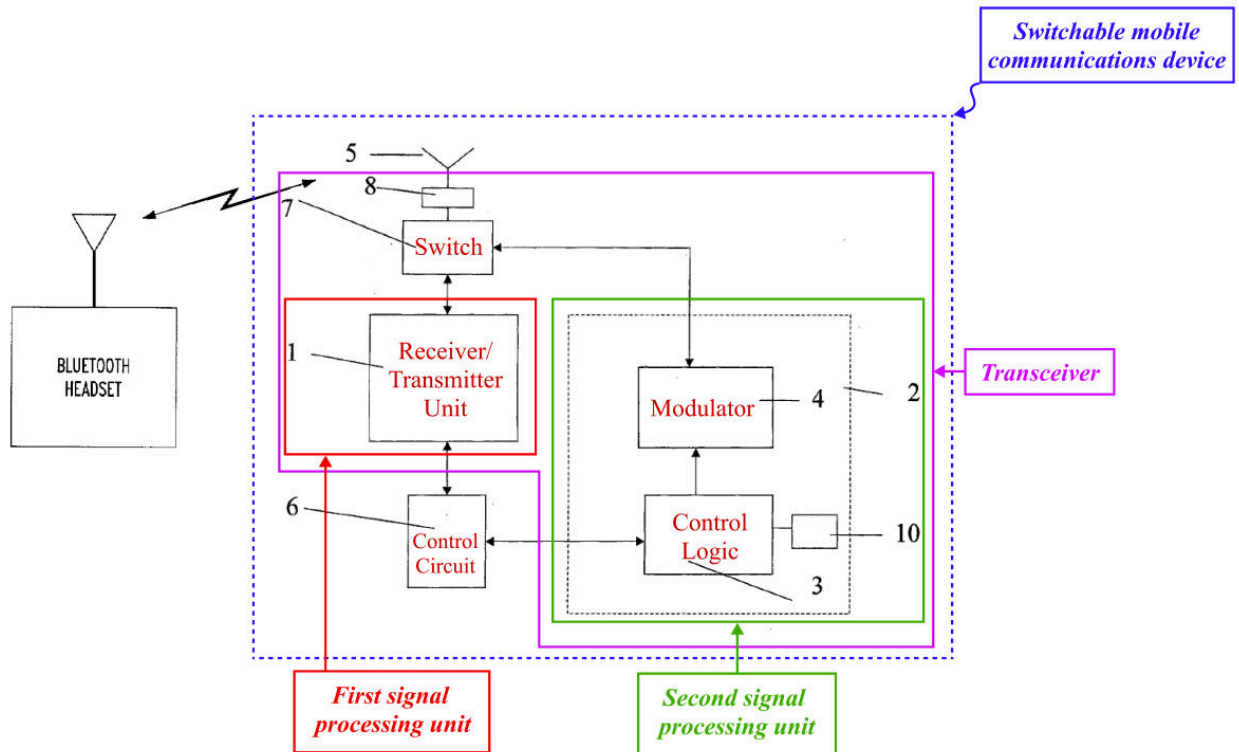
on the task at hand, without needing separate hardware for each function. In this example, the transceiver might change its frequency or protocol depending on whether it is handling RFID communication or managing a Bluetooth voice call. The three types of switching discussed above ensure that the mobile phone can effectively manage both RFID and voice call signals, leveraging the same or shared transceiver components while switching between functionalities as needed.

2. Claims 2, 3, 7-12

[2.1] The method of claim 1, wherein said transceiver comprises a first signal processing unit configured to process voice call signals and a second signal processing unit configured to process RFID signals,

127. As discussed for [1.2], in Willgert-Mooney, a “communications unit” (*transceiver*) includes a Bluetooth transmitter 1 (*first signal processing unit*) configured to *process* Bluetooth voice communications (*voice call signals*).

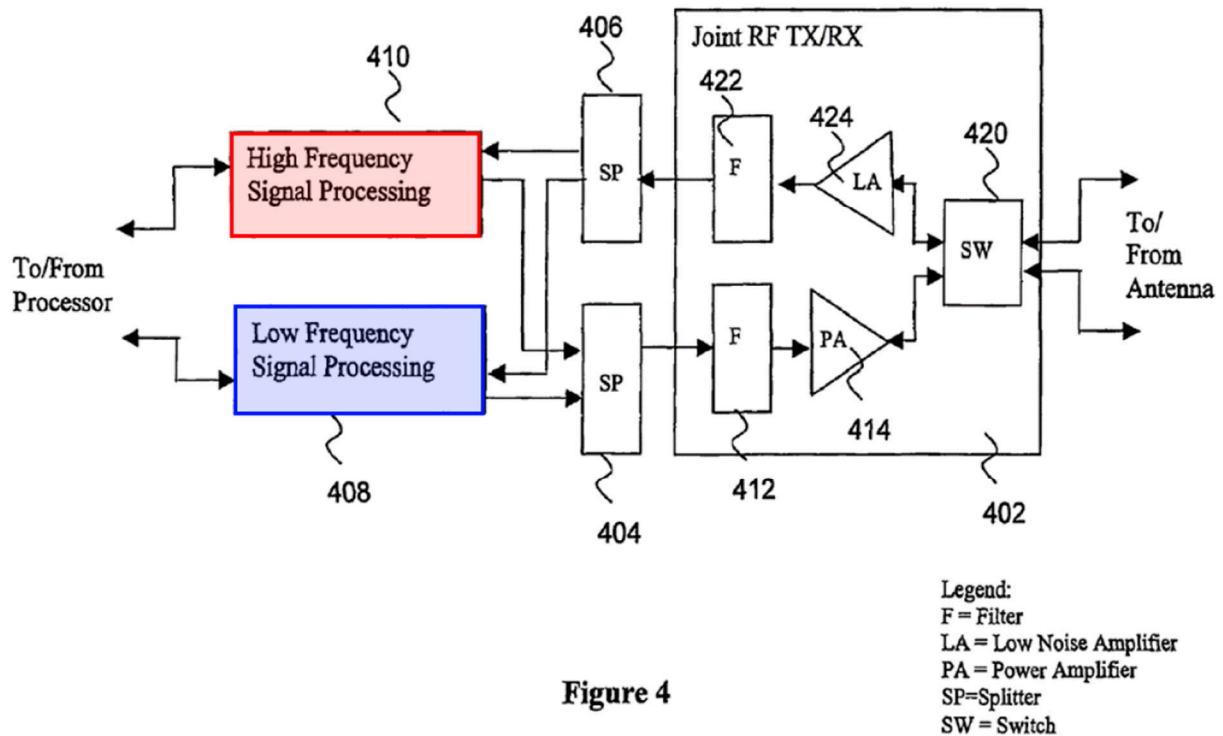
APPLE-1004, [0030]; APPLE-1005, [0048], FIG. 3. The “communications unit” also includes a RFID transponder 2 (*second signal processing unit*) configured to *process RFID signals*. APPLE-1004, [0023], [0030]. As shown below, the Bluetooth transmitter 1 and RFID transponder 2 are each sub-components within the “communications unit” (*transceiver*) and thereby represent *unit[s]* of the *transceiver*:



Willgert-Mooney

Identification of sub-components (*units*) shown above is consistent with disclosure in the '984 patent specification of the *transceiver*. Figure 4 of the '984 patent shows the structure of "transceiver 308," including "low frequency signal processing 408" (blue) and "high frequency signal processing 410" (red):

308



APPLE-1001, FIG. 4

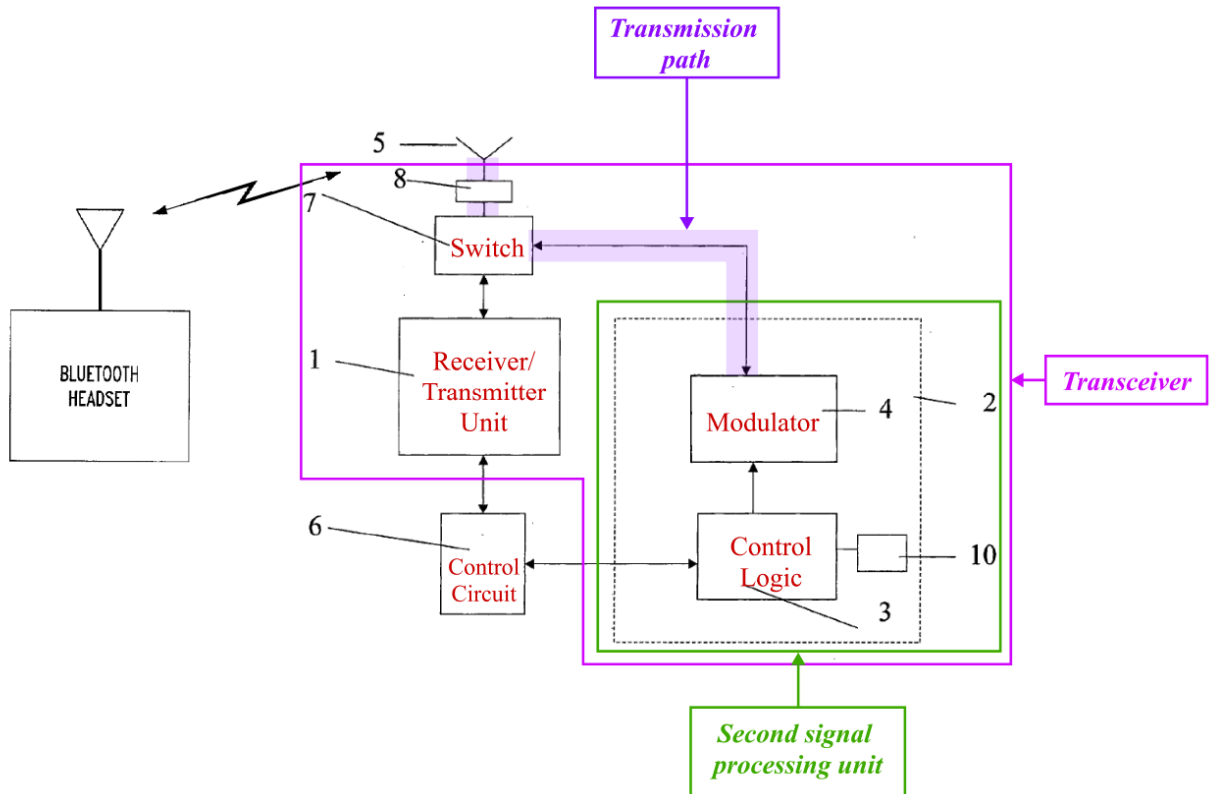
128. Notably, the '984 Patent's disclosure related to "transceiver 308" references purely conventional circuit functions (i.e., "known in the art") as being performed by the "separate signal processing sections 408 and 410" (i.e., sub-components of transceiver 308) to process the different frequency voice call and RFID signals. APPLE-1001, 6:50-7:30. In Willgert-Mooney, each of the sub-components of the "communications unit" would have been obviously understood to process corresponding signals and thereby represent examples of *signal processing unit[s]* as recited in [2.1]. See, e.g., APPLE-1004, [0024], [0028];

APPLE-1004, [0015], [0023](as describing examples of signal processing operations).

[2.2] said switching comprising coupling the second signal processing unit to a transmission path of the transceiver.

129. As discussed for [2.1], the “communications unit” of Willgert-Mooney includes a RFID transponder 2 (***second signal processing unit***) and associated components for processing RFID signals. APPLE-1004, [0023], [0030]. Further, as discussed for [1.pre] and [1.2], Willgert teaches use of an “electronic switch 7” to switch signal processing functionality relating to Bluetooth and RFID signals (e.g., by switching between the output of Bluetooth transmitter 1 and the output of RFID transponder 2 depending on the type of signal received through antenna 5). APPLE-1004, [0022-0024]. Indeed, as claimed in Willgert, the “switch is controlled by a detector when transmitting from the communications unit, and wherein the detector is operable to ascertain whether a signal received by the antenna is a Bluetooth signal or an RFID signal.” APPLE-1004, cl. 6. Based on the teaching in Willgert on controlling the switch 7, a POSITA would have understood that the switching performed by the “communications unit” would have included ***coupling***, enabled through the switch 7, the RFID transponder 2 (***second signal processing unit***) ***to a transmission path of the transceiver***. APPLE-1004,

[0023], [0022-0024], [0030], cl. 5 (“switch [is] connected between the antenna and each of the receiver/transmitter unit and the transponder.”).



Willgert-Mooney

[3] The method of claim 1, wherein said first RFID transponder data comprises a selected one of a security key and an identifier.

130. In Willgert-Mooney, data output by RFID transponder 2 (e.g., a responsive signal transmitted in response to receiving a query/transponder signal) uniquely identifies the RFID transponder 2 to a communicator (i.e., RFID reader) that provided the query/transponder signal and receives the responsive signal. APPLE-1004, [0017] (“[e]ach RFID transponder will typically have a unique identity that is sent to [a] communicator...”); *see also id.*, [0005] (describing use of

“ID tag[s]” where “[t]he identity can be read by a communicator at a given short distance”). A POSITA would have thereby understood and found obvious that the responsive signal output by RFID transponder 2 (*first RFID transponder data*) utilizes an identifier (*selected one of...an identifier*) used by the communicator to identify the RFID transponder 2. APPLE-1004, [0017] (“Each transponder will typically have a unique identity that is sent to the communicator . . .”).

131. It would have been obvious to a POSITA that the Willgert teaches a communication unit to be capable of writing a “security key” to be written into the transponder memory. Specifically, Willgert’s “transponder may also be designed to enable information to be written into the transponder memory, so that said information can be read-out from the memory later on, in the aforesaid manner”. APPLE-1004, [0018]. A POSITA would have understood and found obvious that the writing of such information into the transponder memory includes the writing of a security key provided by the RFID reader. In view of Willgert’s teaching, it would have been obvious to a POSITA that when receiving a RFID signal, the transponder may respond by performing the task “so that said information can be read-out from the memory”, where the said information is a security key if the such a read signal is received by the transponder, instead of a read signal for transmitting the transponder identifier.

132. Moreover, as discussed for [1.3], in response to receiving a query/transponder signal, RFID transponder 2 “send[s] a signal in response to the signal received.” APPLE-1004, [0025]. A POSITA would have understood that the transmission (i.e., *output*) of the responsive signal (*RFID transponder signal*) in response to the signal received allows the transponder to transmit a first RFID transponder data comprising a selected one of a security key and an identifier.

133. A POSITA reading the claim language would have understood and found obvious that the phrase “a selected one of” does not mean that a user is the one doing the selecting. For example, in claim 5, the language recites “facilitating a user in selecting the RFID data from a plurality of the RFID data using the mobile communication device.” In claim 5 the user is clearly defined as the one selecting. Further, when claim 2 is viewed in the context of claim 1, the “RFID signal is output in response to the mobile communication device determining the mobile communication device is in an operational space of the RFID reader based upon receipt of the RFID probing signal” and does not appear to require interaction from a user to transmit. Given that neither claim 1, nor claim 2 mention any user selection or interaction, a POSITA would have understood and found obvious that claim 2 simply recites a list of options for RFID transponder data and one of those options is transmitted.

134. Additionally, RFID-based identification systems (such as the Willgert system) were known by the Critical Date to transmit RFID signals that included a security key and/or an identifier to ensure secure and accurate communication between the RFID transponder and the RFID reader. The identifier typically represents a unique code or number that is associated with the object or person carrying the RFID tag, serving as the core data that identifies the subject within the system. To prevent unauthorized access or data interception, these systems often incorporated a security key, which is an encrypted piece of data that only authorized readers could validate. The security key was used to authenticate an RFID transponder and ensure that the identifier data was only accessible by authorized systems. This encryption and authentication process provided an additional layer of protection, making it harder for attackers to clone RFID tags or intercept communication. Together, the security key and identifier allowed RFID systems to securely transmit data, balancing the need for both convenience and security in identification applications such as payment systems, access control, and inventory management.

[7] The method of claim 1, wherein the method further comprises facilitating provision of the first RFID transponder data to the mobile communication device.

135. In Willgert-Mooney, RFID transponder 2 of the “communications unit” is configured to receive at least two different types of RFID signals from an

communicator—a query/transponder (read) signal or a write signal. APPLE-1004, [0023]. This technique enables the well-known ability “to read and write other information from and into the ID tag, respectively, with the said of the communicator [(RFID reader)].” APPLE-1004, [0005]. Specifically, Willgert teaches that “the transponder may also be designed to enable information [(*the first RFID transponder data*)] to be written into the transponder memory [(*comprises facilitating provision . . . to the mobile communication device*)], so that said information can be read-out from the memory later on, in the aforesaid manner [(responding to a query/probing signal)].” APPLE-1004, [0018]. A POSITA would have understood and found obvious that when writing into the transponder’s memory for the purpose of later reading out in response to a query/probing signal, that the RFID transponder data “written into the transponder memory” comprises at least a *provision[ing] of the first RFID transponder data to the mobile communication device*, so that the RFID transponder data can later be “read-out from the memory” in response to a query signal. APPLE-1004, [0018].

136. A POSITA would have understood and found obvious that “facilitating provision of the first RFID transponder data” could take various forms, such as user input, download, scan, or any other form of data transfer or data input into the device. For example, Willgert’s transponder has a “write” ability where a transponder can receive a write signal and the signal can be

“entered into the memory.” APPLE-1004, [0023]. This write functionality describes a well known ability of the transponder’s data to be updated such that it can appropriately respond to an RFID reader’s queries. For example, “the transponder may also be designed to enable information to be written into the transponder memory, so that said information can be read-out from the memory later on, in the aforesaid manner.” APPLE-1004, [0018]. In other cases, the ability to provision data to the card can updated user information on the card. APPLE-1019, 15.

[8] The method of claim 7, wherein said facilitating of the provisioning of the RFID transponder data to the mobile communication device includes facilitating provision of at least a signaling attribute associated with the outputting of the RFID transponder data in the format compatible with said RFID reader.

137. As discussed above in [7], a POSITA would have understood and found obvious that when writing into the transponder’s memory for the purpose of later reading out in response to a query/probing signal, that the RFID transponder data “written into the transponder memory” comprises at least **a signaling attribute associated with the outputting of the RFID transponder data**, so that the RFID transponder data can later be “read-out from the memory” in response to a query signal. APPLE-1004, [0018]. Further, Willgert teaches that the “write signal is a modulated signal sent by the communicator ... control logic 3 includes a decoder, which functions to decode the signal received.” APPLE-1004, [0018]. Finally,

because the response provided by the RFID transponder 2 is itself based on receipt of a query/transponder signal provided by the communicator, a POSITA would have understood and found obvious that the RFID data is “written into the transponder memory” such that it is *in the format compatible with said RFID reader. Id.*

[9.1] The method of claim 1, wherein the method further comprises: monitoring for proximal presence of the RFID reader by the mobile communication device; and

138. In Willgert-Mooney, RFID transponder 2 of the “communications unit” is configured to determine when it is in sufficient proximity to the communicator (*RFID reader*). APPLE-1004, [0004], [0006], [0007], [0015], [0017]. A POSITA would have understood and found obvious that this determination involves determining that the Willgert-Mooney phone is in a *proximal presence* of the communicator, e.g., the phone is located in an area surrounding the communicator in which the RFID transponder 2 would be able to detect a query/transponder signal from the communicator.

139. Willgert contemplates using communication between the RFID transponder and the communicator for “reading an identity,” which would have involved communication with the “communicator at a given short distance,” e.g., “five meters.” APPLE-1004, [0005]. At such distances, the RFID transponder 2 would be capable of (1) detecting a query/transponder signal provided by the

communicator and (2) responding to the query/transponder signal. *See* APPLE-1004, [0015], [0017]. In the context of the identity verification systems contemplated in Willgert, a determination by the Willgert-Mooney phone of being within a sufficient proximity to a communicator involves the phone being in the *proximal presence* of the communicator. *See* APPLE-1004, [0005]-[0006].

140. A POSITA would have understood and found obvious that RFID transponder 2 may be configured as a passive RFID transponder, which was a conventional RFID transponder configuration by the Critical Date, as demonstrated by Freund (filed 3/31/2003) (APPLE-1011). In Freund, an RFID transponder is configured to be “activated by an RF signal sent by [a] reader” when “the passive RFID device is in proximity of a reader.” APPLE-1011, [0006]. Likewise, RFID transponder 2 may be similarly configured as a passive RFID transponder such that it is activated by a query signal sent by a communicator disclosed in Willgert when the passive RFID transponder is in sufficient proximity to the communicator. *See* APPLE-1004, [0015], [0017]. Such a configuration, RFID transponder 2 waits to receive (*monitor[s]*)⁹ query/transponder signal provided by a communicator when

⁹ The term “monitor” is used once in the ’984 patent specification. APPLE-1001, 4:66-7:5 (“...device 102 **monitors** for probing signals of an intended RFID reader

the RFID transponder is in sufficient proximity (*proximal presence*) to the communicator (*RFID reader*). APPLE-1004, [0004], [0006], [0007], [0015], [0017].

141. Additionally, the '984 patent specification references the terms “proximal presence” and “operational space.” I understand that, based on Counsel’s explanation of Varia’s litigation positions, Varia interprets “proximal presence” as the area surrounding an RFID reader in which a conventional RFID transponder will detect an RFID probing signal from the reader. Additionally, I understand that Varia interprets “operational space” as the area surrounding an RFID reader in which either an active or a passive conventional RFID transponder would be able to respond to the RFID probing signal from the reader. I disagree with these definitions because they deviate from the plain and ordinary meaning as

120... to determine whether device 102 is within the operational space of such a RFID reader 120.”). The '984 patent contemplates a device monitoring for proximal presence of a proximal RFID reader by monitoring for signals sent by the RFID reader. Willgert similarly describes a mobile telephone monitoring for query/transponder signals provided by a communicator in determining that the communicator is close to the telephone. *See* APPLE-1004, [0015]-[0017].

understood by a POSITA by the Critical Date. However, to the extent that the proposed definitions are relevant, Willgert's teachings satisfy them.

142. Specifically, the concepts of a first range in which a transponder may detect a probing signal and a second range in which the transponder is physically capable of responding to that signal are not recited in the claim language. There is also no claim language relating to determinations of whether the transponder is within one of these ranges (and not the other). For example, claim 9 of a related patent (the '947 patent) determines both ranges (proximal presence and operational space) using a probing signal. A POSITA would have understood and found obvious that when the transponder and the RFID reader are communicating as designed, that both of these ranges would at least coincide at the time of communication. Any distinction between the proximal presence or operational space is irrelevant for the purposes of understanding the claim because both ranges are determined "based on a RFID probing signal received."

143. Further, a POSITA would have understood and found obvious that the range at which an RFID transponder can communicate (both detect and respond to a signal) is the more frequently used range. For example, when describing the physical range of a 125 kHz transponder, the read/write range is may be 1 meter. APPLE-1019, 14. A POSITA may distinguish between a range in which an RFID transponder can receive a signal and not respond, but would more commonly work

with and find useful the range in which two-way communication can be achieved (Patent Owner's operational space). Willgert describes receiving and reflecting signals from an RFID reader, and POSITA would have understood and found obvious that this disclosure contemplates a range in which two-way communication can occur. APPLE-1004, [0017] Willgert's contemplated signal transmission encompass the functionality described by Varia for each of the "proximal presence" and "operational space" terms.

[9.2] on detection of the RFID reader by the mobile communication device, outputting, by the transceiver, second RFID transponder data as a second radio frequency signal, the outputting emulating output of the second RFID transponder data by an RFID transponder of a passive type.

144. As discussed below, under plain meaning, the language of [9.2] does not impose limitations on the nature of the ***first RFID transponder data*** and the ***second RFID transponder data***, and is broad enough to encompass various types of transmission scenarios. As one example, [9.2] may be satisfied where two signals transmission outputs are separate in time, such that transmission at a first time corresponds to the ***first RFID transponder data*** and transmission at a second time corresponds to the ***second RFID transponder data***. Absent claim language to the contrary, this principle remains true whether each transmission represents a different type of RFID transponder data or, or whether they are instead directed to the same type of RFID transponder data. *Id.*

145. A POSITA would have understood and found obvious that transmissions by the “communications unit” of Willgert-Mooney satisfy the requirements of [9.2] under plain meaning in various ways. First, based on Willgert, the RFID transponder 2 of the “communications unit” is “designed to enable information to be written into transponder memory, so that said information can be read-out from memory later on, in the aforesaid manner.” APPLE-1004, [0018]. From this disclosure, a POSITA would have understood that the RFID transponder 2 is configured to output multiple signal transmissions over time (e.g., signal transmissions based on information that is “read-out from the memory”). At one time, RFID transponder 2 transmits a first signal transmission (*first RFID transponder data*), and at some later time, transmits a second signal transmission (*second RFID transponder data*). *Id.* In this scenario, each transmission may be based on different data, e.g., different data written into transponder memory, and each of the first and second transmissions constitutes different data. APPLE-1004, [0018]. Indeed, a POSITA would have recognized that, when configured in this manner, a write signal allows a communicator to provide a mobile device with information for identification, and RFID transponder 2 would then use this information for signal transmissions (e.g., to a nearby communicator). *Id.* The information may be re-written at a later time with new modulation data for a new system, so that identification could be properly made in that new RFID system.

This would indicate that signal transmissions by the RFID transponder 2 at different times that are dependent on the written information (and represent different transponder data).

146. Willgert’s disclosure further confirms that RFID transponder 2 is configured to output multiple signal transmissions over time. Specifically, in Willgert, upon receiving a “query signal” from a communicator (i.e., RFID reader), RFID transponder 2 is configured to “reflect the received signal while modulating the signal with a pulse train,” where “[i]nformation relating to the pulse train is stored in the memory” of RFID transponder 2. APPLE-1004, [0017]. Because “[e]ach transponder will typically have a unique identity that is sent to the communicator...,” a POSITA would have recognized that RFID transponder 2 is configured to transmit multiple signal transmissions based, for example, on pulse train information stored in its memory.

147. Moreover, as discussed for [1.3], in response to receiving a query/transponder signal, RFID transponder 2 “send[s] a signal in response to the signal received.” APPLE-1004, [0025]. The transmission (i.e., *output*) of the responsive signal (*RFID transponder signal*) enables the communicator to determine the “identity” of RFID transponder 2 and includes information representing the first *RFID transponder data*. *Id.*, [0005]; *see also id.*, [0017]. Given Willgert’s disclosure of proximity-based communications between an RFID

transponder and a RFID reader, a POSITA would have naturally expected different types of connections in relation to movement of the device incorporating the RFID transponder (relative to the RFID reader). After the initial communication, a user may move the device such that the RFID transponder is no longer within the range of the RFID reader. In this type of scenario, a POSITA would have further recognized that the user may or may not return within the range of the RFID reader. *Id.* Where a user returns to the range of the RFID reader after leaving, the RFID transponder would have engaged in a subsequent communication with the RFID reader in a manner similar to the initial communication. *Id.* Specifically, RFID transponder 2 would have similarly received a second query/transponder signal, and in response, send a second signal in response to the second query signal received. APPLE-1004, [0025]. The transmission (i.e., **output**) of the subsequent responsive signal (***second RFID transponder signal***), in this scenario, enables the communicator to later determine the “identity” of RFID transponder 2 and includes information representing the ***second RFID transponder data***.

148. Because Willgert teaches that it was well-known for RFID-based identity verification to be based on information being “read by a communicator at a given short distance” (e.g., “five meters”) (APPLE-1004, [0005]), a POSITA would have found it obvious that some implementations of the identity verification functionality provided by Willgert-Mooney would have involved the RFID

transponder 2 being implemented as a passive RFID transponder (e.g., an RFID transponder without a dedicated power source and configured to output identity information in response to being activated by a signal received from a nearby RFID reader). In such implementations, the RFID transponder 2 would have output information representing the *second RFID transponder data* automatically whenever the Bluetooth-enabled mobile telephone being within a proximity to a RFID communicator such that the RFID transponder 2 is activated by a signal provided by the RFID communicator. APPLE-1004, [0005]; *see id.*, [0017], [0025].

149. This was a well-known configuration of RFID transponders by the Critical Date, as demonstrated by Freund. In Freund, an RFID transponder is “activated by an RF signal sent by [a] reader” when “the passive RFID device is in proximity of a reader.” APPLE-1011, [0006]; Further, because these implementations would have involved the RFID transponder 2 being implemented within the Willgert-Mooney phone (i.e., a Bluetooth-enabled telephone (*see* APPLE-1004, [0030]-[0032])), a POSITA would have understood and found it obvious 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*). This is because the outputting of signals in these implementations occurs

automatically, whenever the RFID transponder 2 is within a certain proximity to a communicator. *see* APPLE-1001 4:59-65 (describing RFID transponder output being “emulated in a passive manner” as being an RFID being “outputted automatically”); *see* APPLE-1004, [0004] (“[o]ne such ID tag is designed to receive a signal sent by a communicator and to reflect this signal in a modulated state”).

[10] The method of claim 9, wherein said monitoring comprises sensing for a probing radio frequency signal of the RFID reader by the mobile communication device.

150. As discussed for [9.1], in some implementations of the “communications unit” in Willgert-Mooney, RFID transponder 2 would have been understood and/or obvious to function as a passive RFID transponder. APPLE-1004, [0004], [0006], [0007], [0015], [0017]; APPLE-1011, [0006]. A POSITA would have understood and found obvious that RFID devices both *sense* for signals external to the device through an antenna and *monitor* for which of the external signals constitutes ***a probing radio frequency signal of [an] RFID reader***. In such implementations, RFID transponder 2 would have been configured to wait to receive (*monitoring*) a query signal (***probing radio frequency signal***) provided by a communicator (i.e., RFID reader) when the RFID transponder is in sufficient proximity to the communicator (***RFID reader***). APPLE-1004, [0004], [0006], [0007], [0015], [0017]; *compare* APPLE-1001, 7:16-27 (“the output signal

of a RFID to emulate either an active or a passive transponder, **and** the received probing signal of a RFID reader.”) *with* APPLE-1004, [0017] (“The transponder is thus adapted to receive a query signal sent from a suitably known communicator, **and** therewith reflect the received signal while modulating the signal with a pulse train.”). Such a passive RFID transponder configuration was also conventional by the Critical Date, as demonstrated by Freund. *See* APPLE-1011, [0006].

[11] The method of claim 9, wherein said first RFID transponder data and second RFID transponder data are the same data.

151. As discussed for [9.2], in Willgert-Mooney, the RFID transponder would have been understood to output multiple signals representing the ***first RFID transponder data*** and the ***second RFID transponder data*** automatically whenever the Bluetooth-enabled mobile telephone is in a proximal presence of an RFID communicator. APPLE-1004, [0005], [0017], [0025]. Because each these signals represent the same type of information (e.g., identity information of the RFID transponder), the signals represent the same type of information (***same data***). *See* APPLE-1004, [0005], [0017].

[12] The method of claim 1, wherein the mobile communication device is a selected one of a wireless mobile phone and a personal digital assistant equipped with communication capability.

152. In Willgert-Mooney, the “communications unit” is incorporated in a mobile phone (***selected one of a wireless mobile phone***) equipped with Bluetooth communication capability (***equipped with communication capability***). For

example, Willgert describes that the “communications unit” may be implemented in a “mobile telephone designed for Bluetooth communication.” APPLE-1004, [0030]-[0031]. A POSITA would have understood and found obvious that Willgert’s mobile telephone “designed for Bluetooth” would be a *wireless* mobile telephone.

3. Claim 13

[13.pre] A method for providing a radio frequency identifier (RFID), from a switchable mobile communications device capable of RFID communication and voice call communication, the method comprising:

[13.1] monitoring for proximal presence of a proximal RFID reader external to said mobile communication device by said mobile communication device,

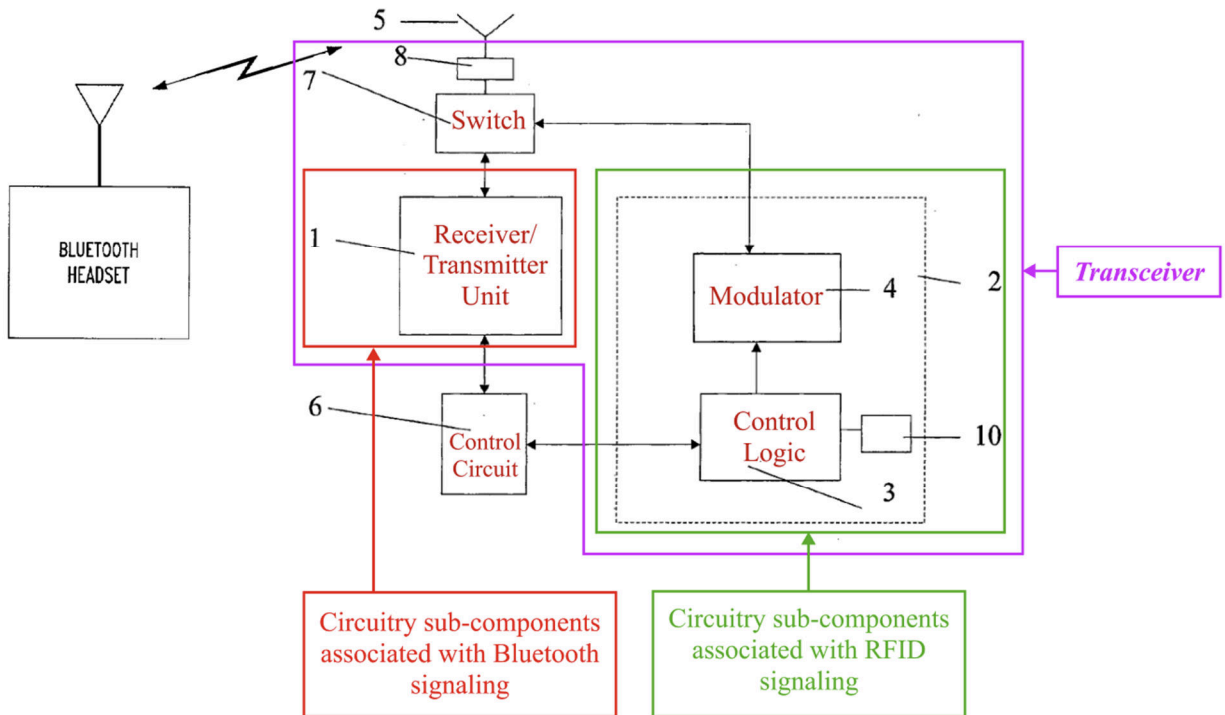
153. Willgert-Mooney renders the following limitations of claim 13 obvious in the same manner as explained above.

Claim 13 Limitation	Corresponding Claim Limitation
[13.pre]	[1.pre]
[13.1]	[9.1]

[13.2] the mobile communication device having a transceiver configured, to output, in a first state, RFID transponder data in a format compatible with said RFID reader upon the mobile communications device determining proximal presence of one or more RFID readers, the transceiver being also configured to output, in a second state, a voice call signal for transmission at least in part over a wireless network; and

154. See [1.2], [1.3], [9.1], [9.2]. As discussed for [1.2], [1.3], [9.1] and [9.2], the “communications unit” of Willgert-Mooney (*transceiver*) includes a

RFID transponder configured to wait to receive a signal provided by a communicator (i.e., RFID reader) when the RFID transponder is in sufficient proximity to the communicator. APPLE-1004, [0004]-[0007], [0017]; *see* APPLE-1011, [0006] (as disclosure of a well-known configuration of a passive RFID transponder by the Critical Date). Further, as discussed for [1.2] and [9.2], *the transceiver* is also *configured* to transmit (i.e., *output*) RFID signals to a communicator of an RFID system (*to be received by the proximal RFID reader*). APPLE-1004, [0023], [0030]. For instance, in response to receiving a “query signal,” (*upon the mobile communications device determining proximal presence of one or more RFID readers*) RFID transponder 2 generates and sends a responsive signal (*output, in a first state, RFID transponder data to be received by the proximal RFID reader*) by using modulator 4 to “reflect[]” the received signal or otherwise “send a signal in response to the signal received.” *Id.*, [0022]-[0025]; *see* [1.2].

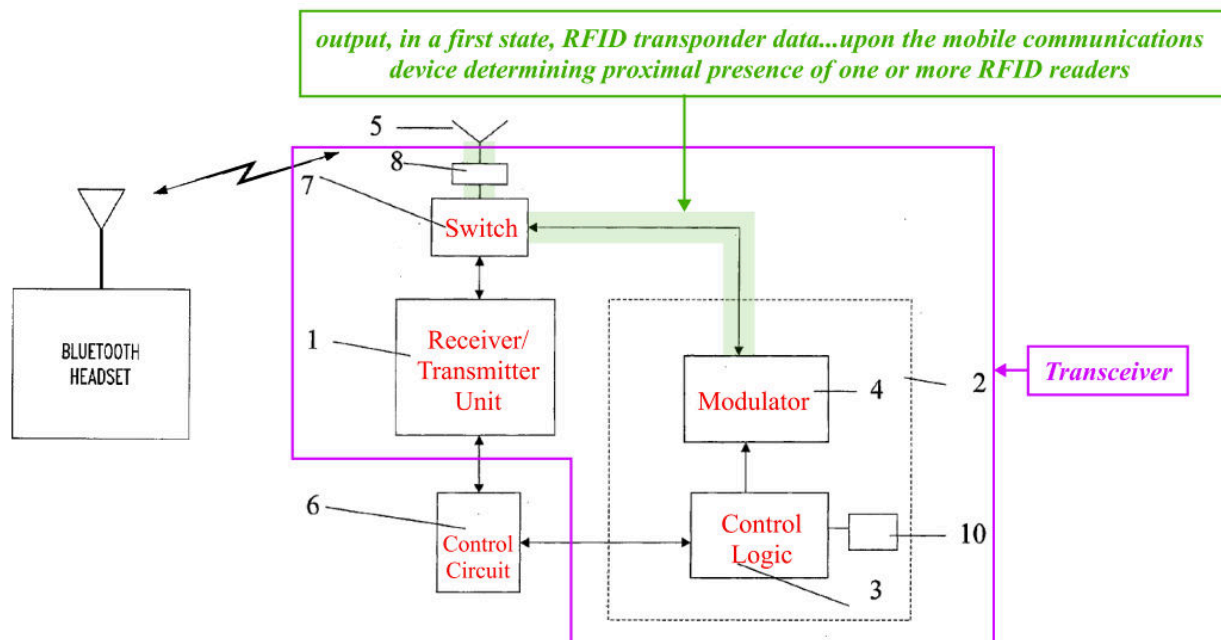


Willgert-Mooney

155. In the implementations where RFID transponder 2 is configured in this manner, RFID transponder 2 of the “communications unit” (*transceiver*) is configured to transmit a responsive signal to be received (*RFID transponder data to be received*) by a communicator “at a given short distance, for example of five meters” that provides a query signal (*proximal RFID reader*). APPLE-1004, [0005]-[0006]. As discussed in [9.1] and [9.2], in the context of the identity verification systems contemplated in Willgert, a determination by the Willgert-Mooney phone of being within a sufficient proximity to a communicator involves the phone being in the *proximal presence* of the communicator. The responsive signal is outputted when the RFID transponder 2 is within sufficient proximity to

the communicator (*upon the mobile communications device determining proximal presence of one or more RFID readers*). APPLE-1011, [0006]; *see also* §XI.A.(ii) (addressing interpretations of *transceiver*, the discussions of which are incorporated by reference). A POSITA would have understood and found obvious that the responsive reaction of Willgert’s transponder happens *upon* and “in response to” *the mobile communications device determining proximal presence of one or more RFID readers*.

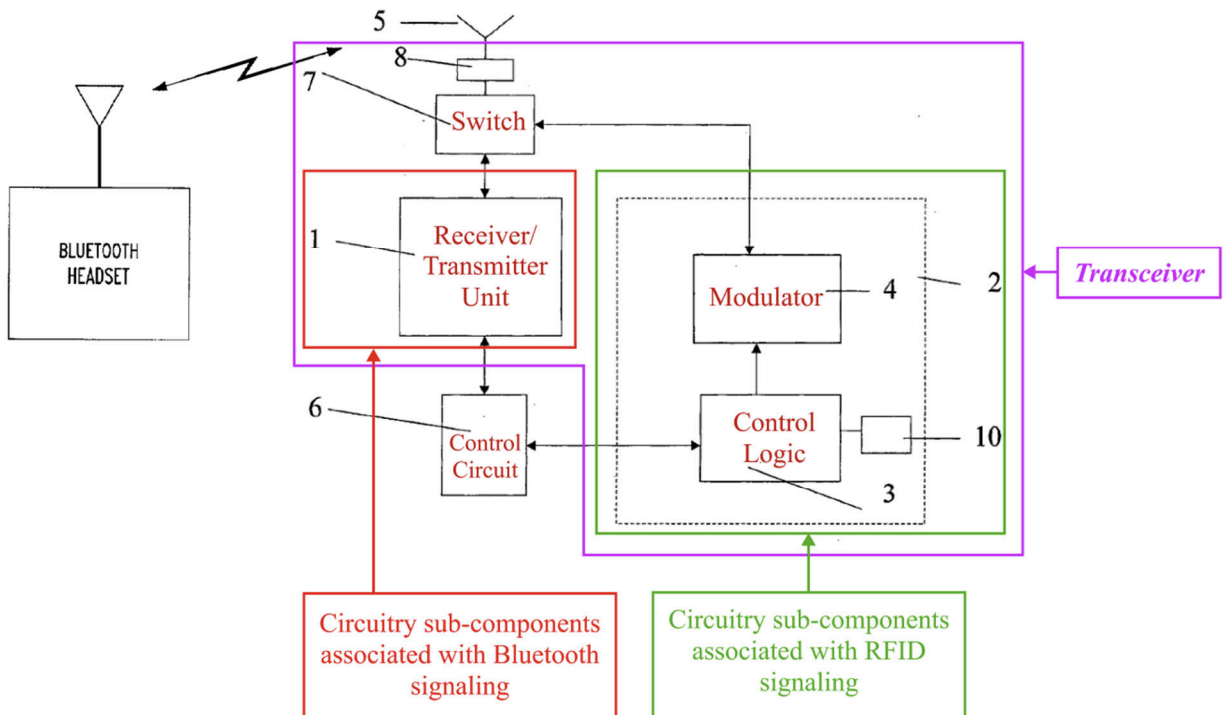
156. Similar to [9.2] where the signal was output “on detection of the RFID reader,” [13.2] recites “*upon the . . . device determining proximal presence of one or more RFID readers*.” As discussed for [9.2], a POSITA would have understood and found obvious that detection occurs when the phone is within sufficient proximity (*proximal presence*) of the *one or more RFID readers*. Further, Willgert discloses that “[u]pon completion of this detection, the signal received is sent either to the Bluetooth receiver/transmitter 1 or, alternatively, to the transponder 2” and that “[w]hen a transponder signal is received, the signal will either be reflected by the modulator 4 [(*output*)] or . . . entered into the memory, depending on the design of the transponder.” APPLE-1004, [0017], [0021], [0023].



Willgert-Mooney

157. For the reasons discussed above for [1.2], the “communications unit” of Willgert-Mooney also satisfies attributes of Varia’s statements regarding *transceiver* from prosecution of related applications. *See* APPLE-1002, 92-93 (“transmitter and receiver combined in a single package/housing/unit and sharing at least some common circuitry for both transmission and reception located within a mobile communication device”), 155 (“single component for transmitting and receiving”), 155 (“two state (switching required) transceiver”); *see also id.*, 134-57; APPLE-1004, [0021]-[0024], [0028], [0030].

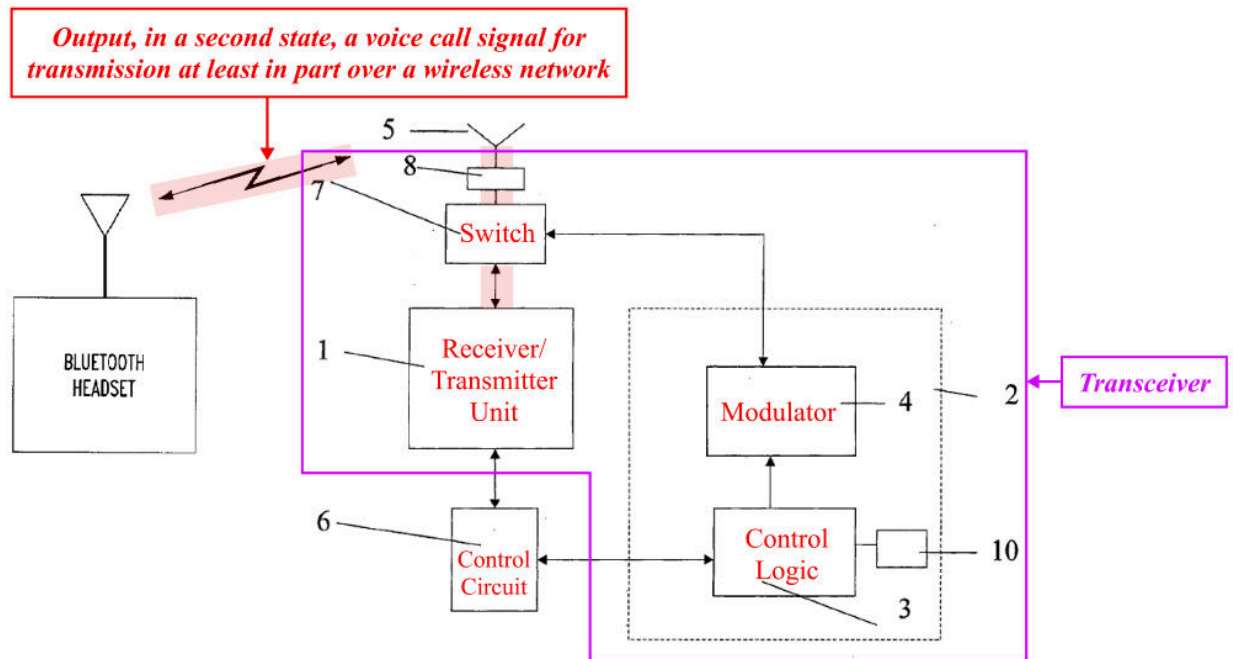
158. As discussed for [1.2], Willgert teaches *a first state*¹⁰ for RFID communications and *the transceiver being also configured to output, in a second state, a voice call signal*. The Willgert-Mooney *transceiver* is *configured to* transmit (i.e., *output*) Bluetooth voice communications (*voice call signal*) to a Bluetooth headset. APPLE-1004, [0030]; APPLE-1005, [0048], FIG. 3. For example, switch 7, like switch 404 of the '984 patent, is in a second state when it is transmitting voice communications. APPLE-1004 [0022-0024].



Willgert-Mooney

¹⁰ "First" and "second" are switched in the claim language between claim 1 and claim 13, but the functions are equivalent.

159. Further, as discussed in §III.A.1(iii), the Bluetooth voice communication would have enabled the Bluetooth headset to “hear voice and/or tones” generated from the telephone, as shown below. APPLE-1005, [0048]; *see* APPLE-1004, [0024], [0030]. Further, in using the Bluetooth protocol to establish a connection between the telephone (which incorporates the “communications unit”) and the Bluetooth headset, the established wireless connection (*transmission at least in part over a wireless network*) would have formed a piconet wireless network (*wireless network*), which Mooney teaches may be “commonly referred to as a BLUETOOTH piconet” that “provides peer-to-peer communications over short distances.” APPLE-1005, [0004].



Willgert-Mooney

160. Again, consistent with Varia's statements from relevant prosecution history, the "communications unit" of Willgert-Mooney renders obvious the *transceiver* configuration collectively recited in [13] for the same reasons as discussed above for [1.2]. See APPLE-1002, 92-93, 134-57; APPLE-1004, [0021]-[0024], [0028], [0030].

[13.3] the transceiver being also configured to output, in a second state, a voice call signal for transmission at least in part over a wireless network; and

161. As discussed for [1.2], in some implementations of Willgert's "communications unit," it would have been obvious to implement control circuit 6 as a single, common processor for processing all wireless signals (RFID, Bluetooth, voice calls). APPLE-1004, [0019], [0024]. In such implementations, in one state (*second state*), the "communication unit" is configured to transmit (i.e., *output*) voice call signals (*voice call signal*) relating to telephony functions of a mobile telephone that incorporates the "communications unit." APPLE-1004, [0030]-[0032]; APPLE-1005, [0048], FIG. 3.

162. Further, a Bluetooth-enabled telephone incorporating Willgert-Mooney's "communications unit" would have been understood to provide functionality for making and receiving phone calls, which involve transmitting voice call signals over a cellular network (e.g., GSM, CDMA) (*wireless network*). For example, the telephone would have been understood to communicate with cell

towers, which are part of the cellular network, establish a connection that allows for the transmission and reception of voice call signals. *Id.* This wireless connectivity enables the device to access the network's services, including voice communication, without the need for physical cables.

[13.4] on detection of the RFID reader, outputting, by the transceiver, the RFID transponder data as a radio frequency signal, said data being output in said format employed by the RFID reader.

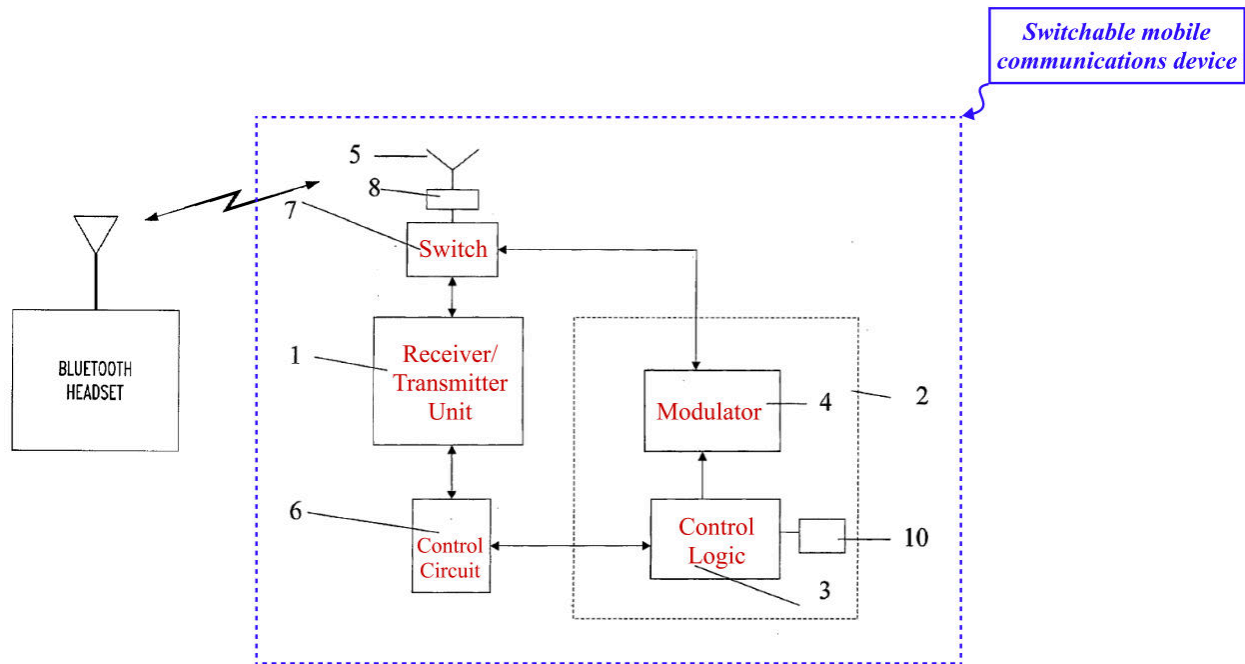
163. As discussed for [1.3], a POSITA would have understood and found obvious that Willgert's switch 7 allows RFID communication such that a modulated signal (which includes identity information) (***RFID transponder data as a radio frequency signal***) transmitted by RFID transponder 2 is also capable of being "decoded" by a communicator (***in the format employed by the RFID reader***). APPLE-1004, [0017]; *see id.*, [0005] ("[t]he identity can be read by a communicator at a given short distance")

4. Claim 21

[21.pre] A switchable mobile communication device capable of RFID communication and voice call communication, the mobile communication device comprising:

164. Willgert-Mooney renders [1.pre] obvious through disclosure of a Bluetooth-enabled mobile telephone (***mobile communications device***). APPLE-1004, Abstr., [0030], [0032]. As discussed for [1.pre], the Bluetooth-enabled mobile telephone is capable of communications that involve (a) RFID signals

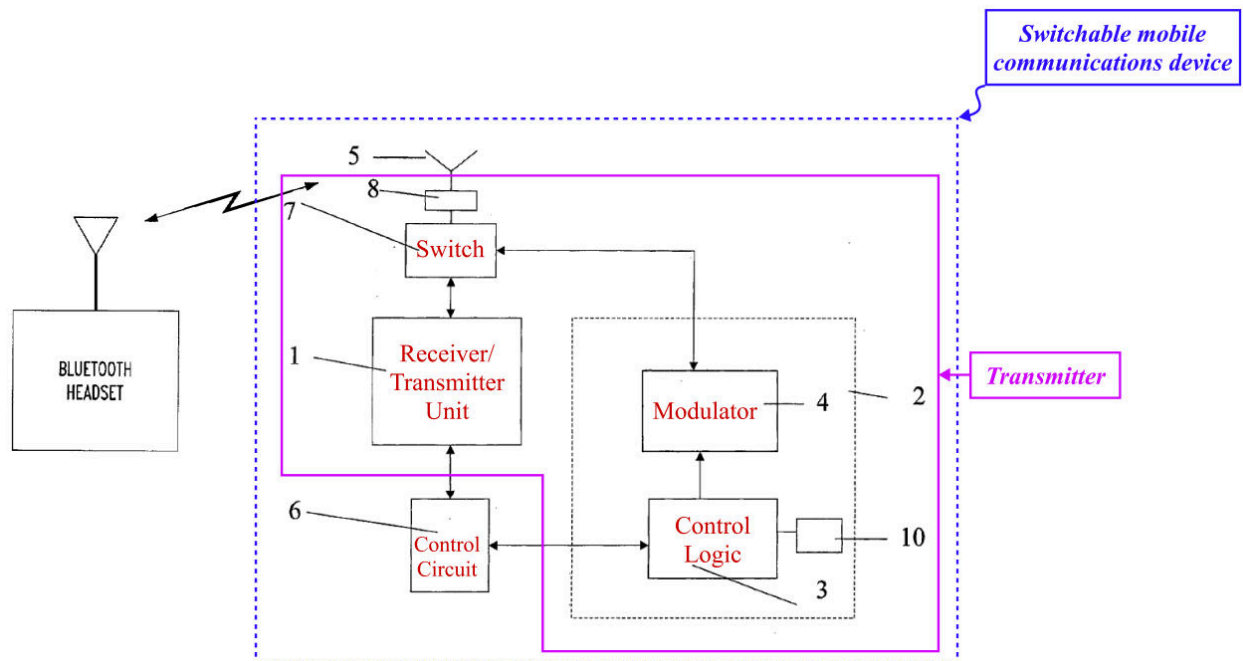
(***RFID communication***) to a communicator (i.e., RFID reader), and (b) Bluetooth voice communication based on voice data collected by a mobile telephone (***voice call communication***) to a Bluetooth headset. See [21.1]-[21.3].



Willgert-Mooney

[21.1] a transmitter configured to transmit a radio frequency signal, the transmitter comprising a first signal processing section and a second signal processing section,

165. In Willgert-Mooney, the “communications unit” includes transmitting sub-components that render this limitation obvious. As shown below, the “communications unit” includes sub-components for Bluetooth voice communication (e.g., Bluetooth transmitter 1) and RFID (e.g., RFID transponder 2), each of which share a common antenna 5.



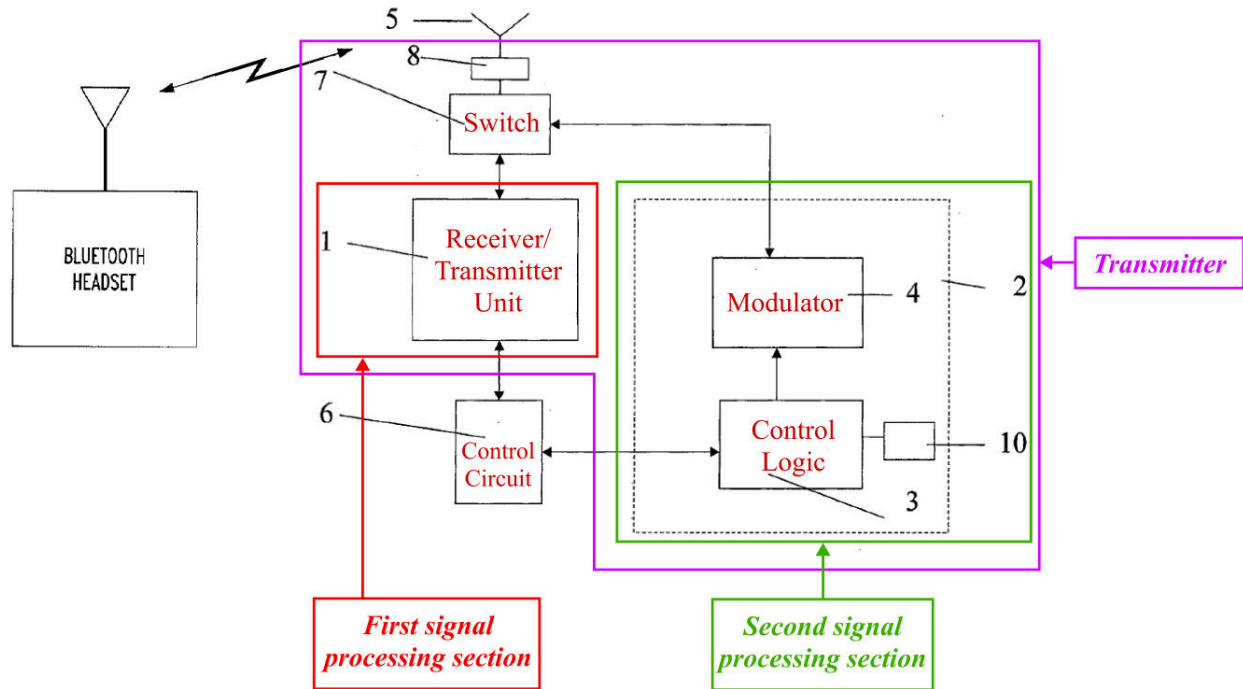
Willgert-Mooney

166. It would have been obvious that Bluetooth transmitter 1 and RFID transponder 2 of the “communications unit” in Willgert-Mooney are configured to transmit signals of different frequency ranges. Around January 2002 (before the Critical Date), Bluetooth was known to “use[] the unlicensed ISM band,” which includes frequency ranges between “2.4000” GHz and “2.4835” GHz worldwide. APPLE-1013, 23. In contrast, the frequency range for “the vast majority of [RFID] transponders” was “in the 13.56MHz” range, whereas the frequency ranges of “passive” RFID transponders was “less than 135 KHz range.” *Id.*, 20. A POSITA would have found it obvious that, in at least some configurations of the

“communications unit” in Willgert-Mooney, Bluetooth transmitter 1 is configured to output Bluetooth signals in the frequency range of 2.4000-2.4835 GHz, while RFID transponder 2 is configured to RFID transponder signals in the frequency range around 13.56MHz or less than 135 KHz.

167. Indeed, dual-band transceivers configured to transmit signals over non-overlapping frequency ranges were conventional by the Critical Date. APPLE-1014, APPLE-1015 (as disclosing examples of dual-band transceivers). For example, Yamazaki teaches a design of a dual-band transceiver IC for GSM and DCS1800 applications. Similarly, Razavi discloses a 900-MHz/1.8-GHz dual-band transceivers for GSM and DCS 1800 standards, at Table 1 and page 573, APPLE-1015.

168. Further, because the “communications unit” includes sub-components for transmitting signals in different frequency ranges, Bluetooth transmitter 1 would have operated as a *first signal processing section* and RFID transponder 2 would have operated as a *second signal processing section*. Notably, the '984 Patent's own disclosure related to the “separate signal processing sections 408 and 410” acknowledges that the functionality performed by these sections was purely conventional, simply performing signal processing functions “known in the art” to process the different frequency voice call and RFID signals. APPLE-1001, 6:50-7:30.



Willgert-Mooney

169. For the reasons discussed above, the “communications unit” in Willgert-Mooney is an example of single component that includes common circuitry (e.g., switch 7, detector 8) for transmitting RFID and voice call signals to an antenna (e.g., antenna 5). *See* APPLE-1002, 92-93, 134-157; APPLE-1004, [0021]-[0024], [0028].

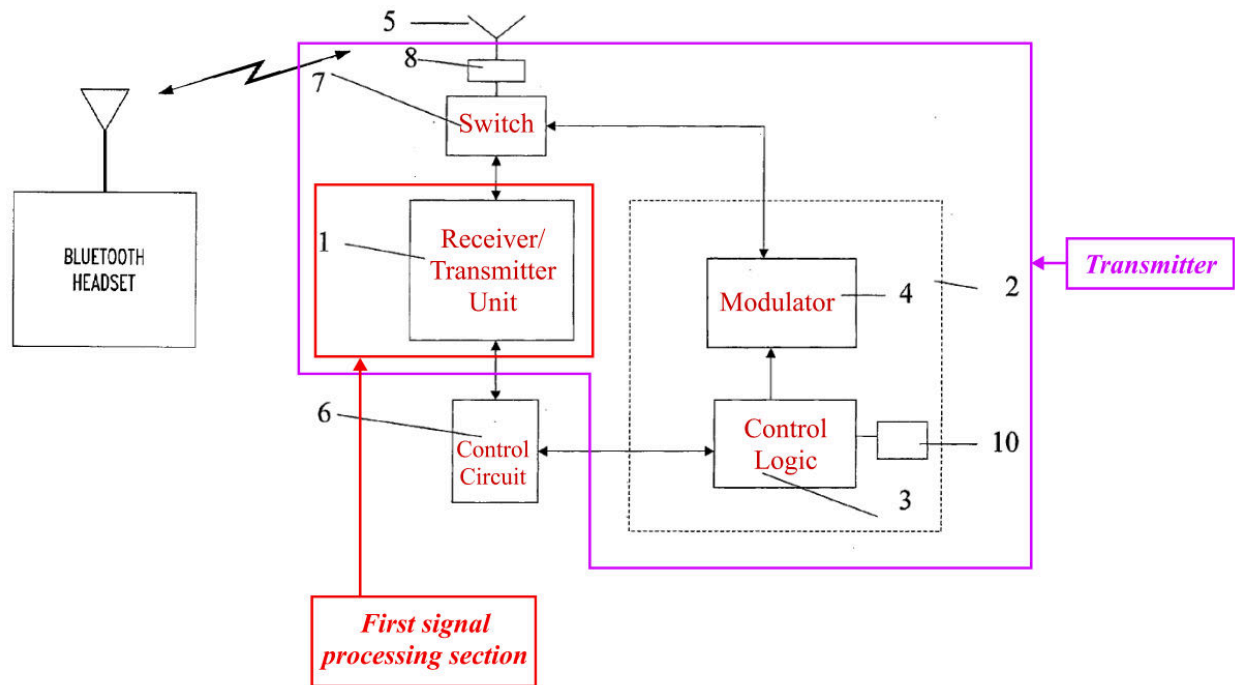
170. As discussed above, the “communications unit” in Willgert-Mooney is an example of single two state component for transmitting signals and switching between voice signal transmission and RFID. APPLE-1002, 134-157. The “communications unit” in Willgert-Mooney is also an example of one or more

signal processing units that share common transmit components (e.g., switch 7, detector 8). APPLE-1004, [0021]-[0024], [0028]; APPLE-1002, 92-93.

[21.2] the first signal processing section¹¹ configured to output voice call signals in a first radio frequency range and

171. As discussed for [21.1], in the “communications unit” of Willgert-Mooney, Bluetooth transmitter 1 would have operated as a ***first signal processing section*** that outputs Bluetooth voice communication signals within the frequency range of 2.4000-2.4835 GHz (***first radio frequency range***). APPLE-1013, 23. Further, as explained in §III.A.1(iii) and [1.1], Bluetooth transmitter 1 is configured to transmit (i.e., ***output***) Bluetooth voice communications to a Bluetooth headset. APPLE-1004, [0024], [0030]; APPLE-1005, [0048], FIG. 3. Finally, the ’984 specification teaches that the “high frequency signal processing” can “transmit and receive signals are transmitted and received in the GHz ranges.” APPLE-1001, 7:9-16.

¹¹ Without language within the ’984 patent specification to indicate otherwise, a POSITA would have understood and found obvious that recitation of a ***section*** in claim 21 is functionally similar to recitation of a ***unit*** in claim 2. The term “unit” does not appear in the ’984 patent specification. There is also no disclosure indicating a functional difference between “unit” and “section.”

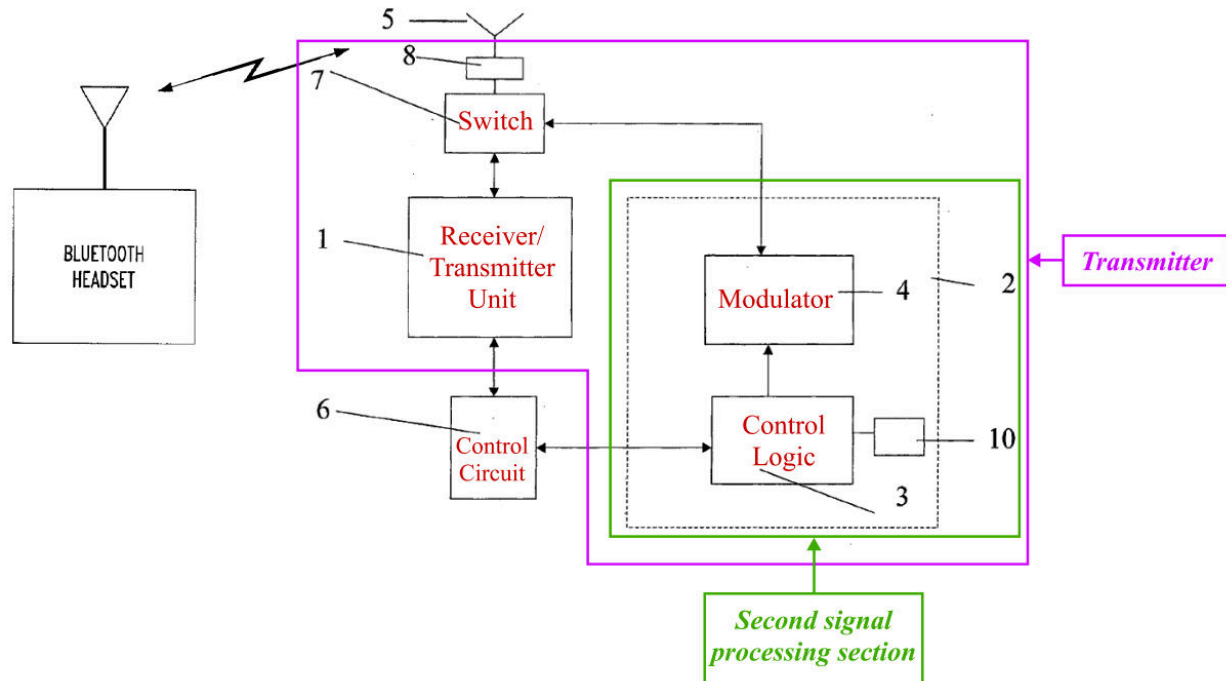


Willgert-Mooney

[21.3] the second signal processing section configured to output RFID transponder signals in a second radio frequency range;

172. As discussed for [21.1], in the “communications unit” of Willgert-Mooney, RFID transponder 2 would have operated as a **second signal processing section** that outputs RFID transponder signals within, for example, in the frequency range around 13.56MHz or less than 135 KHz (**second frequency range**). APPLE-1013, 20-21. Further, as explained in §III.A.1(iii) and [1.1], RFID transponder 2 is configured to transmit (i.e., **output**) RFID signals representing identity information (**RFID transponder signals**) to a nearby communicator (i.e., RFID reader). APPLE-1004, [0005], [0025]. Finally, the ’984

specification teaches that the “[l]ow frequency signal processing” can “transmit and receive signals are transmitted and received in the MHz ranges.” APPLE-1001, 7:16-23.



Willgert-Mooney

[21.4] a storage medium to store a first data and instructions to: monitor for proximal presence of one or more RFID readers external to the mobile communication device; and

173. In Willgert-Mooney, signal transmission functionality of the “communications unit” is controlled by control circuit 6. APPLE-1004, [0022]; *see id.*, [0019]. A POSITA would have understood and found obvious that, in mobile telephones, certain implementations of such signal transmission functionality may be provided using a processor that runs software *instructions*

stored in a memory. Such a processor would have provided greater flexibility, through software updates, relative to that of a signal processor in hardware (e.g., in circuitry) with fixed operation. *Id.*

174. Software-based processors for controlling signal transmissions of transceivers (e.g., the “communications unit” of Willgert-Mooney) were well-known by the Critical Date. For example Schlang (APPLE-1012, published 10/1/1998, before the Critical Date) disclosed “dual band mobile station” configured to “switch[] between transmission and reception in either of the two bands...” APPLE-1012, Abstract. In Schlang’s “dual band mobile station,” a “microprocessor 112 controls the overall operation of the mobile station through software programs stored in the program memory 114.” *Id.*, 13:1-12; *see also id.*, 12:14-20, FIG. 9. Further, an “RF section 120” of a transceiver includes “two frequency synthesizers” with settings “controlled by the microprocessor 112.” *Id.*, 13:21-36.

175. The configurations of logic circuit 6 discussed above would have been implemented with associated memory (*storage medium*) for storing *instructions* and the *first data* associated with RFID signals to control and enable the communication functionality of RFID transponder 2. APPLE-1012, 13:1-12 (“microprocessor 112 controls the overall operation of the mobile station through software programs stored in the program memory 114”). The transmission

functionality stored in the memory would have included instructions for detecting (*monitoring*), using detector 8, a signal provided by a communicator (i.e., RFID reader) when the RFID transponder is in sufficient proximity (*proximal presence*) to the communicator (*proximal RFID reader*). APPLE-1004, [0004], [0006], [0007], [0015], [0017]; APPLE-1011, [0006]. A POSITA would have understood and found obvious that the proximal RFID reader sending probing signals to the device would be *external to the mobile communication device*.

176. Generally, in software-based signal processor configurations, instructions are typically stored in a separate, associated memory component, such as RAM or flash memory. The processor, guided by these stored instructions, manages the transmission and reception of signals, as well as other operational functions of the mobile phone. This separation of the processor and memory allows for flexibility in software updates and enhancements, enabling more advanced signal processing capabilities without needing to modify the hardware.

177. In the software-based signal processor configuration discussed above, it would have been understood by a POSITA that at least some of the memory in communication with the processor would have been configured to store data associated with RFID transponder 2. Such configurations would have improved the transmission control capabilities of the “control unit,” e.g., by enabling memory access to RFID transponder data after the detection of a signal from an

RFID reader. *Id.* This configuration is consistent with Willgert, which describes RFID transponder 2 including “associated memory” that stores “[i]nformation relating to the pulse train” relating to a query signal received from a RFID reader. APPLE-1004, [0017]-[0018]. Further, because RFID transponder 2 is “designed to enable information to be written into the transponder memory” so that the “information can be read-out from the memory later on,” a POSITA would have recognized it to be advantageous for the information described in Willgert as being stored in transponder memory (including *first data*) to similarly be stored in memory associated with a software-based signal processor. *Id.*

178. A POSITA would have had a reasonable expectation of success in implementing communication functionality of a multi-modal transceiver in the software-based signal processor discussed above. For example, the '974 patent describes a processor implementing such multi-signal type functionality through software and yet does so without providing any implementation details or identification of any impediments in realizing such implementations. APPLE-1001, 5:14-49 (describing processor 302 executing instructions stored in memory 304). In failing to provide any such implementation details/impediments, the '974 patent itself corroborates the ability and knowledge of a POSITA to use software to implement the multimodal functionality of the Willgert-Mooney communications

unit (i.e., to implement that functionality through use of a processor that retrieves and executes instructions and data stored in a memory).

179. Fox also describes similar functionality in which smart cards are used through a mobile phone. APPLE-1010, 4:42-55. Here, the main controller 44 is a microprocessor unit can communicate between the cellular and smart card features of the phone to “performing both cellular telephone and smartcard functions.” *Id.* In fact, Fox claims that the that both the cellular main controller and the smartcard controller are “implemented within a single microprocessor.” *Id.*, Cl. 1.

[21.5] operate the transmitter to switch between the first and second signal processing sections to selectively: (a) output first RFID transponder data as said RFID transponder signals in a format employed by a proximal RFID reader, in response to detection by the mobile communication device of the proximal RFID reader, and (b) output a voice call signal for transmission over a wireless network; and

180. As discussed for [1.2], Willgert-Mooney renders obvious certain scenarios where the “communications unit” (collectively *transmitter*) is *switch[ed]* between two states. APPLE-1004, [0020]-[0024]. The first state involves transmitting RFID signals (*output[ing] first RFID transponder data as said RFID transponder signals*) in response to receiving a query signal from a communicator (i.e., RFID reader) (*in response to detection by the mobile communication device of the proximal RFID reader*). As discussed in [1.3], Willgert discloses that the modulated signal (which includes identity information) transmitted by RFID

transponder 2 is also capable of being “decoded” by a communicator (*a format employed by a proximal RFID reader*). APPLE-1004, [0017]; *see id.*, [0005] (“[t]he identity can be read by a communicator at a given short distance”). The second state involves transmitting Bluetooth voice communication (*output a voice call signal for transmission over a wireless network*).

181. As discussed for [21.pre] and [21.4], a POSITA would have found it obvious that, in the ordinary course of using the mobile telephone, there would be a variety of transmission scenarios of the “communications unit” within the telephone. *Id.* For example, in a usage scenario, the “communications unit” would have *switch[ed]* states in the manner recited in [21.5] (through instructions executed by a processor) because the transmission configuration of the “communications unit” would have *selectively* changed, e.g., between a *first signal processing section* outputting Bluetooth voice communication signals within the frequency range of 2.4000-2.4835 GHz (*first radio frequency range*), and *second signal processing section* outputting RFID transponder signals within the frequency range of, for example, around 13.56MHz or less than 135 KHz (*second radio frequency range*). APPLE-1013, 21-23. As previously discussed, a change to the transmission configuration of the “communications unit” involves a change to the configuration of the switch 7 in controlling transmission output of the “communications unit.” APPLE-1004, [0020]-[0024].

182. Moreover, in Willgert-Mooney, a configuration of switch 7, like that of switch 404 of the '984 patent, switches between transmitting voice signals and RFID signals (e.g., by switching between the output of Bluetooth transmitter 1 and the output of RFID transponder 2 depending on the transmission scenario).

APPLE-1004, [0022]-[0024]. From this disclosure, it would have been obvious that if the “communications unit” transmitted a Bluetooth voice communication using antenna 5 before receiving a query/transponder signal from a communicator of an RFID system, then a configuration of switch 7 would have *switch[ed]* to enable RFID transponder 2 to transmit a responsive signal. APPLE-1004, [0030].

183. As discussed for [1.2], in the context of RFID-based identification systems where a mobile telephone incorporates both an RFID transponder and a Bluetooth transmitter unit (such as the Willgert system), a POSITA would have recognized that it was obvious to configure at least three types of “switching.” One type of switching is logic switching, which involves software-based control, where the mobile phone's processor uses logical conditions or algorithms to determine when to switch between the RFID and voice call functionalities. For example, the phone may automatically prioritize an RFID signal when the user is near an RFID reader, switching back to voice calls when the RFID interaction is complete. This is managed through programming logic without altering the hardware setup.

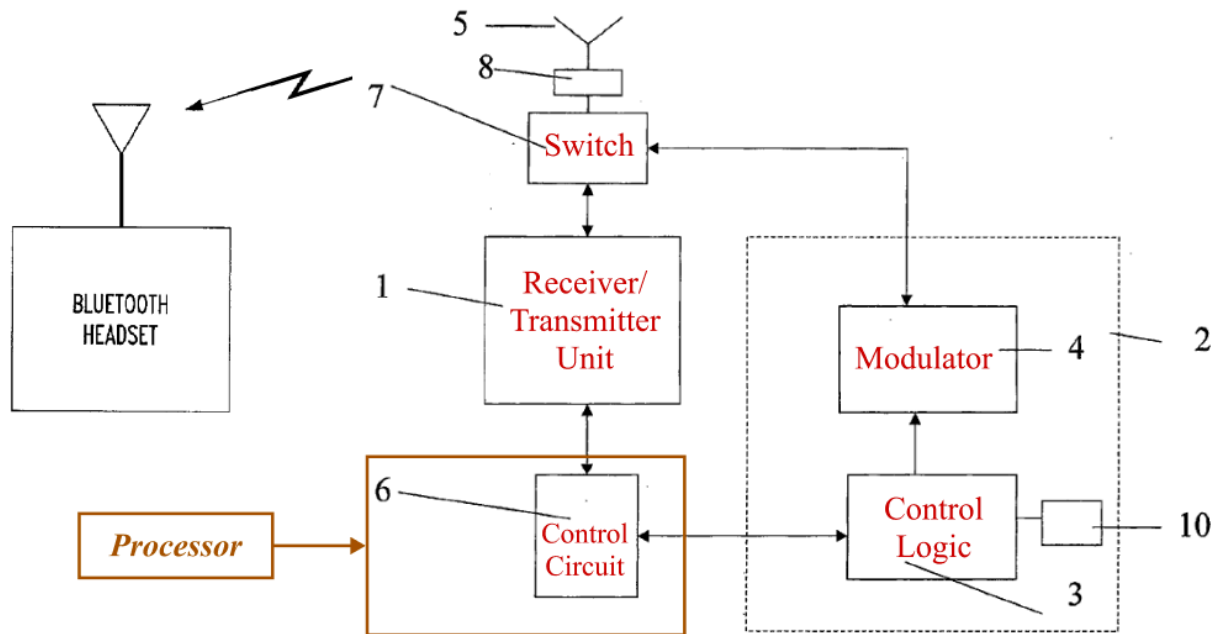
184. Another example of switching is physical switching, where the phone may use hardware mechanisms, such as relays or electronic switches, to physically change the circuit paths that connect the transceiver to either the RFID system or the voice call system. This might involve rerouting signals or changing connections within the phone's circuitry to switch between the two functions.

185. Another example of switching is functional switching, which involves changing the operating mode of the transceiver to handle different types of signals. The same hardware could function in different functional modes, e.g., one functional mode for RFID signal transmission and another for voice calls. Functional switching enables the device to alternate between these functions based on the task at hand, without needing separate hardware for each function. In this example, the transceiver might change its frequency or protocol depending on whether it is handling RFID communication or managing a Bluetooth voice call. The three types of switching discussed above ensure that the mobile phone can effectively manage both RFID and voice call signals, leveraging the same or shared transceiver components while switching between functionalities as needed.

[21.6] a processor coupled to the transmitter and the storage to execute the instructions.

186. As discussed for [21.4], a POSITA would have found it obvious to implement communication functionality of the “communications unit” through a

software-based processor (*processor*) since such processors were well-known by the Critical Date for dual-mode transmitters, as shown by Schlang (APPLE-1012, published 10/1/1998). *See* APPLE-1012, Abstr., 12:14-20, 13:1-12, 13:21-36, FIG. 9. In such implementations, control functionality of control circuit 6 would have been implemented in the software-based processor (*processor*) and thereby coupled to memory (*storage*) with stored instructions to provide all functionality through RFID transponder 2, including instructions relating to controlling transmission output of RFID transponder 2 (*instructions*). *Id.* The software-based processor would have been configured to execute the instructions to, for example, enable functionality for RFID transponder 2 in waiting to receive a signal provided by a communicator (i.e., RFID reader) when the RFID transponder is in sufficient proximity to the communicator. APPLE-1004, [0004], [0006], [0007], [0015], [0017].



Willgert-Mooney

5. Claim 28

[28] *The device of claim 27, wherein the instructions are further designed to include with said facilitating, provisioning of at least a signaling attribute associated with the outputting of the first RFID transponder data in the form of a radio frequency signal.*

187. As discussed for [27], [7], and [8], in implementations of Willgert-Mooney, software instructions (*the instructions*) provided by a processor are *designed to* enable an RFID transponder to facilitate provisioning of RFID smart card information to a mobile telephone. See [5]; see also APPLE-1006, 2:15-23, 4:1-2, 4:20-27, 7:11-20, 9:1-6; APPLE-1025. Such provisioning would have included proprietary signal information (*signaling attribute associated with the outputting of the first RFID transponder data*), which would have allowed the

mobile device to output identification information of different RFID smart cards
(*outputting of the first RFID transponder data*) in a manner compatible with the
external RFID reader (*radio frequency signal*). APPLE-1025.

6. Claim 32

[32.pre] A switchable mobile communication device capable of radio frequency identifier RFID communication and voice call communication, the mobile communication device comprising:

188. Willgert-Mooney renders the following limitations of claim 32
obvious in the same manner as explained above. See [21.pre].

[32.1] a transmitter configured to transmit a voice call signal in a first operational state and a RFID transponder signal in a second operational state;

189. As discussed for [1.2], in Willgert-Mooney, a “communications unit”
(*transmitter*) includes a Bluetooth transmitter 1 configured to transmit a Bluetooth
voice communication signal (*transmit a voice call signal in a first operational
state*) and an RFID transponder 2 configured to transmit an RFID transponder
signal (*transmit a RFID transponder signal in a second operational state*).

APPLE-1004, [0022]-[0025], [0030]; APPLE-1005, [0048], FIG. 3.

[32.2] a storage medium to store a first data and instructions to switch the transmitter between the first and second operational states to selectively (a) monitor for proximal presence of a proximal RFID reader, and on detection of the proximal RFID reader, output RFID transponder data as an RFID signal in a format employed by the RFID reader, and (b)

transmit a voice call signal to another user of another communication device at least in part over a wireless network; and

190. As discussed for [21.4], [21.5], in implementations of Willgert-Mooney, RFID transponder 2 is controlled by logic circuit 6 with associated memory (***storage medium***) for storing software instructions to control the transmission functionality of RFID transponder 2 (***instructions***). As taught in Willgert, the memory would have also stored identification information for the RFID transponder (***first data***), e.g., “[i]nformation relating to [a] pulse train” (APPLE-1006, [0017]) and “information to be written into the transponder memory” (id., [0018]).

191. Further, as discussed for [9.1] and [9.2], in Willgert-Mooney, RFID transponder 2 is configured to wait to receive (***monitor***) a signal provided by a communicator (i.e., RFID reader) when the RFID transponder is in sufficient proximity (***proximal presence***) to the communicator (***proximal RFID reader***). APPLE-1004, [0004], [0006], [0007], [0015], [0017]. The RFID transponder is also configured to transmit a RFID transponder signal when the RFID transponder 2 is within sufficient proximity to the communicator (***on detection of the RFID reader by the mobile communication device***). APPLE-1004, [0015], [0017]; APPLE-1011, [0006].

192. Additionally, as discussed for [1.2], in Willgert-Mooney, the “communication unit” is configured to transmit Bluetooth voice communication signals (*voice call signal*) to a Bluetooth headset. APPLE-1004, [0030]; APPLE-1005, [0048], FIG. 3. A POSITA would have understood that Bluetooth voice communications involve, for example, voice calls from one mobile device (e.g., a cell phone) to another cell phone (*user of another communication device*) for communication over the wireless cellular network. APPLE-1005, [0048]; APPLE-1004, [0008], [0030]; APPLE-1006, 2; APPLE-1017, 1.

[32.3] a processor coupled to the transmitter and the storage to execute the instructions.

193. As discussed for [21.6], a POSITA would have found it obvious to implement communication functionality of the “communications unit” through a software-based processor (*processor*). See APPLE-1012, Abstr., 12:14-20, 13:1-12, 13:21-36, FIG. 9. In such implementations, control functionality of control circuit 6 would have been implemented in the software-based processor (*processor*) and thereby coupled to memory (*storage*) with stored instructions to provide all functionality through RFID transponder 2, including instructions relating to controlling transmission output of RFID transponder 2 (*instructions*). *Id.* The software-based processor would have been configured to execute the instructions to, for example, enable functionality for RFID transponder 2 in waiting

to receive a signal provided by a communicator (i.e., RFID reader) when the RFID transponder is in sufficient proximity to the communicator. APPLE-1004, [0004], [0006], [0007], [0015], [0017].

7. Claims 14, 18-20, 22, 27-31, 33, 37-39

194. Willgert-Mooney renders the following claims obvious in same manner as discussed above.

Claim	Corresponding Claim(s)
[22]	[3]
[18], [27], [37]	[7]
[19], [28], [38]	[8], [19]
[14], [29], [33]	[10], [14], [29]
[30]	[11]
[20], [31], [39]	[12], [20]

XI. [GROUND 1B] – Claims 1, 3, 7-14, 18-20, 32, 33 And 37-39 Are Obvious Over Willgert

A. Varia's Statements In The Litigation

195. As noted in §VIII.C, in the Litigation, I understand that Varia has characterized the scope of certain claim terms (e.g., *transceiver*, *switch[ing]*, *state*). As explained below, Willgert satisfies Varia's proposed constructions and thereby makes claims 1, 3, 9-14, 20, 32, 33, and 39 obvious based on Varia's constructions.

196. I understand that Varia has alleged an interpretation of *transceiver* where an NXP 67V04 NFC Controller, Qualcomm WTR4905 Multimode LTE Transceiver, and Qualcomm WTR3925 RF Transceiver collectively represent the "transceiver." I further understand that Varia identified internal circuitry and components, including an NXP 67V04 NFC Controller, Qualcomm WTR4905 Multimode LTE Transceiver, and Qualcomm WTR3925 RF Transceiver. I also understand that Varia interprets the *transceiver* as encompassing circuitry of different components within a mobile device that *collectively* enable transmission/reception functionality of the mobile device. A POSITA would have recognized that Varia's interpretation lacks physical or logical constraints for the claimed "transceiver," in which case its elements are rendered obvious by Willgert's contemplated RFID and voice call signaling functionality within a single telephone. APPLE-1004, [0014], [0030]-[0032].

B. Analysis

1. Claim 1

[1.pre], [1.1], [1.3]

197. The application of Willgert within Ground 1B incorporates by reference the disclosures of Willgert relating to the functionality of RFID transponder 2 referenced in Ground 1A (identified below) and thereby render the following claim limitation obvious in the same manner as discussed above.

Claim	Corresponding Analysis
[1.pre]	Ground 1A, [1.pre]; APPLE-1004, [0020], [0022]-[0024], [0030], [0032].
[1.1]	Ground 1A, [1.1]; APPLE-1004, [0020], [0022]-[0024], [0030], [0032].
[1.3]	Ground 1A, [1.pre]; APPLE-1004, [0017], [0022]-[0024], [0030].

[1.2] switching a transceiver of the mobile communications device from a first state to a second state upon reception of said instruction, the transceiver configured to output voice call signals in the first state and to output RFID transponder signals in the second state; and

198. As discussed below, implementations of Willgert’s “communications unit” satisfy Varia’s broad interpretations of various claim terms in the Litigation.

(i) *State/s/*

199. Based on my understanding, Varia’s position in the Litigation appears to broadly interpret *switching* and *state* in the context of the transceiver configuration recited in [1.2]. As best understood, Varia appears to interpret a *state* as being unbounded such that it encompasses a transmission state in which an associated transmitter may be configured to transmit different signal types (whether sequentially or simultaneously) over a specified time frame (e.g., a state in which a transceiver can transmit either RFID and/or voice call signals). This interpretation finds no support in the intrinsic record of the ’984 patent.¹²

¹² The ’984 patent specification does not reference the term “state.” Nor does it teach an example where a transceiver switches specifically from a voice transmission mode to an RFID transmission mode. Instead, it simply discloses a “transceiver 308” capable of transmitting and receiving “signals of a voice call[]” and “signals of the RFID feature, e.g. the output signal of a RFID to emulate either an active or a passive transponder, and the received probing signal of a RFID reader.” See APPLE-1001, 6:50-7:30, FIG. 4. But this disclosure lacks detail as to states related to transitioning from one type of transmission to the other. The operation of switch 404 is the most salient disclosure suggestive of the recited

Nonetheless, implementations of the Willgert's "communications unit" discussed above similarly represent a transceiver in a mobile telephone according to Varia's interpretation,.

200. Specifically, under Varia's interpretation (where a *state* is not uniquely limited to transmission of a specific signal type), it would have been obvious that some implementations of Willgert's "communications unit," involve use of a single, common processor (e.g., a control circuit 6) for processing all wireless signals (RFID, Bluetooth, voice calls). APPLE-1004, [0019], [0024]. Willgert teaches that the "function of the control logic 3" (associated with Bluetooth) may be "included in the function of the control circuit 6," and circuit 6 provides signal processing functionality for both Bluetooth signals and RFID signals. APPLE-1004, [0019]. Given this disclosure, a POSITA would have been motivated to configure control circuit 6 as a common processor for handling processing for voice call signals as this configuration would have removed the need for redundant circuitry (e.g., the need for different, dedicated processors) for Bluetooth and voice call signals within a mobile telephone. *See* APPLE-1017, 1 (describing a "triple-band GSM phone capable of working in the 900-, 1800-, and

"state[s]" and "switch[ing]" in the '984 patent *See* APPLE-1001, 6:50-7:30, FIG.

1900-MHz bands” that is “Bluetooth enabled” and can connect to the headset...without needing wires of any sort”); *see also* APPLE-1012, 13:1-12 (describing a “dual band mobile station” with a “microprocessor 112” that “controls the overall operation of the mobile station through software programs stored in the program memory 114”). This is also consistent with Willgert’s broader disclosure of leveraging the “communications unit” to provide signaling capabilities relating to different types of wireless signals (e.g., Bluetooth, RFID). APPLE-1004, [0031].

201. Configurations of multi-modal transceivers with circuitry associated with different types of wireless signals were also conventional by the Critical Date. APPLE-1010, 3:22-25, 5:1-12. Based on the disclosure above, in a first state, a POSITA would have found it obvious that Willgert’s “communications unit” uses control circuit 6 as a single, common processor for processing wireless signals of a mobile telephone, including transmissions (i.e., *output[s]*) related to voice call signals (*voice call signals*) of the telephone. APPLE-1004, [0024], [0030]. As explained above, a POSITA would have configured control circuit 6 to handle processing for voice call signals as this would have removed the need for redundant circuitry for Bluetooth and voice call signals within a mobile telephone.

202. Further, in a second state, the “communications unit” includes RFID transponder 2, which is configured to transmit (i.e., *output*) RFID signals (*RFID*

transponder signals) to a communicator of an RFID system. APPLE-1004, [0023], [0030]. As discussed in § X.A.1, in response to receiving a “query signal,” RFID transponder 2 “send[s] a signal in response to the signal received.” *Id.*, [0025]. The transmission of the responsive signal enables a communicator (i.e., RFID reader) to read the “identity” of RFID transponder 2, e.g., “at a given short distance,” such as “five meters.” *Id.*, [0005]; *see also id.*, [0017] (“[e]ach transponder typically have a unique identity that is sent to the communicator...”).

203. Additionally, under Varia’s interpretation, Willgert renders obvious certain scenarios where the “communications unit” (collectively *transceiver*) is *switch[ed]* from a state of transmitting voice call signals (*first state*) to a state of transmitting RFID signals (*second state*) upon receiving a query signal from a communicator (i.e., RFID reader) (*upon reception of [an] instruction to transmit [] RFID transponder data*). As discussed for [1.1] under Ground 1A, a POSITA would have found it obvious that the query/transponder signal includes signal information enabling RFID transponder 2 to identify a signal type (read, write) and such that the included information represents an *instruction* to the RFID transponder 2 to identify the type of signal prior to performing a responsive action. APPLE-1004, [0023].

204. Moreover, based on the RFID and voice call signaling functionality contemplated in Willgert by a Bluetooth-enabled mobile telephone, a POSITA

would have found it obvious that at least some of the transmission scenarios of the “communications unit” satisfy Varia’s interpretation of [1.2]. *See, e.g.*, APPLE-1004, [0014], [0030]-[0032]. In one exemplary usage scenario, the “communications unit” would have *switch[ed]* states because the configuration of the “communications unit” would have changed as a result of the type of signal being transmitted, e.g., from a *first state* where voice call signals are transmitted for output, to a *second state* where RFID signals are transmitted for output. Indeed, where Willgert’s “communications unit” transmits an RFID signal serially after a user completes a voice call using the Bluetooth-enabled mobile telephone, this scenario satisfies Varia’s interpretation of [1.2]. As noted in Ground 2, a mobile device configuration for use in this scenario was also well-known by the Critical Date, as shown by Holloway (APPLE-1006). *See* APPLE-1006, 4:15-18 (describing a telephone that may “undertak[e] a local communication [(RFID communication)] using said communications means substantially simultaneously with, before or subsequent to a telephone communication”).

(ii) *Transceiver Configuration*

205. I understand that in the Litigation, Varia argued that the combined set of components within the mobile communications device are what comprise the claimed “transceiver.” Based on this, certain implementations of Willgert’s “communications unit” in a mobile telephone (configured to output voice call

signals and RFID signals) similarly includes a combined set of components and/or a sum total of circuitry for outputting *voice call signals* and *RFID transponder signals*. APPLE-1004, [0030]-[0032]; *see* APPLE-1001, 9:32-36, 10:8-17. As discussed above, it would have been obvious to implement control circuit 6 as a common processor for handling voice call signals and RFID signals, which was a well-known configuration of multi-modal transceivers implemented in the types of mobile devices described in Willgert. *See* APPLE-1017, 1; APPLE-1012, 13:1-12; APPLE-1010, 3:22-25, 5:1-12.

2. Claim 3, 7-14, 18-20, 32, 33, And 37-39

206. The application of Willgert within Ground 1B incorporates the disclosures of Willgert discussed in Ground 1A and makes these claims obvious in the same way.

XII. [GROUND 2] – Claims 3-9, 15-19, 22-28 And 34-38 Are Obvious Over Willgert-Mooney-Holloway-Pitroda

A. Analysis

1. Claims 3-9

[3] *The method of claim 1, wherein said first RFID transponder data comprises a selected one of a security key and an identifier.*

207. As described in the '984 patent specification, "RFID 110 may be any keys and/or identifiers," including "identifiers, such as employee numbers, driver's license numbers, credit card numbers..., affinity program member identifiers..." APPLE-1001, 3:60-65. As discussed for [3] in Ground 1A (§XI.A.2)), Willgert

describes *RFID transponder data compris[ing]* identification information (*identifier*). APPLE-1004, [0017]. Holloway further identifies scenarios where RFID technology is used through a mobile telephone, including “at passport control points, [to] access to high security buildings or [for] checks on the holders of driving licenses.” APPLE-1006, 9:25-10:2. In Willgert-Mooney-Holloway-Pitroda, identification information output by an RFID transponder (*first RFID transponder data*) may include a *security key* (e.g., information providing “access to high security buildings”) and/or an *identifier* (e.g., information representing a “driving license[]”). *Id.*; see APPLE-1001, 1:40-54.

208. To the extent that *selected one* in [3] is deemed to require user selection, it would have been obvious that a phone provided by Willgert-Mooney-Holloway-Pitroda is configured to output, via an RFID transponder, identification information (*first RFID transponder data*) based on a user selection (*selected one*) of a particular RFID smart card from amongst the different types of RFID smart cards described in Holloway, including information providing “access to high security buildings” (*security key*), or information representing a “driver license[]” (*identity*). APPLE-1006, 9:25-10:2.

209. Specifically, Holloway’s mobile telephone “provides a means to carry out normal day to day credit/debit purchases,” which a POSITA would have understood may be accomplished through, e.g., user selection between a credit card

and a debit card for use in an RFID smart card transaction. APPLE-1006, 7:28-32, 10:4-15; APPLE-1007, 7:16-38, 8:18-29.

210. This implementation detail is consistent with Holloway’s teaching of telephone 10 as “incorporat[ing] the functionality of a **number of different cards** within the one mobile telephone.” Holloway also supports a POSITA’s understanding of this implementation through various teachings relating to display and user input mechanisms for supporting RFID smart card-based financial transactions provided by the telephone. *See, e.g.*, APPLE-1006, 9:1-6 (displaying “credit card number and expiry date” associated with a transaction), 7:22-26 (“the user is able to operate [the telephone] for any payment application, just like with an RFID smart card...”), 8:14-24 (in performing a transaction using the telephone, the user may “enter the amount to be paid”).

[4] The method of claim 3, wherein said security key comprises a selected one of a garage door key, an exterior door key, an interior door key, and a motor vehicle door key.

211. As discussed for [3], the Willgert-Mooney-Holloway-Pitroda telephone would have allowed RFID technology to be used in the scenarios described in Holloway, including “at passport control points, [to] access to high security buildings or [for] checks on the holders of driving licenses.” APPLE-1006, 9:25-10:2. A POSITA would have found it obvious that “access to high security buildings” within Holloway may involve, e.g., providing access to a

building through an exterior door by transmission of RFID transponder data including an access credential (*exterior door key*) to an RFID reader associated with the door. Indeed, RFID-based access control systems were well-known by the Critical Date. *Id.* (citing APPLE-1019, 8, describing an “access control system” where an RFID smart card is “presented to a door reader”).

[5] The method of claim 1, wherein said first RFID transponder data comprises an identifier, and said identifier comprises a selected one of a social security number, a driver's license number, an affinity program account number, and a credit card number.

212. *See* [3]. As discussed in Section X.B.1, Holloway identifies scenarios where RFID technology is used through a mobile telephone, including “all conventional credit and debit card transactions.” APPLE-1006, 7:28-32. Further, from Pitroda, a user can “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.” APPLE-1007, 8:18-29. In Willgert-Mooney-Holloway-Pitroda, a mobile telephone would have been configured to output identity information (*first RFID transponder data*) with a *credit card number* for use in a RFID smartcard-based financial transaction.

213. By 2002, RFID technology was known for its ability to transmit data wirelessly between an RFID transponder (or tag) and a reader. This technology was seen as suitable for credit card information because RFID tags

were capable of storing small amounts of data, such as account numbers, which could be wirelessly transmitted when within range of an RFID reader. These techniques promised faster transactions and reduced the need for physical contact between the card and the reader. One successful example of such a system is the Octopus Card launched in 1997 by Hong Kong's mass transit system (MTR)^{13 14}.

[6] The method of claim 1, wherein the method further comprises facilitating the user in selecting the first RFID transponder data from a plurality of RFID transponder data using the mobile communication device.

214. Holloway describes a mobile telephone “incorporat[ing] the functionality of a number of different cards within the one mobile telephone,” which, in combination with Willgert and Mooney, renders this claim obvious. APPLE-1006, 12:5-18.

215. As discussed for [3], Pitroda teaches user selection of (*facilitating the user in selecting*) an RFID smart card (*the first RFID transponder data*) from among a wallet of available RFID smart cards (*from a plurality of RFID transponder data*). APPLE-1007, 7:16-38, 8:18-29. A POSITA would have understood that implementations of the Willgert-Mooney-Holloway-Pitroda phone to enable user selection of a particular RFID smart card from “different cards” for use in an RFID smart card transaction. APPLE-1006, 12:11-18; *see id.*, 7:28-32,

¹³ <https://www.octopus.com.hk/en/consumer/octopus-cards/about/index.html>

¹⁴ <http://news.bbc.co.uk/1/hi/technology/3121652.stm>

10:4-15. In such implementations, each RFID smart card would have been understood to be associated with different identification information (e.g., different credit card number), and the identification information associated with the “different cards” (and stored in memory) collectively represent ***a plurality of RFID transponder data***. See *id.*, Abstract (“The memory (16) may have subdivisions corresponding to different smart cards”), 12:11-18 (“The memory within the telephone 10 may be sub-divided into a number of mutually secure areas partitioned by firewalls[,]” which “makes it possible to allocate service providers with individual areas for their particular application[.]” and “possible to incorporate the functionality of a number of different cards within the one mobile telephone.”). In ***facilitating selection of*** an RFID smart card from “multiple cards” through a user interface (***using the mobile communication device***), the Willgert-Mooney-Holloway-Pitroda phone would have thereby ***facilitat[ed] the user in selecting*** an RFID smart card (***first RFID transponder data***) from multiple available RFID smart cards (***from a plurality of RFID transponder data***).

216. Further, because a user selection of an RFID smart card allows the transmission of identification information of the selected RFID smart card by the mobile device, a POSITA would have understood that selection of the RFID smart card itself is a selection of the outputted identification information (e.g., credit card number) (***the first RFID transponder data***) from amongst the identification

information for different available RFID smart cards (*plurality of RFID transponder data*).

[7] The method of claim 1, wherein the method further comprises facilitating provision of the first RFID transponder data to the mobile communication device.

217. As discussed for [7] in Ground 1A, a POSITA would have understood and found obvious that when writing into the transponder's memory for the purpose of later reading out in response to a query/probing signal, that the RFID transponder data "written into the transponder memory" comprises at least a *provision[ing] of the first RFID transponder data to the mobile communication device*. APPLE-1004, [0005], [0018].

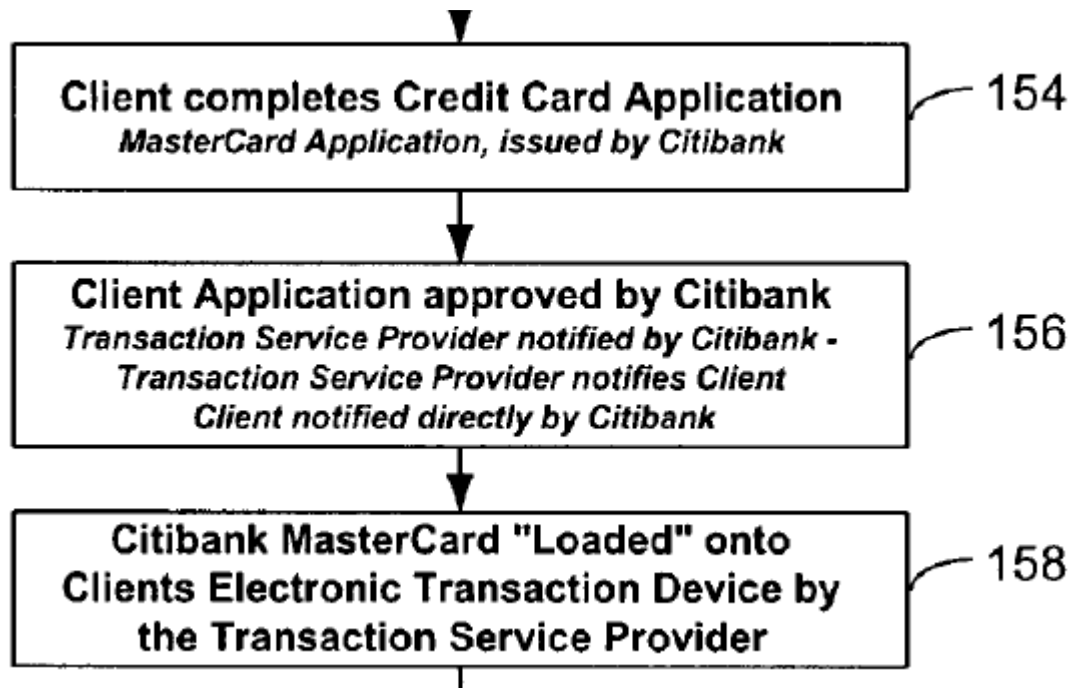
[8] The method of claim 7, wherein said facilitating of the provisioning of the RFID transponder data to the mobile communication device includes facilitating provision of at least a signaling attribute associated with the outputting of the RFID transponder data in the format compatible with said RFID reader.

218. As discussed for [7] and [8] in Ground 1A (§XI.A.2), Willgert teaches that the "the transponder may also be designed to enable information to be written into the transponder memory, so that said information can be read-out from the memory later on, in the aforesaid manner [(in response to a query/probing signal)]." APPLE-1004, [0018]. By enabling information to be written into transponder memory, the Willgert thereby discloses *facilitating provision of the first RFID transponder data to the mobile communication device. Id.*

219. Further, a POSITA would have understood and found obvious that, in providing transponder data to a mobile telephone, the data can be “read-out from them memory later on” such that the information written into transponder memory includes attributes associated with a subsequent transmission based on read-out (*at least a signaling attribute associated with the outputting of the RFID transponder data*). *Id.* Finally, because the response provided by the RFID transponder 2 is itself based on receipt of a query/transponder signal provided by an RFID communicator, a POSITA would have understood and found obvious that the RFID data is “written into the transponder memory” such that it is *in the format compatible with said RFID reader*. *Id.*

220. In Willgert-Mooney-Holloway-Pitroda, a mobile telephone stores “a number of different cards within the one mobile telephone,” as described in Holloway. APPLE-1006, 12:11-18; *see id.*, 2:15-23 (“mass transit, vending machines, access control and use as an electronic purse”). This stored information would have been obtained at least during an initial configuration operation through one of several exemplary processes described in Pitroda as being used by transaction service providers to provide RFID smart card information to a mobile telephone. *See e.g.*, APPLE-1007, 3:59-4:40. Pitroda’s Figure 10 references a “transaction service provider service flow,” during which a user registers as a new client (step 150) and a “new electronic transaction device 12 requested by [the]

client.” APPLE-1007, 17:44-62. During this process, a “Citibank MasterCard” is “Loaded” onto a client’s device by the transaction service provider (step 158) and a client profile is updated (step 160). *Id.*, 17:63-65. Further, the transaction service provider may “[i]ssue account services,” which include “activating specific accounts, such as credit cards, on an electronic transaction device 12” after which “the specific card(s) may be **downloaded** from the transaction service provider 10 to the electronic transaction device 12.” APPLE-1007, 12:6-14. A POSITA would have understood that “loading” (or “download[ing]”) of RFID smart card information onto Willgert-Mooney-Holloway-Pitroda telephone involves the provision of identification information to be used in an RFID smart card transaction (*provision of the first RFID transponder data to the mobile communication device*).



APPLE-1007, Fig. 10 (cropped)

221. By the Critical Date, RFID readers of different transaction service providers were known to use different signal formats (e.g., different signal frequencies, different coding schemes). *See* APPLE-1025("other varieties of tags and sensors have been developed which operate in the frequency range 50 Hz - 50 MHz."). Indeed, the ability to facilitate user in selecting the first RFID transponder data from a plurality of RFID transponder data using the mobile communication device and the RFID smart card information "loaded" or "downloaded" onto the Willgert-Mooney-Holloway-Pitroda telephone would have included provider-specific signal information for the telephone to communicate with different types of RFID readers.

222. Given the above, receipt of provider-specific signal format information by the Willgert-Mooney-Holloway-Pitroda telephone would have enabled communications with the different types of RFID readers described in Holloway.” APPLE-1006, 7:22-26 (describing a “reader” associated with “mass transit application,” 7:27-30, describing a “reader that is interfaced to the retailer’s EPOS (electronic point-of-sale) system,” and 8:14-24, describing a “reader fitted to a vending machine”).

223. Moreover, “various RFID readers used different generations of smart card technology, and at least some of the RFID readers described in Holloway would have used different frequencies and and/or different signal formatting requirements (*signaling attributes*), including different International Organization for Standardization (IOS) standards.” APPLE-1019, 20 (which recognizes that RFID signals can have different ISO standards based on security requirements). And, because Holloway teaches “one mobile telephone” for “a number of different cards,” a POSITA would have recognized that the RFID smart card information “loaded” or “downloaded” onto the Willgert-Mooney-Holloway-Pitroda telephone would have included provider-specific signal information (*signaling attribute*) for enabling the telephone to communicate with different types of RFID readers(*in a format compatible with said RFID reader*)(e.g., each associated with a different transaction service provider). Indeed, provisioning of RFID signal information to

RFID transponders to enable communications with RFID readers was conventional by the Critical Date. *See, e.g.*, APPLE-1006, 2:15-23, 4:1-2, 4:20-27, 7:11-20, 9:1-6; APPLE-1025. APPLE-1004, [0017]; *see id.*, [0005] (“[t]he identity can be read by a communicator at a given short distance”).

[9.1] The method of claim 1, wherein the method further comprises: monitoring for proximal presence of the RFID reader by the mobile communication device; and

224. Willgert-Mooney-Holloway-Pitroda incorporates the teachings of Willgert and Mooney and thereby renders [9.1] obvious for the reasons discussed in Ground 1A. APPLE-1004, [0004], [0006], [0007], [0015], [0017]; APPLE-1001, [0006].

225. The disclosures of Holloway and Pitroda further demonstrate obviousness of various elements of the independent claims discussed in Ground 1A with respect to Willgert-Mooney. For example, as discussed in §X.C.2, the Willgert-Mooney-Holloway-Pitroda device would have enabled a user to select an RFID smart card amongst multiple available options for use in an RFID smart card transaction, which is merely one example of an ***instruction*** recited in at least [1.1] (e.g., a user instruction to transmit RFID transponder data associated with a RFID smart card selected by the user). APPLE-1006, 10:4-15, 12:11-18; APPLE-1007, 7:18-40. Further, as discussed for [9.2] below, the Willgert-Mooney-Holloway-Pitroda phone would have rendered obvious scenarios in which a user may select

different RFID smart cards sequentially for use in different RFID smart card transactions.

[9.2] on detection of the RFID reader by the mobile communication device, outputting, by the transceiver, second RFID transponder data as a second radio frequency signal, the outputting emulating output of the second RFID transponder data by an RFID transponder of a passive type.

226. Willgert-Mooney-Holloway-Pitroda incorporates the teachings of Willgert and Mooney and thereby renders [9.2] obvious for the reasons discussed in Ground 1A. APPLE-1004, [0004], [0006], [0007], [0015], [0017]. Willgert-Mooney-Holloway-Pitroda further renders [9.2] obvious based on the teachings of Holloway and Pitroda discussed below.

227. As discussed in Ground 1A, a POSITA would have understood that the RFID transponder 2 of the “communications unit” as being configured to transmit multiple signal transmissions over time. APPLE-1004, [0017]. This is consistent with the Willgert-Mooney-Holloway-Pitroda device, which, as discussed in §X.C.2, would have stored RFID smart card data to allow the user can use a single device as a replacement for “different cards.” APPLE-1006, 10:16-27, 11:5-18, 2:20-23.

228. Further, based on Pitroda, the Willgert-Mooney-Holloway-Pitroda device would have allowed a user to select an RFID smart card to be outputted for a given RFID transaction. APPLE-1007, 7:18-40, 7:11-29, 7:28-8:4, 9:1-2, 9:5-6,

12:11-19. Because the Willgert-Mooney-Holloway-Pitroda device enables use for multiple smart card transactions, the device is configured to transmit (i.e., **output**) a first signal with identification information for a first RFID smart card transaction (***RFID transponder signal*** with ***first RFID transponder data***) and, at some later time, transmit a second signal with identification information for a second RFID smart card transaction (***second radio frequency signal*** with ***second RFID transponder data***). APPLE-1007, 7:14-40. Further, because RFID smart card transactions by the Willgert-Mooney-Holloway-Pitroda device are based on user selection, the combination renders [6.2] obvious whether the user selects the same RFID smart card, or alternatively, selects different RFID smart cards, for use in each smart card transaction.

229. Additionally, based on Holloway, the Willgert-Mooney-Holloway-Pitroda device would have transmitted signals with identification information for RFID smart card transactions using “relatively short-range communication means” to determine proximity to a nearby reader (***on detection of the RFID reader***). APPLE-1006, 3:24-26, 7:22-26 (“For example in a mass transit application, the user simply presents the telephone to the reader while passing through the 25 gate or barrier”); *see id.*, 7:28-8:4. Further, as taught in Holloway, signal output by the Willgert-Mooney-Holloway-Pitroda device emulates functionality of an RFID smart card and thereby ***emulates output*** of an RFID transponder associated with a

smart card, including a passive RFID smart card (*RFID transponder of a passive type*). *Id.*, 7:22-26 (“Once the telephone has been loaded with money, the user is able to operate it for any payment application, just like with an RFID smart card”). As discussed in Ground 1A, one well-known configuration of an RFID transponder was a passive RFID transponder that is “activated by an RF signal sent by [a] reader” when “the passive RFID device is in proximity of a reader.” APPLE-1011, [0006].

2. Claims 28

[28] *The device of claim 27, wherein the instructions are further designed to include with said facilitating, provisioning of at least a signaling attribute associated with the outputting of the first RFID transponder data in the form of a radio frequency signal.*

230. As discussed for [27], in implementations of Willgert-Mooney-Holloway-Pitroda, software instructions (*instructions*) provided by a processor are *designed to* enable an RFID transponder to facilitate provisioning of RFID smart card information to a mobile telephone. *See* [8]; *see also* APPLE-1006, 2:15-23, 4:1-2, 4:20-27, 7:11-20, 9:1-6; APPLE-1025. Such provisioning of at least a signaling attribute would have included proprietary signal information (*signaling attribute associated with the outputting of the first RFID transponder data*), which would have allowed the mobile device to output respective identification information corresponding to different RFID smart cards (*outputting of the first*

RFID transponder data) in a manner compatible with the external RFID reader
(*radio frequency signal*). APPLE-1025.

3. Claims 15-19, 22-27, 34-38

231. Willgert-Mooney-Holloway-Pitroda renders the following claims
obvious in same manner as discussed above.

Claim	Corresponding Claim
[15], [22], [34]	[3], [15]
[16], [17], [23], [24], [35], [36]	[4], [16]
[25]	[5]
[26]	[6]
[18], [27], [37]	[7]
[19], [38]	[8]

XIII. CONCLUSION

232. The findings and opinions set forth in this declaration are based on my work and examinations to date.

233. I may continue my examinations. I may also receive additional documentation and other factual evidence over the course of this IPR that will allow me to supplement and/or refine my opinions. I reserve the right to add to, alter, or delete my opinions and my declaration upon discovery of any additional information. I reserve the right to make such changes as may be deemed necessary.

234. In signing this declaration, I recognize that the declaration will be filed as evidence in an IPR before the PTAB. I also recognize 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 within the United States during the time allotted for cross-examination.